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Presentation of Content

In the first article we present, *Virtual and Augmented Reality as a digital strategy for the commercialization of Michoacan crafts. Case: Mara Ceramics*, by RODRIGUEZ-ROBLED0, Gricelda, GONZALEZ-ASPERA, Alma Lilia, RODRIGUEZ-RUIZ, Leticia Rubicela, GONZALEZ-ASPERA, Araceli, with adscription in the Universidad Tecnológica de Morelia and the Instituto Tecnológico de Morelia, as next article we present, *Proposal of a simple recommendation system for small and medium enterprises for decision making based on unsupervised learning*, by URUETA-HINOJOSA, Daniel E., LARA-VELÁZQUEZ, Pedro, GUTIÉRREZ-ANDRADE, Miguel A., DE LOS COBOS-SILVA, Sergio G., with adscription in the Universidad Autónoma Metropolitana, as next article we present, *Dynamism and competitiveness of mexican beef, a focus of market diversification*, by CARRILLO-ÁNGELES, Rebeca Yurani, CRUZ-SORIANO, Emmanuel and ESCAMILLA-SALAZAR, Zugaide, with adscription in the Universidad Politécnica de Atlacomulco and the Universidad Autónoma del Estado de México, as next article we present, *Business strategies: Advantages of outsourcing in companies*, by JUAREZ, Sandra, TOSCA, Carlos and JIMENEZ, Francisco, with adscription in the Universidad Juárez Autónoma de Tabasco.

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Virtual and Augmented Reality as a digital strategy for the commercialization of Michoacan crafts. Case: Mara Ceramics

Realidad Virtual y Aumentada como estrategia digital para comercialización de la artesanía Michoacana. Caso: Cerámica Mara

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Abstract

This work deals with the process of creating 3D pieces of handicrafts Michoacanas to be shown through the use of Virtual Reality and Augmented as part of the solution to promote a strategy of marketing and promotion of the products of the craft workshop Cerámica Mara, SA de CV . These resources are innovative elements incorporated into an Electronic Commerce site, which allow the user to appreciate during their journey the handmade pieces exhibited in the virtual gallery, with the possibility of selecting the pieces, being able to configure the color and texture, and / or visualize them in their mobile device through the QR codes provided in the site catalog; all with the intention of serving as elements that potentiate the user's purchase intention. The design of the research was based on the qualitative model of case study, under the Scrum development methodology, being a collaborative work between the Academic Bodies of Multimedia and Electronic Commerce of the Technological University of Morelia and the Science, Technology and Management of the Organizations of the Technological Institute of Morelia. The scope obtained so far consists of a functional prototype of the Electronic Commerce Site, which incorporates a journey with 3D models of Virtual Reality and Augmented Reality via QR codes, with the possibility of purchase. It is expected that in later stages data will be obtained that allow studying how to modify the purchase intention, level of sales and market captured in commercialization of Michoacán ceramic crafts, through this proposal.

Crafts, Electronic Commerce, Digital Marketing, Virtual and Augmented Reality

Resumen

El presente trabajo aborda el proceso de creación de piezas 3D de artesanías Michoacanas a ser mostradas mediante el uso de la Realidad Virtual y Aumentada como parte la solución para impulsar una estrategia de comercialización y promoción de los productos del taller artesanal Cerámica Mara, SA de CV. Siendo estos recursos elementos innovadores incorporados a un sitio de Comercio Electrónico, que permiten al usuario apreciar durante su recorrido las piezas artesanales expuestas en la galería virtual, con posibilidad de selección de las piezas pudiendo configurar el color y textura, y/o visualizarlas en su dispositivo móvil a través de los códigos QR provistos en el catálogo del sitio; todo ello con la intención servir como elementos que potencialicen la intención de compra del usuario. El diseño de la investigación se basó en el modelo cualitativo de estudio de caso, bajo la metodología de desarrollo Scrum, siendo un trabajo colaborativo entre los Cuerpos Académicos de Multimedia y Comercio Electrónico de la Universidad Tecnológica de Morelia y el de Ciencia, Tecnología y Gestión de las Organizaciones del Instituto Tecnológico de Morelia. El alcance obtenido hasta el momento consiste en un prototipo funcional del Sitio de Comercio Electrónico, que incorpora un recorrido con modelos 3D de Realidad Virtual y Realidad Aumentada vía códigos QR, con posibilidad de compra. Se espera que en etapas posteriores se obtengan datos que permiten estudiar como modifica la intención de compra, nivel de ventas y mercado captado en comercialización de las artesanías de cerámica michoacana, mediante esta propuesta.

Artesanías, Comercio Electrónico, Marketing Digital, Realidad Virtual y Aumentada

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Introduction

The word crafts, for Unesco (sf), refers to "Craft products that are produced by artisans, either entirely by hand, or with the help of hand tools or even mechanical means, provided that the manual contribution direct artisan remains the most important component of the finished product ", meanwhile Tovar (1964) defines it as " All creative manual technique, to produce individually, goods and services. " For the National Council for Culture and the Arts (Conaculta) in Mexico, the origin of handicrafts has its history in rural areas, where artisans created a wide variety of pieces of various materials.

Mexican crafts distinguish it, cultural diversity and creative wealth of the people, and their ancestors, which is appreciated throughout the world with respect and admiration. For Dietz (2014), in Mexico, the artisan sector since the time of the conquest has been developed mainly by indigenous communities, in which artisan workshops are established, integrating to conserve the techniques and traditions of its elaboration, and counteracting the problem of the competition of products from low-cost industrial processes, with similar appearance, but at a lower price and quality, these communities of artisans in general face the problem of the commercialization of their products, either due to the low capacity to reach the market, or for reasons of distance or intermediation, according to the survey conducted by the National Survey of Cultural Consumption of Mexico (ENCCUM, 2017) in Mexico there is an approximate of 11 '791, 856 people engaged in crafts, while in the state of Michoacan , a total of 11,640 artisans are registered (CESOP, 2013), thanks to the wealth of natural resources, trad cultural events, and artistic manifestations generate works of great value that are recognized nationally and internationally (Tejeda, 2002).

Theoretical Framework

The problem of marketing is one of the main challenges faced by artisan workshops, in this sense Gil, (cited by González, Rodríguez, González, & Rodríguez, 2015), mentions that the artisanal product requires a change of strategies that allow artisans to bring their products to consumers, bypassing the barriers of intermediaries, so it is necessary to define new ways to achieve it.

One of these forms is the Electronic Commerce (Dans, 2017), which consists of a commercial activity carried out through the internet that allows the distribution, sale, purchase, marketing and supply of products or services, whose usage trend is increasing. gradually throughout the world, both in user volume and commercial sites.

In general terms, according to Galeano (2019), the countries with the highest percentage of users that use electronic commerce are Indonesia (86%), China (82%) and Germany (81%). Worldwide, the average percentage of Internet users who have purchased an online product or service reached 75% in 2019. E-commerce is growing by leaps and bounds, with Latin America being one of the economies that most use this method of purchase, in which according to Castellors (2018), Mexico reached 92.2 million users by 2021.

Currently, electronic commerce has become synonymous with convenience, agility, security, ease of payment, optimization of time, low costs for users Elena (2019) when making purchases, this niche of opportunity is being used by different segments of market making the possibility of doing business in this medium attractive, thus forcing to change the way of acting and thinking of organizations, mainly, by allowing to reach a greater percentage of the population with a lower investment and obtaining better profits, situation that motivates to leave behind the traditional process of trade and adopt this way of doing business because of the many advantages it offers, being one of the most attractive the possibility of reaching a greater number of clients, both national and foreign (SE.s.f).

The evolution that electronic commerce has experienced has allowed it to go from being a simple catalog of products or services, to be a resource with great appeal for users; being digital marketing one of those crucial elements, for the promotion and diffusion of the products that are offered in it.

Marketing establishes the set of principles focused on understanding the needs of an audience in order to boost sales through an adequate communication of the product or service to create a link with people, which will add value to them becoming the arbitrator between the interests of the business and the need of the consumer (Rattinger, 2018).

Among the resources that can be used in a digital marketing strategy (Intereconomía, 2018), is to offer clients the Virtual Reality (VR) and Augmented Reality (AR) service. The Virtual Reality (RV), allows to represent a "conceptual world in three dimensions" that can be perceived in two different ways. From a technical point of view, the 3D Models, is a group of mathematical formulas that describe a "world" in three dimensions and that from a visual point of view, is perceived as a schematic representation visible through a set of objects, elements and properties that, once rendered, will become a figure in 3D animation, which allows the creation of Virtual Reality environments (Rodríguez, González, Rodríguez & Robles, 2012). On the other hand, Augmented Reality (AR) is a technology that complements the perception and interaction with the real world and allows the user to be in an augmented environment with information generated by a computer. (Mendieta, Paredes, Sing, Cruz & Cáceres., 2017).

