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Presentation of the Content

In number twelve, is presented an article *The learner's self-regulation and academic success* by PÉREZ-UROZA, Elizabeth, GUEVARA-ROMERO, María Lourdes and SALGADO-MONTES, Stephanie Scherezada, with adscription at Benemérita Universidad Autónoma de Puebla, in the next article *Technical report for a Lemon packing plant in southeastern Mexico regarding productivity, for the generation of an improvement model* by LÓPEZ-ANZUREZ, Omar Alejandro, ELISEO-DANTÉS, Hortensia, LÓPEZ-VALDIVIESO, Leticia and PÉREZ-GÓMEZ, Gerardo Ernesto with adscription at TecNM campus Villahermosa, in the next section *Competitiveness of grain oats in Mexico since 1996 to 2017* by GÓMEZ-GÓMEZ, Alma Alicia, BAUTISTA-MARTINEZ, Laura and LUQUEZ-GAITAN, Carlos Ernesto, in the next section *Assessment of the perception of quality in mexican municipal sports services*, by MORQUECHO-SÁNCHEZ, Raquel, SOLIS-GONZALEZ, Jesús, GONZALEZ-CASTRO, Juan Carlos Arturo and ACOSTA-GONZALEZ, Ariana Linette, with adscription at Universidad Autónoma de Nuevo León.

Content

Artículo **ECORFAN Journal-Republic of Peru**
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Accessibility and mobility deficiencies of line 2 RUTA, case of San Ramón, Puebla

Deficiencias de accesibilidad y movilidad de la línea 2 RUTA, caso colonia San Ramón, Puebla

PÉREZ-UROZA, Elizabeth†*, GUEVARA-ROMERO, María Lourdes and SALGADO-MONTES, Stephanie Scherezada

Benemérita Universidad Autónoma de Puebla, Mexico.

ID 1st Author: *Elizabeth, Pérez-Uroza* / **ORC ID**: 0000-0002-6428-5303, **CVU CONACYT ID:** 968420

ID 1st Co-author: *María Lourdes, Guevara-Romero* / **ORC ID:** 0000-0001-7312-3499, **Researcher ID Thomson:** Q-5521-2017, **CVU CONACYT ID:** 336949

ID 2nd Co-author: *Stephanie Scherezada, Salgado-Montes* / **ORC ID:** 0000-0001-6756-428X, **CVU CONACYT ID:** 491615

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Abstract

Deficient accessibility and mobility conditions can create exclusion, which is why, when planning a mass transport system, it is necessary to analyse them at the neighbourhood level in order to guarantee the right to the city and access to public transport. The objective of this article is to show how the deficiencies of urban accessibility in line 2 of the RUTA system, in the case study of the San Ramón colony, Puebla, since the necessary pedestrian infrastructure conditions were not considered, which causes difficulties in pedestrian mobility to access public transport. This situation was confirmed by the disappearance of the urban routes that provided transport services in the colony. The action-research methodology was implemented through successive approaches in the theoretical, physical-spatial and legal spheres. The analysis was carried out through the application of a diagnostic instrument to evaluate urban accessibility, workshops with focus groups to identify the perception of inhabitants and users, interviews with key actors and multilevel matrices of legal instruments, with the aim of making recommendations that include participatory management.

Accessibility, Mobility, Articulated transport system

Resumen

Las deficientes condiciones de accesibilidad y movilidad pueden ser creadoras de exclusión, por esto, cuando se planifica un sistema de transporte masivo, es necesario analizarlas en la escala barrial con la finalidad de garantizar el derecho a la ciudad y el acceso al transporte público. El objetivo del presente artículo es mostrar cómo las deficiencias de accesibilidad urbana en la línea 2 del sistema RUTA, en el caso de estudio de la colonia San Ramón, Puebla, ya que no se consideraron las condiciones de la infraestructura peatonal necesarias, lo que ocasiona dificultades en la movilidad peatonal para acceder al transporte público. Esta situación se aseveró con la desaparición de las rutas urbanas que prestaban el servicio de transporte en la colonia. Se implemento la metodología de investigación-acción a través aproximaciones sucesivas de los ámbitos teórico, físico-espacial y legal. El análisis se realizó a través de la aplicación de un instrumento diagnóstico para evaluar la accesibilidad urbana, talleres con grupos focales para identificar percepción de los habitantes y usuarios, entrevistas a actores clave y matrices multinivel de instrumentos legales, con la finalidad de hacer recomendaciones en donde se incluya la gestión participativa.

Accesibilidad, Movilidad, Sistema de transporte articulado

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* Author Correspondence (Email: elizabeth.perezu@alumno.buap.mx)
† Researcher contributing as the first author.

Introduction

Cities are configured in the places where people live, work and carry out various activities. Latin American cities from the 90s present characteristics such as urban expansion through horizontal growth of the peripheries (De la Hoz Sánchez & Monzón de Cáceres, 2009). This process required various modes of transport on foot, bicycle and public transport by the population to carry out activities (Vasconcellos, 2010), since decentralized cities represent a greater number of trips, greater distances in transfers and dependence on the car (Guerrero, 2014).

Urban growth in metropolitan cities has required modifying public transport and orienting it towards a mass transport model that allows the transfer of a greater number of users more quickly, such as the Bus Rapid Transit (BRT) Guerrero (2014). Examples of the implementation of this model are some cities in the metropolitan areas of Mexico defined from the intermunicipal conurbation, where the need for a mass transportation system increased, such as the metropolitan area called Valle de México and the metropolitan area Puebla- Tlaxcala, Zamudio & Alvarado (2015) and (2018). Particularly in the city of Puebla, which has a horizontal growth, in the southern periphery there are urban settlements lacking in services, infrastructure and urban facilities. Such is the case of the San Ramón neighborhood, it was built in 1985 and currently has a population of 6,149 people (INEGI, 2015).

The implementation of a mass transportation system Urban Articulated Transport Network (RUTA) in the city of Puebla in 2013, was carried out in order to be an integrated, safe, accessible, efficient and quality transportation system.

However, it also increased the difficulties of pedestrian mobility due to the deficient conditions of accessibility to public transport. The system consists of three trunk lines oriented from north to south and from east to west. In particular, line 2 was implemented in 2015 and runs through the city from north to south, is located on avenida 11 sur and is structured in 34 stations, a Metrobús line with a length of 13.8 km, and feeder routes.

The San Ramón neighborhood was affected by the implementation of this line, due to poor urban conditions and the lack of pedestrian infrastructure, coupled with the withdrawal of urban routes and thus the waiting times to board the RUTA system were increased. distances from homes to access public transport. Therefore, the problem of a low planning of the RUTA system is identified, in which it was omitted to consider the pedestrian infrastructure to access the public transport system, which causes difficulties in pedestrian mobility. The neighborhood has deficiencies in urban accessibility conditions such as dirt roads, deteriorated sidewalks, and urban obstacles such as changes in the level of the sidewalks, noxious vegetation and light poles.

It is hypothesized that the poor urban conditions that affect pedestrian mobility could be solved through participation mechanisms that help improve the accessibility and mobility of the neighborhood.

Development of Sections and Sections of the Article with subsequent numbering

This article is made up of three sections: the first section shows a theoretical framework in which theoretical references such as Gutiérrez (2013) and Carpio (2014) were reviewed that help to define the mobility paradigm and the principles of accessibility, from the right to the city approach. In the second section, the diagnostic analysis and evaluation are presented by means of an instrument of urban accessibility conditions in the case of study. In the third section, citizen participation workshops were applied with the inhabitants of the colony to identify the perception of accessibility and mobility to the RUTA system. Finally, the conclusions of the research work are presented.

Methodology

The methodology used in this work was Action Research under the approach through successive approaches to the three fields of theoretical, physical-spatial and legal study. The method of documentary analysis was applied through a theoretical review of the principles of accessibility, the paradigm of mobility and public transport from the perspective of the right to the city.

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A diagnostic analysis of the conditions of urban accessibility and pedestrian mobility was carried out through field trips, spatial analysis with Geographic Information Systems, and an evaluation was carried out through an instrument designed based on the Mexican street manual. For the analysis of those involved, workshops were held with focus groups of inhabitants, students and members of the board of directors in order to identify the perception of mobility and accessibility of the inhabitants.

The importance of accessibility to public transport

Mobility has been understood as a practice that allows people to move from one place to another, allowing people to access goods and services, in addition to the different land uses of the territory that are specified in the needs of the inhabitants (Gutiérrez, 2013). The operation of the city is closely related to social, economic and political structures, this operation is called urban dynamics, and it is made up of three dimensions: physical, moral and functional (Jiménez, De Hoyos, & Álvarez, 2014). The physical dimension refers to what is built in an urban environment such as the uses of land, infrastructure and equipment; the moral or technical dimension refers to all regulatory frameworks and planning instruments; and the functional dimension refers to the activities that the inhabitants carry out (Jiménez, De Hoyos, & Álvarez, 2014).