Both the RV and the RA, are effective resources in digital marketing, due to the great appeal due to the novel way of presenting products and services to their potential customers, with simplified information in which the abstract can become concrete and simulations and images facilitate understanding for all types of audiences, and in which the greatest attraction is that the user becomes the protagonist, thereby generating a positive reinforcement in remembering the brand or the product, due to the experience ; It also allows evaluating reactions to take into account the emotions and behaviors in different customer buying situations and to test the acceptance of new products.

Likewise, the flexibility of 3D models allows the creation of any scenario. 3D modeling allows to generate exact copies of the original handmade pieces, which can be appreciated in color, shape and texture by remote users as a way to attract their attention and interest in the product that is offered.

Gil (2002) mentions that if you want Mexican crafts to sell and be present in international markets, you need to operate under innovation in marketing and that it is better for users to experience the sensation of being immersed, interacting with objects of said environment. (González et al., 2015). The commitment to this technology is on the rise, and in 2016, Deloitte predicted that in that year it would be the first year in which virtual reality (VR) would generate revenues of 1,000 million dollars, of which approximately 700 million would come from equipment sales and the rest of content sales, calculating sales of approximately 2.5 million RV devices.

It is a fact that companies are betting on the use of this technology, arguing that Virtual Reality and Augmented aims to be the next trends that capture and maintain the attention of consumers.

Methodology

The objective was to obtain information about the penetration in the market, the purchase intention and the level of sales that Mara SA handicrafts company can achieve. De CV through the use of an Electronic Commerce site that incorporates elements of Virtual and Augmented Reality accessible via QR codes, as innovative aspects of its digital marketing strategy.

The context of the study is located in the company Artesanal Mara, which is an artisan workshop located in the town of Morelia, Mich. With over 20 years, dedicated to craft pieces with unique designs by the fact of being made and finished by hand. This company is located in the tertiary sector, with the manufacture of tableware, pottery, sculptures, slabs, porcelain and ornamental pieces. In its beginnings it counted on the work of 3 artisans and currently has a staff of 18 artisans and 2 administrators. Its products have been positioned mainly in the United States market and part of Europe, as well as in prestigious department stores in Mexico.

Its current marketing strategy includes the promotion and offer of products through advertisements on web pages, sale through telephone and direct sales in its establishment. Your system of financial transactions is via bank deposit and in cash. Its sales fluctuate between 2000 to 3000 pieces per year.

After the organizational diagnosis made to the company, it was detected the need to design a digital strategy that complements the marketing efforts of traditional ceramic crafts, considering the potential of having an Electronic Commerce site complemented with the use of an application of Virtual and Augmented Reality accessible via QR codes.

The management methodology used for the development of the project was based on Scrum, which allowed to properly coordinate the human resource, and facilitated the communication process of the team composed of 3 full-time professors from the Multimedia Academic and Electronic Commerce the Technological University of Morelia (CAMCE-UTM) and 1 research professor of the Academic Body Science, Technology and Management of the Organizations of the Technological Institute of Morelia (CACTGO-ITM) and 3 students of the IT career, as well as 2 members of the workshop artisan Ceramic Mara, regarding the allocation of roles and activities to be carried out in the set of iterations proposed in the planning, thus achieving the satisfactory partial progress of the phases (see figure 1) considered for their creation:

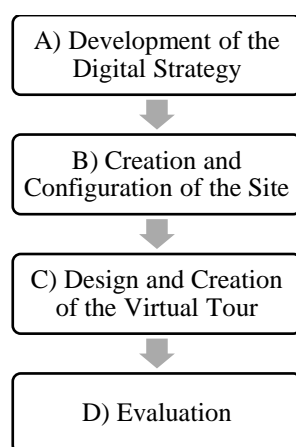


Figure 1 Development phases
Source: Own

A) Phase of development of the digital marketing strategy: Consistent in developing the activities related to the diagnosis or analysis of the situation of the company, where the trends and socio-economic situation of the ceramics sector were determined, the gathering of information related to the product to be marketed and the market segment to which is directed, as well as the analysis of the offer of the competition and substitute;

Defining the objectives and strategies to be achieved, establishing long, medium and short term goals. Likewise, the actions are considered to be developed to reach the target market and within these were included the positioning strategies of the brand on the internet and social networks. Finalizing with the future evaluation to analyze the results obtained, through measurement tools, such as Google Analytics, in order to feedback the plan and determine if it is continued with this or adjustments will be made, to comply with the proposed objectives.

B) Phase of creation and configuration of the e-commerce site:

Consistent with the definition of the aspects for the creation of the e-commerce site, such as choosing the name of the site for your reservation, specification of the required hosting service, selection of provider, advantages / disadvantages / price, tools for its configuration, Site design, aspects of usability and navigation, content to be considered in the following sections: Corporate information, Customer service, Electronic product catalog, Shopping cart, Order delivery, Promotions and offers, Payment mechanisms, Virtual tour and Reality Augmented accessible via QR code for mobile devices.

C) Design and creation phase Virtual Tour and Augmented Reality:

Consistent in the approach with artisans to define the development of the prototype, with a survey of photographic images and interviews, identifying the most representative and demanded products in order to obtain the pertinent information that subsequently after ordering, systematizing and analyzing serves as a list of requirements to fulfill for the development of the 3D models, of the artisan pieces. These 3D models are integrated into the graphic engine to generate the Virtual and Augmented Reality application.

D) Evaluation phase: After its integration, the intention is to submit the prototype to evaluation, by the client and a representative sample of potential users in order to verify its functionality and behavior. To finally implement the application of Virtual Reality and Augmented for its diffusion, through the digital media selected that allow the interaction required for your navigation.

Results

Partial results obtained so far include phases A, B, C. With regard to the diagnosis of a company, its commercialization strategy is carried out in traditional media through direct customer-company treatment in the manufacturing workshop with payment mechanisms via bank deposits, cash sale made directly with the client in the marketing company, with delivery of the product at home, being its main customers the US and European markets, with little penetration in the national market, so the digital marketing strategy or on the internet, this is in the process of creation.

For the development of the digital marketing strategy, the analysis aspects of the target audience and of the competition, the demographic and psychographic aspects, the internal SWOT analysis were considered, in order to identify which are the company's strengths, capabilities and available resources and environmental factors that we can take advantage of, such as market niches, identifying the weak points and environmental factors that can be harmful. Selecting as tools for the design of the digital marketing strategy those with the greatest impact for the positioning of the brand of the Ceramics Mara, as well as the start-up of the website of Electronic Commerce, which after its implementation, will be carried out follow-up to analyze the results obtained, measuring the figures obtained in these tools, visits to the web, the origin of the traffic, visit time on the web, among others, considering especially the measurement variables provided by Google Analytics.

Regarding the results obtained from the creation and configuration phase of the Electronic Commerce Site and based on the established plan, the activities have been carried out to date:

- a) Reservation of the domain, being this as ceramicamara.com,
- b) Accommodation of the Electronic Commerce site in a temporary hosting for the tests.
- c) Configuration of the WordPress tool and the WooCommerce plugin with the functionalities of management and organization of products by category of the store, shopping cart, payment and shipping systems, who we are, as well as the visit to the virtual tour where you can see the handmade pieces modeled in 3D, (see figure 2 and 3).



Figure 2 Homepage of the e-commerce site
Source: Own

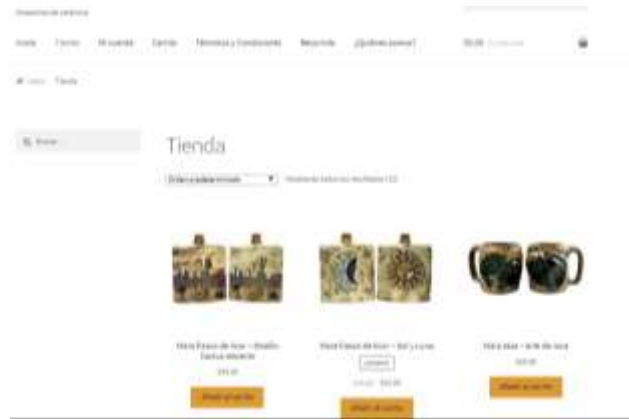


Figure 3 View of the store of the e-commerce site ceramicamara.com
Source: Own

In relation to the design and creation phase of the virtual tour, it has been possible to develop, according to plan, the activities of:

- a) Survey of photographic images and interviews with artisans, identifying the most representative and demanded products,
- b) Development of the 3D models of the artisan pieces using Maya 3D software, taking care of the aspect of the texturing of the pieces by means of the figure edition, generating an approximate of 50 handmade pieces.
- c) Integration of the models in the Unreal Engine 4 graphics engine to build the virtual reality application.

- d) Shape the interactive application located in a contemporary museum (see figure 4), in which it shows the external environment of the stage, its building, as well as the models of decoration objects and ceramic products of the company's crafts, such as plates, plates, cups and boxes (see figure 5).



Figure 4 Interaction scenario of the Virtual Reality application

Source: Own



Figure 5 Modeling pieces of crafts modeled in 3D

Source: Own

The products can be seen in detail by the client, because it will see its shape, texture, color, size, dimensions, technique and materials used in its preparation (see Figure 6), all these features will be displayed in order to draw attention and of awakening the interest of the client for the purchase of the product.



Figure 6 Handmade piece modeled in 3D with details of texturing

Source: Own

Likewise, the QR codes were generated as part of the product catalog in the Electronic Commerce Site, this integration of the 3D models was done in the Vuforia software, with integration in Unity (see figure 7)



Figure 7 Augmented Reality model seen from the mobile device

Source: Own

As mentioned, the execution of the prototype evaluation phase by a representative sample of potential users is still pending in order to verify its functionality, behavior and attractiveness. That after the evaluation may be released for dissemination, through the digital media selected thus providing added value to the client in which you can experience the feeling of being immersed in an environment typical of the production of crafts, efforts aimed at achieving greater customer satisfaction.

Conclusions

It is a fact that currently companies can not stop dealing with how to make use of digital media in their marketing and marketing strategies, due to the natural migration that is arising from the markets.

The development of this proposal, seeks to highlight the possibility and scope of the incorporation of Virtual and Augmented Reality in conjunction with the functionality offered by Electronic Commerce as a differentiating element that allows to awaken the interest and purchase intention of users, attending to a vulnerable economic sector like that of artisans.

So far it has been successfully experimented with the development process of creating a functional prototype that has been liked by the makers of the ceramic workshop Mara Ceramica

We consider that the use of Virtual and Augmented Reality technology is a potential tool for the commercialization of crafts, due to the following advantages:

1. Showing the products with virtual reality through the internet, facilitates the process of marketing communication between artisans and customers, that is, it facilitates the way to reach directly the final consumer of handicrafts, achieving on the one hand to keep the greatest profit of the sale by not needing intermediaries and on the other hand you have direct contact with the client in order to identify their needs, tastes and preferences, and with this information to produce products that better meet their expectations and be able to offer crafts according to the needs of consumers,
2. Through this technology it is possible to reach a greater number of niche markets, made up of people and distant places that otherwise would be difficult to reach them, through this virtual reality tool, it is easy to the artisan can establish direct and permanent communication with the client, which through suggestions and comments that he considers pertinent, makes what he really needs, so he can have better products contributing to the value chain, giving each customer the unique and original product that is what identifies a craft.
3. Appreciate the craftsmanship in a 360 degree view, that is, from several perspectives, being able with this information to acquire the product from the comfort of your home, without physically moving to the place and interacting freely without feeling pressured to make the purchase, which It will allow you to visit the store comfortably and in detail virtually, whenever you consider necessary.
4. The visits that customers make to the virtual store, will allow to have a large amount of information that will facilitate carrying out the analysis of consumer behavior.

Likewise the information that is provided once the purchase is specified, will also be great utility for this analysis, the information of real and potential customers will allow to determine the expectations, needs, tastes and preferences of the clients that make up the market segment.

Another indirect advantage of this proposal is that it will make it possible to avoid and, where appropriate, reduce some complex social phenomena that currently occur in artisanal communities, such as the migration of artisans to municipal capitals, capitals of the states or as in some other cases abroad mainly to the United States of America, this is due to the scarce and insufficient sales of their crafts and the voracity of some of the intermediaries who buy them crafts at low prices, which causes that they do not generate enough income to stay in their place of origin, coupled with this, the conservation of their traditions is detrimental and the loss of techniques, often ancestral, handed down from generation to generation, for the development of handicrafts are lost.

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Proposal of a simple recommendation system for small and medium enterprises for decision making based on unsupervised learning

Propuesta de un sistema simple de recomendación para pequeñas y medianas empresas para la toma de decisiones basado en el aprendizaje no supervisado

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Abstract

Recommendation systems are generally complicated, due they search to increase their reach and robustness, they combine different artificial intelligence approaches mainly of supervised learning. A disadvantage of this type of systems is that they must have a prior classification to be able to train a system and after they can be able to make decisions in a similar way that a human would do it; however, the task of classification is often expensive because is needed to consult with experts the possible classification (also known as label) that should be given to a specific data; although this method can be profitable for large companies, it is not for small and medium companies. This is the reason which the present work shows a proposal of a simple system that does not need to have a previous classification, allowing it to be profitable for small and medium enterprises in decision making.

Recommendation system, Unsupervised learning, Economy

Resumen

Los sistemas de recomendación generalmente son complicados debido a que ellos buscan aumentar su alcance y robustez, ellos combinan diversos enfoques de la inteligencia artificial principalmente del aprendizaje supervisado. Una desventaja de este tipo de sistemas es que deben de tener una clasificación previa para poder entrenar a un sistema y así poder tomar decisiones como un humano; sin embargo, la tarea de clasificación suele ser costosa debido a que se debe de consultar con expertos la posible clasificación (también conocida como etiqueta) que se le debe de dar a un dato específico lo cual puede ser redituable para las grandes empresas, pero no para las pequeñas y medianas. Es por esta razón que el presente trabajo muestra una propuesta de un sistema simple que no necesite tener una clasificación previa, permitiendo así que el mismo pueda ser redituable para pequeñas y medianas empresas en la toma de decisiones.

Sistema de recomendación, Aprendizaje no supervisado, Economía

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Introduction

In recent years, artificial intelligence has increased its popularity and applications, a particular case is one that is applied to analyze data and from them create recommendation systems, a very particular case is the Netflix award, which in 2010 offered one million dollars to the best recommendation system for its platform.

Recommendation systems can be as complex as required because they can use different artificial intelligence approaches according to the requirement; The traditional approach to create a recommendation system is based on supervised learning in which a system is trained with a large amount of data that, in turn, has a large number of characteristics; what you get is a system that can take decisions as an expert would do it.

Although this approach is practical for cases in which there are labels for the data such as: good, regular, bad or expensive, intermediate, cheap etc. It is not so convenient to implement when you have a large amount of data without labeling.

Consider the example of a vineyard in which a wine with certain chemical characteristics is labeled based on the opinion of tasters as: good, regular or bad; we have that although for a renowned vineyard it may be profitable to hire tasters to analyze 20% of their wines and then taking into account the results they can train a recommendation system; we cannot apply this for a small or medium vineyard.

The objective of this paper is to show the developed proposal of a simple recommendation system for small and medium enterprises to make decisions based on unsupervised learning approach.

This is intended to enable small and medium enterprises to create their own model and thus they can reduce their costs with respect to the classification of their products.

In the present article is described the fundamentals, then the methodology and finally the results of the proposal are analyzed and discussed.

1. Clustering

Clustering algorithms or clustering methods are dividing a data set into groups such that members of the same group are more similar among them than others (Ripley, 2007). The number of groups can be predetermined or can be decided by the algorithm. Interpretation of results that is obtained according to experts who analyze and interpret the partition of the data.

1.1. *k*-means algorithm

The *k*-means clustering (MacQueen, 1967) is the most commonly used unsupervised machine learning algorithm, the goal of this algorithm is to set into *k* groups a given dataset, in this algorithm each cluster is represented by the center or means of the data points belonging to the cluster. The basic pseudocode is (Bilmes, 1998):

1. Begin
2. Randomly choose *k* cluster centers
3. While points stop changing assignment to centroids

Assign each data point to the nearest cluster center

Set the cluster centroids based on the average (mean) position of each centroid's points

4. End While
5. End

An inherent difficulty of the present algorithm is that the value of *k* must be known in advance, this number represents the number of groups (classes), for some instances this number is already set. However, assuming that this number is not available, there are statistical techniques which allows that it can be calculated, one of the simplest method to implement is known as elbow's method

1.1.1. Elbow method for K-Means algorithm

The elbow method consists in the running of the *k*-means algorithm for a given instance in a range of defined values of *k*, for example, for *k* = 1 to 15 and for each result obtained from *k*, the sum of the square errors is calculated (SSE).