Urban dynamics allows analyzing, making proposals and public policies that improve planning and operation schemes in mobility and accessibility issues. Accessibility has been conceived as the ability of people to overcome distances that separate places (Gutiérrez, 2013), hence the importance of providing public transport nodes with pedestrian infrastructure in order to guarantee accessibility to public transport. Faced with inequalities in ease of access and mobility, the term multi-accessibility ensures more democratic environments that allow citizens to exercise the right of mobility (Carpio, 2014). At the international level, based on the new urban agenda of UN Habitat III, Mexico seeks to promote, from its planning instruments and laws, the principle of the right to the city through equitable access to housing, goods and services, as mentioned above. continuation.

Create and inhabit fair, safe, healthy, accessible, affordable, resilient and sustainable cities and human settlements, to enshrine this ideal, known as “the right to the city”, in its laws, political statements and charters. (United Nations on Housing and Sustainable Urban Development, 2017, p. 19)

The purpose of Mexico's New Urban Agenda is to promote urban planning based on safe and accessible mobility for all, and in turn a transportation system that provides a relationship between people, goods and services (United Nations, 2017). Likewise, that prioritizes attention to the needs of people, mainly those who are in vulnerable situations such as women, children, the elderly and people with disabilities.

It is important to improve proximity accessibility, according to De la Hoz Sánchez & Monzón de Cáceres (2009), since mobility does not understand administrative borders; In other words, it goes beyond the neighborhood, metropolitan and regional limits, the inhabitants develop in a fragmented and diffuse territory, which represents territorial inequalities. For this reason, urban development plans must focus on proximity mobility that prioritizes the use of public transport and that facilitates active mobility, in addition, the nodes of public transport accessibility must be analyzed, which considers the quality of the road infrastructure.

Urban planning of the BRT transport system oriented to neighborhood accessibility

Urban growth has oriented public transport towards mass transport in order to increase the capacity of users more quickly in transfers. In the last decade, Bus Rapid Transit (BRT) have been introduced in metropolitan cities because they combine capacity with speed, since they have exclusive lanes that facilitate their flow. It is important that in the planning of BRT systems the conditions of the pedestrian infrastructure are considered, evaluating the environment of public transport stations (Guerrero Contreras, 2014), in order to create accessible environments, the importance of evaluating two fundamental elements.

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First, define the delimitation of an area of influence with a range of 400 to 800 meters (Junping, Wang, Kenneth, & Bo, 2016, p. 18; Gutiérrez & García Palomares, 2008; François Raulin, 2020) to determine an environment pedestrian, which is used for the analysis of public transport nodes and is related to equipment and land uses.

In an urban environment, it is important to highlight the use of residential land that is intended for housing in order to guarantee access to public transportation. Second, an analysis of the conditions of the sidewalks, urban furniture, public lighting, vegetation, and other factors that influence the behavior of pedestrian mobility (Gutiérrez & García Palomares, 2008). In addition, another element that must be considered has been identified as urban obstacles, understood as infrastructure (poles and wiring), urban furniture (garbage cans and telephone booths) and vegetation (trees and undergrowth) that obstruct and hinder pedestrian mobility.

The planning and implementation of a mass transportation system must consider an analysis of accessibility around the stations or nodes of public transportation from the urban scale to the neighborhood scale. Where they are equipped with urban elements and infrastructure that allow pedestrian mobility of the inhabitants to the public transport stations. Therefore, there must be a fluidity in the infrastructure from the different scales, to guarantee accessibility (Junping, Wang, Kenneth, & Bo, 2016).

Urban accessibility index

The analysis in the different territorial scales allows to evaluate the degree of accessibility to the urban environment that the inhabitants have. On the urban scale, the degree of accessibility for pedestrians to the equipment and infrastructure that a city has can be measured, while on the neighborhood scale, the quality and comfort of the pedestrian infrastructure at the level of blocks can be evaluated (Esquivel, Hernández, & Garnica, 2013). The 5 D model is a theory that has helped the design of BRT transport through the accessibility indexes: density, diversity, design, destination and distance, in order to evaluate the neighborhood environment for pedestrian mobility (Junping, Wang, Kenneth, & Bo, 2016).