SSE is the sum of the squared differences between each observation and its group's mean (Kassambara, 2017). It can be used as a measure of variation within a cluster. If all cases within a cluster are identical the SSE would then be equal to 0. The SSE is given by the equation:

$$SSE = \sum_{i=1}^n (x_i - \bar{x})^2 \quad (1)$$

Finally, the results obtained are plotting; if the line chart looks like an arm, then the "elbow" on the arm is the value of k that is the best.

2. Instances

2.1. Wine instance

These data are the results of a chemical analysis of wines grown in the same region in Italy but derived from three different cultivars (Waterhouse, 1998). The analysis determined the quantities of 13 constituents found in each of the three types of wines: the good wines, the regular wines and the bad wines. The attributes are:

- Alcohol
- Malic acid
- Ash
- Alcalinity of ash
- Magnesium
- Total phenols
- Flavanoids
- Nonflavanoid phenols
- Proanthocyanins
- Color intensity
- Hue
- OD280/OD315 of diluted wines
- Proline

2.2. Automobile dataset

This data set consists of three types of entities: (a) the specification of an auto in terms of various characteristics, (b) its assigned insurance risk rating, (c) its normalized losses in use as compared to other cars. The second rating corresponds to the degree to which the auto is riskier than its price indicates. Cars are initially assigned a risk factor symbol associated with its price (Kibler, 1989). The attributes are:

- Symboling: -3, -2, -1, 0, 1, 2, 3.
- Normalized-losses: continuous from 65 to 256.
- Make
- Fuel-type: diesel, gas.
- Aspiration: std, turbo.
- Num-of-doors: four, two.
- Body-style: hardtop, wagon, sedan, Hatchback, convertible.
- Drive-wheels: 4wd, fwd, rwd.
- Engine-location: front, rear.
- Wheel-base: continuous from 86.6 to 120.9.
- Length: continuous from 141.1 to 208.1.
- Width: continuous from 60.3 to 72.3.
- Height: continuous from 47.8 to 59.8.
- Curb-weight: continuous from 1488 to 4066.
- Engine-type: dohc, dohcv, l, ohc, ohcf, ohcv, rotor.
- Num-of-cylinders: eight, five, four, six, three, twelve, two.
- Engine-size: continuous from 61 to 326.
- Buel-system: 1bbl, 2bbl, 4bbl, idi, mfi, mpfi, spdi, spfi.
- Bore: continuous from 2.54 to 3.94.
- Stroke: continuous from 2.07 to 4.17.
- Compression-ratio: continuous from 7 to 23.
- Horsepower: continuous from 48 to 288.
- Peak-rpm: continuous from 4150 to 6600.
- City-mpg: continuous from 13 to 49.
- Highway-mpg: continuous from 16 to 54.
- Price: continuous from 5118 to 45400.

3. Evaluation of the model

3.1. Confusion matrix

To evaluate a model, it is frequently used the accuracy, defined as the ratio of correct predictions made by the model and the overall predictions. Given by the formula:

$$Accuracy = \frac{Total\ Correct\ Predictions}{Total\ Predictions} \quad (2)$$

Although this form is practical, it does not provide all the important information such as the total of correct and incorrect predictions made by the model.

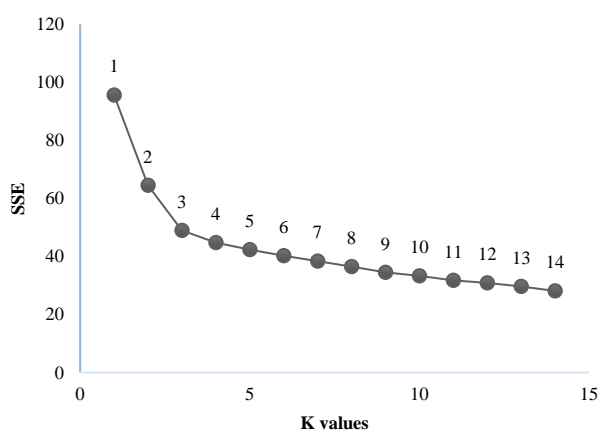
The confusion matrix was first known under the term Contingency Table; it was invented at 1904 by Karl Pearson ²⁰. However, the term confusion matrix became popular in the machine learning community thanks to Kohavi and Provost at 1998. The confusion matrix generated from an instance with n classes, is a $n \times n$ square matrix where rows are named taking the real classes and columns, using the classes provided by the model. In this way, it can be clearly identified when the model classifies a class correctly or incorrectly. Thus, the confusion matrix allows us to evaluate the performance of the model with respect to an instance. For example, for an instance with two classes, the matrix would look like the Table 1:

	Negative (Model)		Positive (Model)
Negative (Real)	True Negative (TN)	Negative	False Positive (FP)
Positive (Real)	False Negative (FN)	Negative	True Positive (TP)

Table 1 Confusion matrix for 2 classes

4. Results

4.1. Wine results



Graphic 1 Elbow method in the wine instance

The results given by the elbow method show in the graphic 1 that the accurate number of classes are 3,

51	0	0
0	65	0
0	0	62

Figure 1 Confusion matrix for wine instance using the proposed model

Taking into account the confusion matrix shown in the Figure 1, it is possible to see that the model allows to visualize that the model forms three large groups intuitively, this means that all the elements belonging to a group are very similar each other, so it is not necessary to analyze all the elements but only one element of each group formed and, once it is classified as a bad, regular or good wine, it is possible to classify all the other elements in the same way without analyze them. For example, if we analyze one element from the first group, we'll find that this group belongs to the good wines, in a similar way if is analyze one element from the others groups, we'll find that they belong to the regular and bad wines respectively.

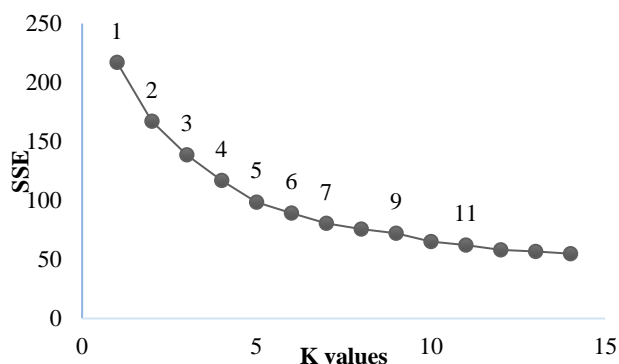
59	0	0
3	65	3
0	0	48

Figure 2 Confusion matrix for wine instance using the proposed model

The model also allows to evaluate a pre-classified instance, for example, in the case of wines; in Figure 2 the confusion matrix for the proposed model is shown; it is observed that the model has a disagreement in six elements between its results and the results obtained by the tasters (label). If we take into account the matrix, the results indicate that three wines that are being classified by experts as bad, for the proposed model are wines of regular quality, if it is translated into economic matters they would mean losses for the company because they are selling a cheaper wine than it should be. On the other hand, there are also three wines that are actually regular but the company is classifying them as good quality wines, this situation can represent a risk too, because if it is proven that they sell wines with an inferior quality at a high price it will generate a bad image, which in turn could result in losses.

Despite all the above, the results do not mean that the tasters or the model made a mistake but simply that those wines have chemical characteristics which make a wine better or worse than it really is and maybe they should be tasted again.

4.2. Automobiles results



Graphic 2 Elbow method in the automobile instance

The results given by the elbow method show in the graphic 2 that the accurate number of classes are 6, despite of in the dataset description indicates that there are 7 kind of cars, in the instance only appears 6 of them; that is the reason why the elbow method gets this value.

7	0	0	0	0	0
0	49	0	0	0	0
0	0	24	0	0	0
0	0	0	42	0	0
0	0	0	0	28	0
0	0	0	0	0	9

Figure 3 Confusion matrix for automobiles instance using the proposed model

In the same manner that in the wine instance, the confusion matrix shown in Figure 3, it is possible to conclude that the model separates the dates into the given number of groups forming six main groups, with this is admissible to determine that all the elements belonging to a group are very similar each other, so it is not necessary to analyze all the elements but only one element of each group formed and then we can assign the same layer to the rest of them.

Conclusions

The proposed model fulfills the function of being simple and at the same time being able to classify the test instances.

It is flexible because it can be applied in databases with a previous label and for those which there is no indication of how to classify. We can conclude that if certain characteristics are taken into account and analyzed with the model, they can save classification costs since once the result of the system is obtained, analyzing only one of the samples that make up a group, it is possible to determine the classification of all the other elements belonging to the same group. Likewise, in the case of instances where there is a previous classification, the model serves to verify these classifications and if required, an additional analysis is made because certain products may be overvalued or undervalued, which each situation to its way represents economic losses.

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Dynamism and competitiveness of mexican beef, a focus of market diversification

Dinamismo y competitividad de la carne de bovino mexicana, un enfoque de diversificación de mercados

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Abstract

In Mexico, the production and export of bovine have remained competitive, placing it within the top ten countries due to its competitiveness which is based on weather conditions, the production of cereals for food and the commercial relationship with the United States.

In this regard, Mexico, with the signing of the North American Free Trade Agreement (NAFTA), promotes international trade with the United States and Canada, with the objective of eliminating obstacles to trade, facilitating the cross-border circulation of goods and services, promoting fair competition in the free trade zone, increases investment opportunities, among others aims (Ministry of Economy, 1993). At the beginning of the agreement, Mexico achieved short-term macroeconomic objectives of stability, economic growth, and inflation control, however, in the long term it has not meant an increase in the standard of living of Mexicans, therefore, Mexico decided to diversify markets of export through bilateral trade agreements with other countries. As a consequence, the objective of this research is to perform an analysis of the commercial position of Mexican beef (2002-2016), obtaining the Grubel & Lloyd index and the grown rate by time interval, concluding that there is a commercial dynamism of this Mexican product..

Competitiveness, Commercial Positioning, Diversification

Resumen

En México la producción y exportación de ganado bovino se han mantenido como actividades competitivas, ubicándolo dentro de los principales diez países, dicha competitividad está basada en las condiciones climáticas, en la producción de cereales para su alimentación y la relación comercial con Estados Unidos. En ese sentido, México con la firma del Tratado de Libre Comercio de América del Norte (TLCAN) impulsó el comercio internacional con Estados Unidos y Canadá teniendo como objetivos eliminar obstáculos al comercio, facilitar la circulación transfronteriza de bienes y servicios, promover la competencia leal en la zona de libre comercio, aumentar las oportunidades de inversión, entre otros (Secretaría de Economía, 1993). Al comienzo del tratado, México logro a corto plazo los objetivos macroeconómicos de estabilidad, crecimiento económico y control inflacionario, sin embargo, a largo plazo no ha significado un aumento en el nivel de vida de los mexicanos, por ello, México decidió diversificar mercados de exportación a través de tratados de comercio bilaterales con otros países. Como consecuencia, el objetivo de esta investigación es realizar un análisis de la posición comercial de la carne de bovino mexicana (2002-2017), obteniendo el índice Grubel & Lloyd y tasas promedio de crecimiento en intervalos de tiempo, concluyendo que existe dinamismo comercial de dicho producto mexicano.

Competitividad, Posicionamiento Comercial, Diversificación

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Introduction

Globalization has imposed as one of the features of international economy at the end of the century, which is characterized by the convergence towards more open and competitive markets; in that sense, the need to reach a more competitive livestock is established as a condition to achieve an efficient international insertion. The current agricultural policy scheme, both in Mexico and in the world, as well as global trade trends, open new marketing opportunities for various agricultural products.

Likewise, within the livestock subsector, the production and consumption of meat are the most important items in the world, in the case of the production of beef worldwide; in 2017, 66,250,349 tonnes were produced (FAO, 2019), which is considered a historical maximum. In the same year, the main producers of beef were the United States of America (17.97%), the European Union (15.85), Brazil (14.41%), Argentina (4.28%) and Australia (3.09%) respectively (FAO, 2019).

In Mexico, beef production is reported with a production volume of 1, 925,901 tons; which is equivalent to 2.90% of the world production.

Trade openness in the world, especially in Mexico, generated new realities which affected the productive chains. The beef chain was very complex, because it competed against the leading country of world production; likewise, most of the cattle production was carried out under extensive conditions, added to the fact that there was a poor integration of its links.

However, Mexican livestock has moved from a process of extensive cattle raising and export of live cattle, to technified and export-oriented processes of fresh and frozen meat of better quality.

It is appropriate to point out that cattle livestock for meat is an important activity in Mexico, because it takes advantage of natural resources in more than 50% of the national territory, for its contribution of meat as a staple food, for the generation of foreign exchange with exports, and for its contribution to rural development through job creation (Marquez, 2004).

Furthermore, in the context of International Trade, Mexico ranks sixth among world producers and ninth in terms of exports, with 89% of these exports destined for the United States of America market (USDA, 2016).

Concerning the above, it is important to note that in 2017 there was uncertainty and concern in the North American Free Trade Agreement (NAFTA) region, specifically in Mexico, regarding the possible results of a renegotiation or even its cancellation. The responsible Mexican authorities indicated that the NAFTA renegotiation process could be completed by the end of 2018 or extended to 2019.

In this context, this research work aims to perform an analysis of the commercial position of Mexican beef (2002-2016) within the region of the North American Free Trade Agreement (NAFTA) and in turn analyze Mexico's relationship with new business partners, to suggest potential markets for that product.

The analysis of the commercial position of Mexican beef was obtained from the Grubel & Lloyd index, which has not been used in previous research on this product. Annual growth rates and average growth rates were also obtained with time periods.

The central hypothesis of this research states that the increase in the production of Mexican beef is directly reflected in the exports made, which indicates a greater market share.

Based on the foregoing, the main reasons for the Mexican commercial opening before and after NAFTA are briefly presented in the first section of this investigation.

In the second section, an overview of the production of Mexican beef is provided, highlighting the main producing states, and some strategies used by producers to create new market spaces and their consolidation.

Finally, in the third section, a general outlook of the North American Free Trade Agreement is presented, where the main reasons after 23 years in force are emphasized, as well as the objectives of the United States-Mexico-Canada Agreement (USMCA).

The Mexican commercial opening and the beef market

In Mexico, commercial integration began during the sixties. As part of the context, the national economy was going through economic crises (1977-1982), subsequently, there was an economic boom derived from the increase in oil prices in international markets. However, this was not enough since market prices fell together with another phenomenon presented, considered "capital flight." At the beginning of the 1980's the opening to foreign trade was reduced, but it was during that same period, when there was greater dynamism, based on the consolidation of NAFTA in 1994; a period in which a growing coefficient of openness was reported. Likewise, over time there has been a greater concentration of foreign trade between Mexico and the United States of America through this treaty.

It is worth mentioning that, at the beginning of Mexico in NAFTA, its global indices of intra-industrial trade increased, until 2001 when they diminished, due to the economic recession of the United States.

In connection to the previous idea, it should be noted that Mexico has remained among the first ten countries in the production and export of live cattle since the 1980's and 1990's. However, it was not included in the production of fresh or frozen meat as it is today. In 1994, the countries that dominated around half of the global meat production were the United States, some countries of the European Union, Brazil and Argentina, but in 1995 China began to enter the market (Chauvet, 1999).

Currently, the demand for meat in the world has presented a notable increase, derived from the following circumstances: population growth, salary increases and changes in food preferences, and it is expected that by 2050 most of the growth will take place in developing countries (FAO, 2019).

Cattle in Mexico

During the 21st century, Mexico's participation in the agricultural sector increased from 9.91% in 2013 to 13.72% in 2012. It also began to gain strength in exports of fresh and frozen meat, having greater production dynamics and generating added value, which were not achieved in previous decades (Ríos, 2015).

Between 2007 and 2016, the production of beef in Mexico increased by 1.8%, similar to that of China, which increased by 1.3%; conversely, the United States reported a decrease of 0.6%. In this same period, consumption rose in countries such as China, 2.7% annually, Turkey 14.9% and India 3.5%. On the other hand, the countries that decreased their consumption were the United States 1.0%, the European Union 1.1% and Mexico 0.9 %, due to high meat prices and dietary changes.

Beef production in 2016 was structured as follows: Veracruz (13.4%), Jalisco (11.5%), Chiapas (6.1%), San Luis Potosí (5.5%), Sinaloa (4.9%), Baja California (4.8%), Durango (4.5%), Michoacán (4.1%), Chihuahua (4.0%) and Sonora (3.7%); in these 10 states, 62.5% of national production concentrated. In the same year, due to the increase in the price of beef, farmers were encouraged to fattening cattle for longer in order to increase the production of meat in greater weight and decrease the number of heads.