Density is understood as the amount of population in an urban or neighborhood environment that is sought to be served or planned (Junping, Wang, Kenneth, & Bo, 2016). Diversity refers to the balanced combination of equipment, land uses and services in a city, mainly in areas destined for housing since, if this diversity is not fulfilled on a neighborhood scale, it means repercussions on mobility (Junping, Wang, Kenneth, & Bo, 2016). The lack of services and equipment increases the number of trips, inside or outside the neighborhood (Ewing & Cervero, 2001). The design refers to those elements of the public space that facilitate pedestrian mobility such as wide sidewalks, lighting and vegetation (Gainza & Iker, 2014).

The destination is understood as the accessibility that destinations have to reach it, which are favored with the combination of land uses, urban design, pedestrian and cycling infrastructure; In general, peripheral neighborhoods have no accessibility, due to discontinuities in the urban fabric and the lack of pedestrian infrastructure (Junping, Wang, Kenneth, & Bo, 2016). Distance refers to the distance to public transport, which not only symbolizes the distance that people must travel to board public transport, in turn implies the integration of various modes of transport (Ewing & Cervero, 2001) (Junping, Wang, Kenneth, & Bo, 2016) (Gainza & Iker, 2014) (see, Figure 1).

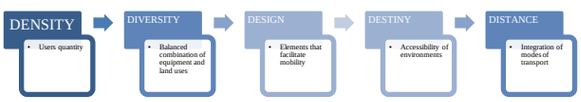

Figure 1 5D model
Source: Own elaboration based on Junping, Wang, Kenneth, & Bo (2016)

It is important to consider the 5D model in the planning of a mass transportation system, at different territorial scales, in which the needs of the inhabitants are recognized to build accessible and appropriable urban environments. In this process, evaluation and participatory management are essential to improve the quality of public space to access public transport in neighborhoods. Participation requires various methodological tools and the involvement of actors as a management instrument (Segovia & Dascal, 2000).

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Mobility before the RUTA system

Before line 2 of the RUTA, the inhabitants of the San Ramón neighborhood traveled through urban routes such as: the Santa Clara route, the 34 route and the Galgos del sur route, with its different branches such as: San Ramón 4th section, Ramón 3rd section and Colosio (see, Figure 2). As of the implementation of the RUTA system, the state government withdrew the urban routes, they were replaced by the feeder routes of the system, which did not retain the same route as the previous ones, the distance between the stops of the feeder route increased up to 1.3 km, compared to urban routes. These changes in the routes have caused users to walk longer distances to board a feeder route and wait up to 20 minutes due to the infrequency.

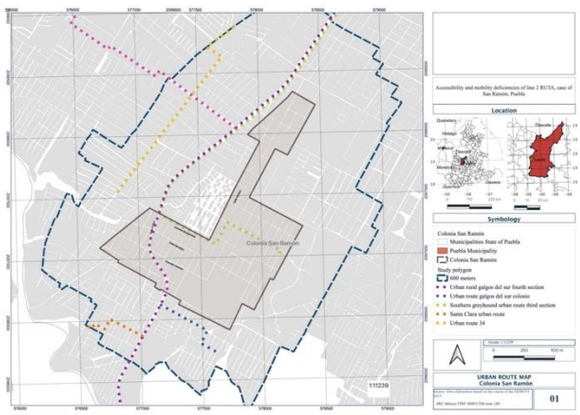

Figure 2 Urban routes before ROUTE
Source: Own elaboration based on the course of the SEMOVI 2015

Colonia San Ramón, poor accessibility

The San Ramón neighborhood is an urban settlement located on the southern periphery of the municipality of Puebla, it was built in 1985 (see Figure 3), the layout of the neighborhood is reticular and is made up of 131 blocks with a total of 2,847 homes, of which only 219 homes have cars (INEGI Population and Housing Census, 2010). In addition, it is adjacent to nine urban settlements such as Jardines de San Ramón, INFONAVIT San Ramón, Geovillas del Sur, Ciprés del Sur, Hacienda del Sur, Jardines de Juan Bosco, l Nuevo Plan de Ayala or also called Unidad Antorchista and Luis Donaldo Colosio, these last two are irregular settlements. In this neighborhood deficiencies are identified in the pedestrian infrastructure such as dirt roads, roads with discontinuous sidewalks and the presence of obstacles.