In 2017, high levels of production were achieved in certain basic products such as: cereals, some types of meat, dairy products and fish. This productive increase was due to the escalation in demand, based on the increase in per capita income in China, which has especially boosted the demand for meat and fish. (OECD/FAO, 2018).

Currently, in Mexico there are 1,151 slaughterhouses, only 52 are Federal Inspection Type (TIF) for cattle (4.5%) and the rest are municipal (López, 2010).

Likewise, more than 80% of the volume of exports of meat and edible cattle offal are carried out by only 30 companies. These establishments are distinguished by the type of products and services they have generated to access new markets. Their main strategies are based on the investment of: factors of animal production that directly affect the quality of meat; developing schemes for the supply of specialized livestock for meat; the presentation of the product, where refrigerated, frozen and vacuum-packed products are handled, ensuring the quality and safety of their products until they reach the consumer; and the diversification of markets that highlights national consolidation, as well as the use of spaces in international trade without neglecting local and regional markets.

Nonetheless, López (2010), indicates that in terms of market diversification, the capacity developed by companies to enter different markets is low and concentrated in the United States of America.

NAFTA and its transition to USMCA

With the signing of the North American Free Trade Agreement (NAFTA), Mexico boosted international trade with the United States of America and Canada, with the following main objectives: to eliminate trade barriers and facilitate the cross-border movement of goods and services between the three countries; to promote conditions of fair competition in the free trade zone; to substantially increase investment opportunities in the territories of the parties; among others (Ministry of Economy, 1993). In the beginning, Mexico achieved the macroeconomic objectives of stability, economic growth and inflation control in the short term. However, in the long term it has not meant an increase in the standard of living of the Mexican population; it has not led to generation of products with high regional content of value and shared production among the member countries. On the other hand, it has achieved a certain level of integration of its production processes, although it maintains a commercial dependence with the United States of America (Ibarra, 2014).

In 2017, after 23 years of operation, the renegotiation of NAFTA began. The Mexican government determined certain priorities grouped into four thematic axes: the first, to strengthen the competitiveness of North America through clear rules, expedited procedures and the elimination of trade barriers to facilitate access to agricultural products; a second axis was to move towards inclusive and responsible regional trade; the third, sought to take advantage of the opportunities of the economy of the 21st century; and the last axis, promoted the certainty of trade and investment in North America.

After a year of NAFTA negotiations, the United States-Mexico-Canada Agreement was implemented, which is based on: “supporting mutually beneficial trade that leads to more free and fair markets, and solid economic growth in the region.” (NAFTA, 2018).

However, despite the signing of the USMCA, Mexico must bet on market diversification and take advantage of other treaties, focusing on countries where there is market growth, presented as stabilizers of the global economy, with the objective of preventing lag in times of economic growth.

Methodology to be developed

In order to determine the commercial position of Mexican beef (2002-2016), and the commercial dynamism that it presents, it is assumed that increases in production and export indicate a greater participation in the market.

In this context, the Grubel Lloyd index is used as an indicator of commercial specialization, which is obtained as follows:

$$IGLL = \frac{1 - \sum |X_{ij}^k - M_{ij}^k|}{\sum (X_{ij}^k + M_{ij}^k)} \quad (1)$$

Where:

X_{ij}^k = Corresponds to the exports of the product or k group of the i country in relation to the j country, in a given year or period.

M_{ij}^k = Corresponds to the imports of the product or k group of the i country in relation to the j country, in a given year or period.

The ranges vary from 0 to 1, where, if the IGLL is closer to zero, it is assumed that trade consists only of imports or exports, generating inter-industrial trade. On the contrary, when the IGLL is close to one, it indicates that imports and exports are equal, that is, it is an intra-industrial trade.

Qasmi & Fausti (1999) propose a classification in four groups:

- 0.00 to 0.25 strong inter-industrial commercial trend.
- 0.25 to 0.50 weak inter-industrial commercial trend.
- 0.50 to 0.75 weak intra-industrial commercial trend.
- 0.75 to 1.00 strong intra-industrial commercial trend.

The Grubel Lloyd index has been used in different investigations; however, it is appropriate to mention that there are no previous studies where this index is used to explain the commercial trend (dynamism) of Mexican beef.

That said, Rosales, (2013) in the study titled: "The Dynamism of China and Emerging Asia: Opportunities and Challenges for Latin America and the Caribbean" refers to the analysis of intra-industry trade based on the methodology devised by Grubel and Lloyd to measure the level of trade flows in the same sector between countries and regions.

Banterle & Carraresi (2006), in their study: "International Trade and the Analysis of Competitiveness in the European Union: The Cases of the Prepared Meat Sector" use the Grubel and Lloyd index to know the intra-industrial trade of the prepared meat sector in EU countries.

The source of data collection for this investigation was The United Nations Commodity Trade Statistics Database (UN Comtrade), where the unit value of tons of cattle meat exports and imports were obtained. The countries that make up the North America region were selected due to the strong established commercial relationship derived from NAFTA. On the other hand, the Asian countries China, Korea and Japan were selected because there is a potential to increase trade.

Likewise, average growth rates were obtained in time intervals (2002-2016), in terms of production and export in the selected countries.

Results

Table 1 shows the Grubel Lloyd index; the index shows results ranging between 0 and 1.

Country	IGLL
Mexico - USA	0.722422359
Mexico - Korea	0
Mexico - Japan	0
Mexico - Canada	0.054879784
Mexico - China	0

Table 1 Grubel Lloyd Index (2002-2016)

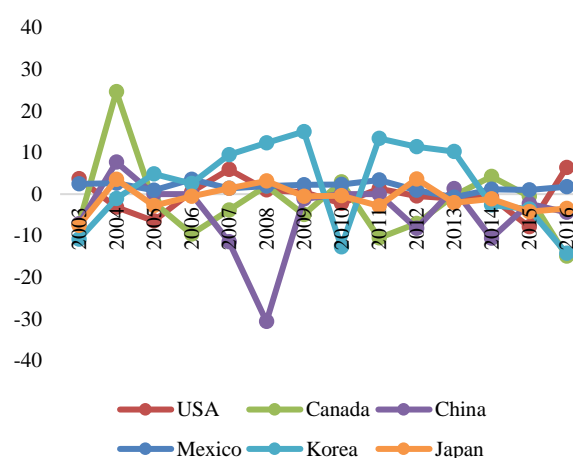
Source: The United Nations Commodity Trade Statistics Database (UN Comtrade), 2019

Mexico presents a Grubel Lloyd index of 0.722422359 with the USA as shown in table 1. According to the ranges established by Qasmi & Fausti (1999), trade would have a weak intra-industrial trend; however, it is very close to moving to a strong intra-industrial trend at the time when its imports are very similar to its exports. By producing and exporting, we get the advantage of doing so with economies of scale, which allows to reduce costs and, therefore, have competitive selling prices, in addition to strengthening the exchange relationship with that country.

On the other hand, Mexico with Canada, Korea, China and Japan presents a strong inter-industrial trade trend. Since the indices are in the range of 0.00 to 0.25, trade goes in only one direction, which means that there is only Mexican beef export to these regions, generating a diversification of markets.

Graph 1 shows the dynamism of annual production growth in the selected countries. It is important to note that the average growth rates in the time interval (2002-2016) were positive, that is, there is an increase in production. Such is the case of Korea (1.9346%), Mexico (1.8319%) and the United States of America (0.0096%) respectively.

Conversely, there are negative rates, that is, there is a decrease in production in China (-4.8896%), Canada (-2.5551) and Japan (-0.8914%).



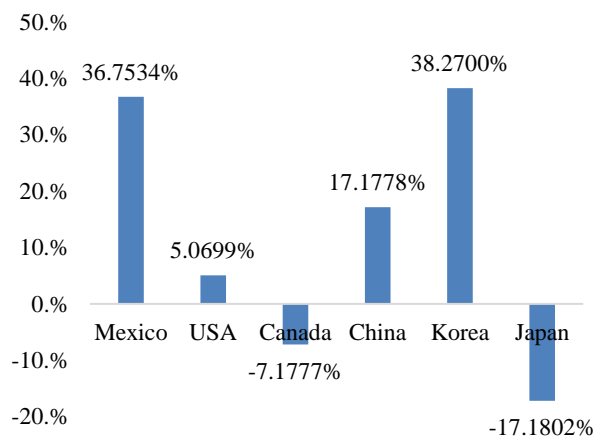
Graph 1 Annual growth of beef production 2019

Source: The United Nations Commodity Trade Statistics Database (UN Comtrade), 2019

Graph 2 reflects the behavior of average export growth during the analyzed period.