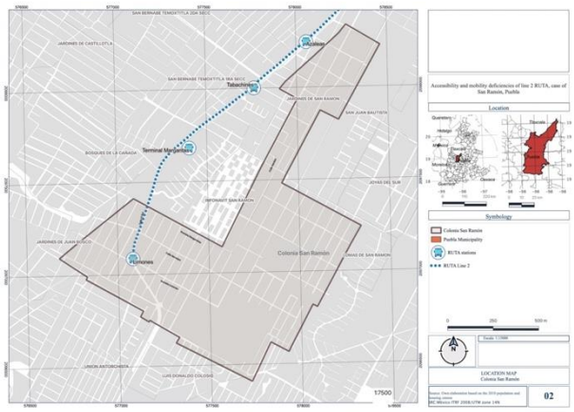

Figure 3 Location
Source: Own elaboration based on the State and Municipal Geostatistical Framework, INEGI, 2018

The conditions of pedestrian mobility in the streets of the San Ramón neighborhood were analyzed based on a diagnostic instrument that was designed to measure the degree of accessibility in the urban structure, it should be noted that the presence of the minimum elements of a road that allows universal accessibility. The instrument is divided into two parts, the first part determines the presence of elements that the roads have, which were classified into ten groups, elements of stationary activity, elements of universal assistance, elements of road safety, elements of connectivity, urban infrastructure, vertical signage, horizontal signage, road covering, green infrastructure and the presence of urban obstacles.

The evaluation was done through a binary system, which allowed to measure the presence of the elements in the road, this instrument was applied in all the roads of the San Ramón neighborhood, through the field trips. In the second part of the instrument, the conditions of these elements were evaluated through a binary system (see, Figure 4). The ten groups of the elements of analysis were broken down into subsections that allowed the evaluation of the conditions and degree of accessibility of the neighborhood's roads.

The elements of stationary activity, in stops and / or stations of public transport, were subdivided into three sections, in which they are evaluated: the signaling of the stops and / or stations, the minimum dimensions for the ascent and descent and the location of the stops in the mixed strip.

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In the elements of assistance and universal accessibility, three groups were reviewed: sidewalks, ramps for people with disabilities and tactile guides. On the sidewalks, it was evaluated that they were continuous, that they met the minimum dimensions, that they did not have obstacles that impeded or hindered mobility and that the slopes did not exceed 2% incline to guarantee pedestrian mobility. In the ramps for people with disabilities, it was evaluated that they had no obstacles and that the slopes did not exceed 2%. In the podotactile guides, they were evaluated that they were continuous on the roads and that they did not present obstacles.

The elements of road safety in which the traffic lights and garrisons were evaluated. The traffic lights of public transport and automobile traffic lights of which the functionality was evaluated were considered. The gaskets were evaluated that they were in good condition, that is to say that they were not broken and that they were painted.

The connectivity elements were considered the exclusive public transport lanes, it was evaluated that they had confinement elements and that they had horizontal signage. Regarding vertical signage, four elements were evaluated such as nomenclature, preventive, restrictive, informative signs, in which readability was evaluated. The horizontal signaling five elements were evaluated: presence of school zone 30, stop line, line of direction of movement, line of pedestrian crossing, line of cyclist crossing.

In the urban infrastructure, the public lighting was evaluated that the luminaires were maintained and functional, and the presence of drainage and sewerage. The roads were evaluated for having some type of asphalt or hydraulic concrete coating, and it was evaluated that it was homogeneous and that it did not show deterioration. In the green infrastructure, the presence of trees or shrubs that provide shade and are a plant barrier was evaluated.

The results of each element were added in natural numbers and became the percentage of accessibility of the roads, 100% represents the presence of all urban elements and in good condition.

The evaluation of the accessibility conditions to the urban structure of the neighborhood was applied to 114 roads (100%). The results obtained from the diagnostic instrument were classified based on an accessibility scale according to the highest value obtained, and from this they were grouped into five types: in a range of 60% to 100% it is very accessible, It is important to mention that none of the roads in the neighborhood belongs to this typology, from 45% to 59%, it is accessible from 30% to 44%, it is moderately accessible, from 15% to 29% it is low accessibility, and 0% at 14% it is very low accessibility; (see, Table 1).

Diagnosis of accessibility to the urban structure		Local road Nardos Street YES (1)	NO (0)	SUM	%	Evaluation
Stationary activity elements	*Public transport stops and / or stations*	1		1	11%	12% VERY LOW ACCESSIBILITY
Elements of assistance and universal accessibility	*Sidewalks, ramps for people with disabilities and tactile guides*	1		3	30%	
Road safety elements	*Traffic lights and garrisons*	1		2	50%	
Connectivity elements	*Exclusive public transport lanes*		0	0	0%	
Urban infrastructure	*Lighting, drainage and sewerage*		0	0	0%	
Vertical and horizontal signage	*Zone 30, stop line, pedestrian crossing and bicycle crossing line*	1		1	20%	
Coating of the road	*Asphalt or hydraulic concrete pavement*		0	0	0%	
Green infrastructure	*Presence of trees and / or shrubs*		0	0	0%	

Table 1 Diagnostic instrument of accessibility to the urban structure
Source: Own elaboration based on the manual of streets of Mexico, SEDATU (2019).

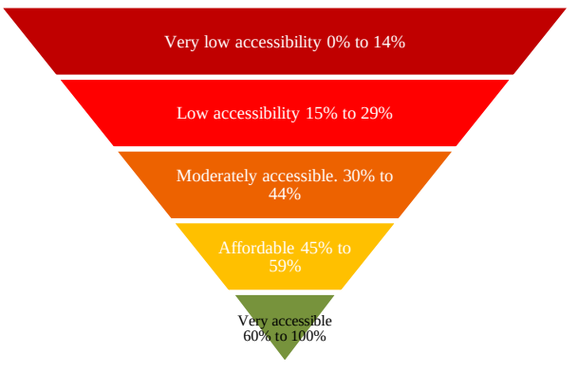

Figure 4 Scale of accessibility to the urban structure
Source: Own elaboration based on the results of the diagnostic instrument of accessibility to the urban structure of the San Ramón neighborhood

According to the results obtained in the accessibility scale, the roads of the San Ramón neighborhood were georeferenced, according to the typologies of: very low accessibility, low accessibility, moderately accessible and accessible. In the results obtained, out of 114 roads analyzed, which represents 100%, 66.66% are roads with very low accessibility, 12.28% are roads with low accessibility, 13.15% are moderately accessible roads and 7.89% are accessible roads. note that no very accessible roads were identified within the analysis (see, Figure 5).

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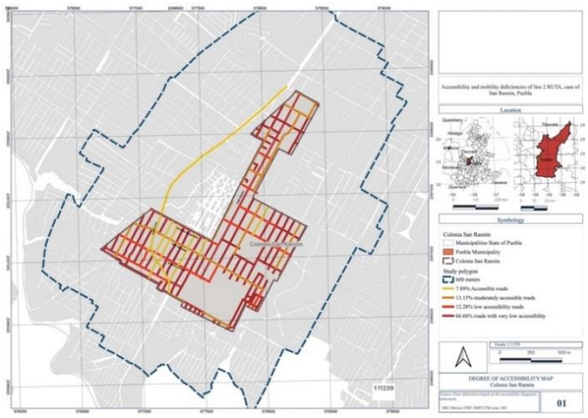

Figure 5 Degree of accessibility of the roads of the San Ramón neighborhood
Source: Own elaboration based on the results of the evaluation of the accessibility diagnostic instrument

The weak planning of the RUTA system

The planning of mass transportation systems must guarantee and ensure the access of the inhabitants to the different services and facilities of the cities, which is why the different legal and planning instruments were reviewed and analyzed from the metropolitan, state and regional levels. municipal that comprises the RUTA system, to identify the regulations and strategies that they propose has the instruments from the five categories of analysis density, diversity, design, destination and distance.

At the metropolitan level, it was identified that the Puebla-Tlaxcala Metropolitan Area Development Plan (2013) does not contemplate the categories of density and diversity, only the design, destination and distance that are included in the section on Metropolitan Mobility Policy. This instrument did not contemplate the development of a transportation system that facilitates the inter-municipal connection of the municipalities of the metropolitan area, and it is also a plan that has not been updated. In addition to this, the plan presents an inconsistency with article 36 described in the General Law of Human Settlements, Territorial Ordering and Urban Development (LGAHOTDU) (2016), since it proposes a coordination of the three levels of government and the participation of the civil society itself is not fulfilled.

On the other hand, there is a weakness in the disappearance of organizations such as the Metropolitan Area Planning Institute (IMEPLAN) since it can accentuate the mobility problems that the metropolitan area has, since there is no body that plans long-term strategies. deadline to improve infrastructure and access to services in the Puebla-Tlaxcala metropolitan area. In addition, the Council for the metropolitan development of this same area has not been able to define strategies for its development. Puebla's sustainable metropolitan development commission lacks specialized profiles in terms of land use planning, mobility and public transport, for this reason, despite its existence, no proposals have been made in favor of mobility and accessibility to public transport.