Regarding the dynamism of exports, Korea presented the highest average growth rate (38.2700%), followed by Mexico (36.7534%), China (17.7778%) and the United States of America (5.0699%).

In the case of Japan and Canada, decreasing rates of -17.1802% and -7.1777% were obtained, respectively.



Graph 2 Average growth of beef exports 2019

Source: *The United Nations Commodity Trade Statistics Database (UN Comtrade), 2019*

It is appropriate to mention that, despite the results obtained in the growth rates of production and exports, the trade balance indicates that the United States of America, Canada and Mexico, respectively, are the markets that report surplus trade balance, that is, the volumes of export are higher in relation to import volumes.

In opposition, Korea, China and Japan have a negative trade balance, which indicates that in the short term they may be potential markets for the placement of Mexican beef.

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Conclusions

In conclusion and based on the results obtained, Mexico should not focus on a single market, it should diversify beef exports and satisfy Asian markets that, in addition to being potential markets, are representatives of global growth.

In addition to commercial diversification, Mexico has to strengthen its internal market to achieve greater economic growth.

Moreover, in the diversification of markets, the different commercial ties and their tariff benefits must be exploited. In the same way, strategies based on the promotion and presence in international fairs should be proposed, in order to achieve competitive advantages.

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Business strategies: Advantages of outsourcing in companies**Estrategias empresariales: Ventajas del outsourcing en las empresas**

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Abstract

The objective of the research is to know the advantages and disadvantages of the use of outsourcing in companies in the Centro, Tabasco. The research is of inductive type with qualitative approach and a phenomenological design, the analysis units were 20 companies that have used this administrative tool, which the owners, managers or personnel in charge of contracting the services, tell their experiences about outsourcing. The results obtained that the business benefits are the use of outsourcing are the decrease of the workload and the assignment of highly trained personnel, also as a conclusion they mention that the hiring of outsourcing is through recommendations of other entrepreneurs, which include positive comments, quality of service, professionalism among others, in addition to the fact that workers who are hired under this modality are committed, with a high degree of responsibility in the development of their activities. It is concluded that the benefits granted by outsourcing are competitive advantages that serve to face market trends, which create benefits for workers and entrepreneurs

Outsourcing, Strategies, Company**Resumen**

El objetivo de la investigación es conocer las ventajas y desventajas que otorga el uso del outsourcing en las empresas en el municipio de Centro, Tabasco. La investigación es de tipo inductiva con enfoque cualitativo y un diseño fenomenológico, las unidades de análisis fueron 20 empresas que han utilizado esta herramienta administrativa, en las cuales los dueños, gerentes o personal encargado de contratar los servicios, cuentan sus experiencias sobre el outsourcing. Los resultados obtenidos que los beneficios empresariales son el uso del outsourcing son la disminución de la carga laboral y la asignación de personal altamente capacitado, también como conclusión mencionan que la contratación del outsourcing es por medio de recomendaciones de otros empresarios, que incluyen comentarios positivos, calidad en el servicio, profesionalismo, entre otros; además que los trabajadores que se contratan bajo esta modalidad están comprometidos, y con alto grado de responsabilidad en el desarrollo de sus actividades. Se concluye que los beneficios que otorga el outsourcing son ventajas competitivas que sirven para afrontar las tendencias del mercado, lo cual crean beneficios para trabajadores y empresarios.

Outsourcing, Estrategias, Empresa

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Introduction

Companies today face the new trends and demands that the market requires, so all changes include the need for globalization and growth without the use of additional capital, as well as to respond to the threats and opportunities of the economy. Part of the current trends is outsourcing, which refers when a company transfers ownership of a business process, that is, it is based on the separation of some activity that is not part of the main skills of an organization, to a third party specialized.

Companies need growth in different areas due to external circumstances, and they do not have the staff to cover them, in addition to the structure to carry out the hiring processes, so they resort to hiring the services of people or companies that comply with the desired training in the areas; Among the advantages of this are mainly the operation, allowing the company to focus on the product or service it provides.

The advantages of Outsourcing contribute a lot to companies, however it must be prepared to be able to manage outsourced personnel, because there are risks that can cause damage to the company, such as the theft of information.

Developing

Due to the ravages of World War II, companies aimed to carry out most of their activities for themselves, in order not to depend on suppliers, in principle it seemed an excellent strategy, however in a way how technologies evolved, its efficiency was declining, because it was very complicated to stay updated and competitive, such as companies specialized in certain areas (Bolaños, 2016).

The administrative process of Henry Fayol is an essential part of the companies (Stoner, Freeman, & Gilbert, 1996), these are still valid today, however, in studies conducted in successful companies based on these principles, which fell rapidly, It shows that the extreme use of the division of labor led them to become bureaucratic entities, which made operations very robust and slow, which at first were simple, in addition to requiring a greater number of personnel, raising costs. Due to these analyzes, new trends such as process reengineering were created.

Hammer and Champy (1994) were the creators of the process reengineering approach, where they propose that managers are often required to start over to rethink how to do the work, how technologies and people should interact, and how to restructure organizations completely. They define reengineering as “the fundamental review and radical redesign of processes to achieve spectacular improvements in critical and contemporary performance measures, such as costs, quality, service and speed” (Hammer & Champy, 1994, p.35).

These reengineering have worked in such a way that companies seek to make efficient using technology and entities immersed in globalization, it is necessary to grant alternatives to make them more competitive, including outsourcing.

There are countless definitions of the word outsourcing, also known as outsourcing or outsourcing, it has the main feature in delimiting activities or processes for a third party to execute. According to Cook (1999, p21), it is “to have the service of a provider, which will provide, on an ongoing basis, the administration of a human resources activity that will normally be carried out within the organization. In a nutshell it is to hire the services of a third party to perform some activity and that for the services provided establish a price.”

Heywood (2002) determines that outsourcing is “... the transfer of an internal business function or functions, plus any associated asset, to an external provider to a service provider that offers a defined service for a specific period of time at an agreed price, if well probably limited (p.27).

According to Schneider (2004), he mentions that outsourcing occurs when an organization transfers ownership of one of its processes to a third party. The crucial aspects in this transfer are, precisely, the importance and consequently, the degree of control over the process being transferred. For this reason, outsourcing, as a management tool, often generates fears and aversion. On the other hand, Rivard and Aubert (2008) conceptualize outsourcing as that process in which services, processes or activities are outsourced to organizations that are able to offer optimal results.

There are various classifications of outsourcing, according to the different points of view of the various authors, Cheon, Grover, & Teng, (1995) issue a classification based on the internalization of human and technological resources:

- Complete outsourcing. This type involves the transfer of the entire computer center and the personnel of the customer information systems to the provider.
- Outsourcing of administration facilities. It implies the outsourcing of the company's human resources and the hiring of Outsourcing for purposes such as computer center administration or technical support administration.
- System integration outsourcing. This type of refers to the hiring in order to integrate the information systems department together with the company's internal staff.
- Timeshare outsourcing. It refers to the outsourcing of a company's technical resources.

The phenomenon of outsourcing encompasses many points according to the required analysis, in the administrative field it is a technique that aims to improve the competitiveness of companies through the reduction of the worker's labor benefits (Ruiz, 2011).

Several factors have influenced the expansion of these types of strategies, from the point of view of companies, the pressures of competitors and organizational changes in the form of specialization, technology, and the easing of laws to take this type of strategies, and from the point of view of the worker the high rates of informality and unemployment have accepted less advantageous jobs (Ruiz, 2011).

Outsourcing models have been increasing in the country, according to data from the Economic Census in 2014, it grew by forty-eight percent in the last ten years. These Censuses mention that, of the 29 million 642 thousand 421 people who were employed, 16.6 percent were not dependent on the company name in which they worked, that is, they were not in a subcontracting regime, in accordance with these and in comparison with Of the Latin American countries, Mexico is the fifth place to use this contracting system (Guerrero, 2017).

Outsourcing has several benefits that favor the administration in terms of costs, focus on the core business activities, optimize processes, expand intellectual capacity, use the highest efficiency.