At the state level, Puebla, in the Transportation Law for the State of Puebla 2017, the presence of the five categories of analysis was identified where density refers to the right to the city in article 4, diversity in universal accessibility in article 4.1, the design of access to services in articles 103 and 115, the destination with the interconnection of equipment in articles 103 and 116, finally the distance in the interrelation of the urban centers mentioned in articles 116 y128. This instrument defines two competent authorities, which is the Secretariat of Infrastructure, Mobility and Transport and the decentralized body of Tolls Puebla in charge of RUTA, however, this law has focused on setting rates, granting concessions, and has not achieved an effective planning of public transport in coordination with the municipalities of the State, in order to achieve a metropolitan planning that benefits the greatest number of inhabitants.

At the municipal level the Municipal Development Plan 2018-2021, the five categories of analysis are present where the density of road users is present in strategy 1.2, diversity in strategy 4.4 use of public transport, design in strategy 3.1 and 3.3 safe and accessible infrastructure, the destination in strategy 4.1 in the orderly and connected transport network, and the distance in the infrastructure to integrate RUTA, however, it is in this strategy where deficiencies are identified that the RUTA system has such that only 11.7% of the stations have pedestrian infrastructure in their surroundings, and that 15,260 homes on the southern periphery have limited access to public transportation.

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The strategies that are proposed do not define a collaboration with various government entities, and the improvement of the pedestrian infrastructure is not contemplated and where universal accessibility is guaranteed.

The analysis based on the 5d model shows the disarticulation between the governmental bodies in the different territorial scales, which is reflected in the weak metropolitan planning in which the route system should impact and in which the citizens are considered and therefore to experts who have profiles specializing in mobility, accessibility and transportation issues. Faced with this lack of coordination at the state and municipal levels in Puebla, civil society has carried out various actions, an example of which is the reform of the articles necessary for Mexicans to have a general law on mobility and road safety. that have been formulated to recognize the right to mobility in conditions of road safety, accessibility, efficiency, sustainability, quality, inclusion and equality.

Towards a solution through a neighborhood organization

According to Segovia and Dascal (2000), citizen participation has the ability to influence decision-making in public affairs and contribute to the development of collective life and arises as a way to amend social problems or demands of public interest, as well It is understood as the involvement of people in decision-making and the degree of influence in matters of public management, such as local government programs.

That is why, to know the perception of the inhabitants, some social actors, focus groups, with inhabitants, students and members of the board of directors who were interviewed were identified. A physical and digital instrument was developed consisting of twelve questions, divided into three sections; the first is for the purpose of obtaining information regarding the occupation and age range of each group, the second is to identify the conditions of mobility, accessibility and transport systems of the colony and the reasons for the transfer, the last section has the purpose of know the opinion that the inhabitants have regarding the mobility of the colony, (see, Figure 6).

The results obtained are, 80% of the inhabitants use public transport and 20% travel on foot. It was also identified that the inhabitants put into practice the use of shared car, which is a palliative action that is considered not to solve mobility deficiencies but demonstrates an organizational structure in the neighborhood. 30% of students live in the neighborhood and 70% go to the neighborhood through the educational center. 50% of students use public transport, 5% use the bicycle as an alternative for mobility.

The inhabitants consider that "there are a lack of units, it is more expensive, they are always full, we have to wait a long time to get on public transport, I prefer that they return to the routes we had" (López, 2020). On the other hand, that "They need to pave the streets and put sidewalks so that we do not walk where cars pass, I prefer to use the shared car, it is faster and safer" (García, 2020). In addition, that “you cannot walk the streets, it is always dark when we get to school and there are no lamps and I have been mugged” (Marin, 2020).

Figure 6 Focus group with inhabitants
Source: Pérez, 2020

The work with the focus groups allowed to corroborate the deficiencies that the neighborhood has in mobility and accessibility to access public transportation, and practices such as the use of carpooling were identified. On the other hand, the presence of a board of directors that during its management period has carried out works that have helped to improve the mobility and accessibility conditions in the neighborhood, the presence of street representatives who are the direct communication between the residents was also identified.

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The inhabitants and the board of directors, however, need actions that generate greater impact, such as linking up with other civil organizations that address accessibility issues, in order to develop projects and proposals from management and participation. With what has been identified so far, it is necessary to articulate social actors with actions that help improve mobility conditions, since citizen participation is identified and the implementation of a participation mechanism is possible.