The most marked benefits is the possibility of hiring suppliers that can offer a great product or service at a lower cost, which would cost the company to do it internally, this is because the supplier uses the economy at scale and according to its volumes has access to better prices and greater technological capacity (Bedoya-Gómez, 2018).

The elimination or reduction of fixed costs are basic, since these become variable, when a company stops producing it hires a component through outsourcing. This helps many companies because most of the costs become variable and depend on production, when there are low production costs are reduced.

Another great benefit is the concentration in key activities, outsourcing frees companies from unnecessary activities that are not part of the strategic ones, and thus hire services such as cleaning, computer maintenance among others. (Guerrero & Terceño, 2012).

Outsourcing favors the acquisition of knowledge, experience and technology from suppliers, because they are specialized in their area, suppliers have qualified personnel to provide excellent service and products. However, using outsourcing as a strategy increases different risks that must be reviewed and analyzed:

One of them is that the service provider becomes a competitor, it must be recognized that the knowledge of the outsourcing provider has high preparations to develop products for several customers, which gives advantages over production time and cost optimization, and they also have access to the intellectual property of the contracting company and could benefit from the information.

In addition, the provider can combine the learning experience and the skill acquired to create a company or expand into a new line of business.

Another risk is the loss of knowledge and skills, as a consequence of transferring the execution of the activity to a third party, the sense of long-term production can be lost. If the provider carries out cutting-edge activities, this power to remain in the organization and is not transferred to the client, therefore it does not have access to the latest technology and products and processes. The high risk is the dependence of the supplier because it limits the normal development of operations in the sense that it can be affected in terms of quality, opportunity, image and costs. (Bedoya-Gómez, 2018).

Methodology

For the present investigation the inductive method was used, with a qualitative approach and a phenomenological design whose purpose is to “explore, describe and understand the experiences of people with respect to a phenomenon and discover the common elements of such experiences” (Hernández, Fernández and Baptista, 2014, p. 493).

The analysis unit was made up of 20 companies which have used outsourcing. The people analyzed have positions of managers or owners of the organizations, the information was collected through a semi-structured interview based on analyzing their experiences on outsourcing.

Results and Conclusions

Based on the observation and as a result of the interviews that were carried out with the businessmen and executives of different companies, a clear panorama of the business vision is observed, regarding the acquisition of professional outsourcing services in the municipality of Centro, Tabasco ; within which it stands out as an advantage, that having the support of companies contracted under this modality the optimization of activities is increasing; finding that the areas or departments where it is most used, is in terms of human resources and accounting with 35%, promotion and sales with 20%, in operational and logistics with 15% and the rest in field work, administration, services, legal, operational and logistics.

In a world in which most people have access to a great diversity of products, services, technology and goods, and in which companies seek to be the strongest and most profitable, the ones that grant the fastest and the fastest growing day after day, it is necessary to have the best work teams and the best people within it, which is why internally, the main factors for which the employer decides to hire the services, is the experience, promote and encourage the sale of products and services, optimize payroll management or discharge of fiscal responsibilities.

The advantages of analyzing outsourcing allow to have a clear vision of its benefits, as it is that the company can react in time for possible changes in its work environment, significantly reducing its expenses and avoiding the constant turnover of staff, because having a service derived from this modality gives the assurance that the employee is a highly trained person in the required area, showing great security and desires to grow or belong to the company.

A primary factor to know the importance of this labor phenomenon, is the time that firms have working under this regime, the interval is open from 6 months to 18 years, giving an average of 9 years, that is, Companies are no stranger to these services, since the average is a considerable time, giving them very good results, otherwise, they would have discarded the idea.

The business benefits in obtaining outsourcing, are largely support for the reduction of the administrative workload, since the personnel assigned to corporations are specialized, trained professionals; significantly reducing operational expenses in payroll, hiring and taxes, in addition to that with this tool it is possible to obtain better quality products or services, since the business only focuses on performing a specific job.

Most companies acquire the outsourcing service on the recommendation of other firms, this recommendation includes giving positive results, quality of service, trust, professionalism and a good price.

According to this, employers and executives have the certainty that outsourcing is for all types of companies, since they adjust to the needs of each company, solve problems and reduce work absenteeism, in addition to training times and payroll expenses, always having sufficient economic and operational capacity to contract this type of services.

As main elements of outsourcing, it helps build shared value and redefine the company, positioning the organization's resources to the key areas; according to the managers, coordinators, owners, and other personnel interviewed, the workers when integrating with this modality, show a high degree of responsibility, satisfied to belong to the labor market, insurance and with desires of growth.

Among the main points the advantages are: Decreasing fixed costs, to increase their profits, increase the flexibility of the company and to provide opportunities for companies to respond quickly and adequately to changes in the environment, taking it counts the competition and the use of technology of the best quality.

Regarding the management of outsourcing services, risks must be taken into account, for example if the service provider is not analyzed, there is a risk of receiving unskilled workers and it affects the development of the company, and that workers be given fair wages and given the corresponding social security services.

When it comes to hiring outsourcing services, a risk arises in training your suppliers and making you your potential competitor, because the contracting company transfers the intellectual property to properly develop their work, being able to benefit from it, and combine all their experience and learning, to generate a company in the same line of business.

Another great risk to not be involved in the issues of innovation and development, because the outsourcing company performs these activities, this knowledge is in their possession, allowing in the future to be in a dominant position for their level of specialization.

One of the most significant disadvantages lies in the investment that has to be made for the search, selection and implementation of outsourcing services, because not only financial resources are allocated, but an analysis of all styles transfer, standards and culture of the organization, through training, assigning the company's employees to these meetings, in the same way if the company outsources not only to one company, but to several, the effort is doubled; associated with this last point, hiring several suppliers causes different quality of the final product and variation in delivery and logistics times.

Finally, to talk about outsourcing we must take into account that there are several parameters that must be contained in the contract, as the first element to consider is that the worker's rights are not violated, but the company may incur a violation of the Federal Labor Law, in addition to the organization must ensure that the company with which you want to hire outsourcing services, offers quality services and transparency.

Recommendations

To be able to subcontract personnel, that is, in order for a company to apply or wish to apply this strategy, certain factors must be taken into account, as a result of the interviews that were conducted with the employers and managers of the companies, we have the following recommendations:

- Make a previous analysis to know the company and its needs.
- To enter into a contract for the provision of services, supply or the necessary with the outsourcing provider. Taking into account clearly in both client and supplier the stipulations that will be established in said contract.
- Analyze the flexibility that can be given in the contract.
- Measure the performance of the outsourced company constantly based on metrics and instruments.
- Maintain continuous and clear communication with the outsourced company, due to flexibility issues or last-minute agreements.
- Consider time, contract development and provider delivery.

- When working with several outsourcing companies at the same time, always take care of the logistics of delivery and quality unification in each of the products delivered.
- Compare price and choose the outsourcing company that best suits the entity's budget needs.
- Permanently preserve the essence of the business.
- Take care of the intellectual property of the contractor, as well as the management of information inside and outside the company.

Outsourcing is increasingly used in companies because it allows a high added value for customers and products, and in most cases reduced processing time or costs, offering stability, but must keep the impact clearly of outsourcing in the company.

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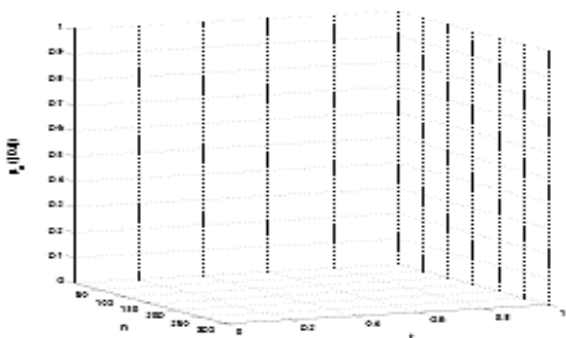
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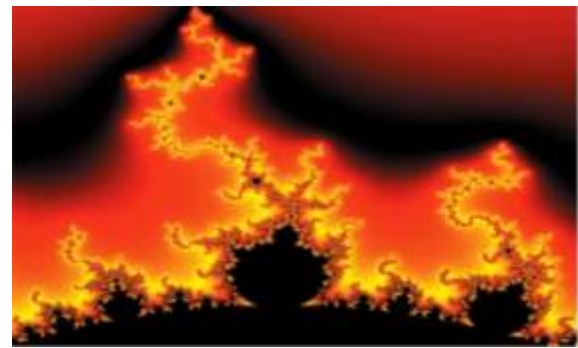


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