That is why a solution proposal to improve the accessibility of the neighborhood will be based on the diagnosis obtained from the instrument and the mechanism of participation with the focus groups, where proposals, strategies and actions are developed that give priority to the roads that were diagnosed as having very low accessibility. Some of the suggested proposals are: to form a committee in charge of managing the accessibility of the neighborhood, which must be made up of members of the board of directors and volunteer residents where short, medium and long-term strategies are formulated, such as carrying out cleaning campaigns of the roads on the hill in which the inhabitants participate, in order to remove obstacles from the roads that make accessibility difficult, such as weeds and garbage. Follow up on requests such as improvement of sidewalks, maintenance of public lighting, request for sidewalks, sidewalks and paving of streets presented to the Puebla City Council. This articulation of strategies and actions of the different social actors can help to contribute to the improvement of the accessibility of the neighborhood.

Conclusions

The disorderly and fragmented growth of cities has had a significant impact on mobility, particularly in terms of travel distances (De la Hoz Sánchez & Monzón de Cáceres, 2009). This urban growth has led us to think about BRT mass transport systems in metropolitan cities due to the need for units with greater user capacity and faster transfers, Guerrero Contreras (2014).

The San Ramón neighborhood is not alien to disorderly and fragmented urban growth, since it belongs to the periphery of the municipality and therefore presents some deficiencies in the pedestrian infrastructure, which were increased when a mass transport system called RUTA was implemented. These deficiencies were evidenced through a diagnosis of the accessibility conditions of the neighborhood where dirt roads, deterioration in sidewalks and low connectivity of these, noxious vegetation and urban obstacles were identified. These conditions cause difficulties in pedestrian mobility to access public transport, according to the diagnosis, 66% of the roads are of very low accessibility.

A review of the planning instruments, plans and programs was carried out from the territorial scales contemplated by the RUTA system, which are metropolitan, state and municipal, based on the application of the 5D model based on categories such as density, diversity, design, destination and distance, in order to identify the deficiencies in the instruments in the planning of the system.

In addition, a participatory process was carried out with the inhabitants of the neighborhood in order to corroborate and support the urban diagnosis, the existence of the neighborhood organization was identified where the inhabitants in a palliative way started the practice of shared car which aims to help to the mobility of the inhabitants, shortening distances to approach public transport, reduce waiting times, be safe, promote organization and not generate a significant cost in the cost of the passage, since it works with voluntary cooperation. Although, this practice does not solve the deficiencies of mobility and accessibility to public transport in the neighborhood, it shows the neighborhood organization structure that is present in the neighborhood, elements of participation in the different organizations were identified, such as the neighborhood organization and the board of directors, such as the practice of palliative actions of the inhabitants, actions and proposals of the board of directors. These elements are the basis for a participatory management that helps to improve the conditions of accessibility to public transport.

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Acronym

BRT - Bus Rapid Transit

INEGI - National Institute of Statistics and Geography

ROUTE - Urban Articulated Transport Network

LGAHOTDU- General Law of Human Settlements, Land Management and Urban Developmen

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Article **ECORFAN Journal-Republic of Peru**
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Technical report for a Lemon packing plant in southeastern Mexico regarding productivity, for the generation of an improvement model

Informe técnico para una empacadora de Limon en el sureste de México en materia de productividad, para la generación de un modelo de mejoramiento

LÓPEZ-ANZUREZ, Omar Alejandro†*, ELISEO-DANTÉS, Hortensia, LÓPEZ-VALDIVIESO, Leticia and PÉREZ-GÓMEZ, Gerardo Ernesto

CONACYT / TecNM campus Villahermosa, Mexico.

ID 1st Author: *Omar Alejandro, López-Anzurez* / **ORC ID:** 0000-0002-2769-4087, **CVU CONACYT ID:** 1003678

ID 1st Co-author: *Hortensia, Eliseo-Dantés* / **ORC ID:** 0000-0003-4006-4669, **Researcher ID Thomson**F-6749-2018, **PubMed Autor ID:** 6eb3adfd69824484b018f668c2670f109f08, **CVU CONACYT ID:** 411079

ID 2nd Co-author: *Leticia, López-Valdivieso* / **ORC ID:** 0000-0001-6288-3636, **Researcher ID Thomson:** G-5753-2018 **PubMed Autor ID:** 88b3c7591c5b9c66b8657c78d9f44d708, **CVU CONACYT ID:** 67839

ID 3rd Co-author: *Gerardo Ernesto, Pérez-Gómez* / **ORC ID:** 0000-0002-3681-3594, **CVU CONACYT ID:** 959329

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Abstract

Productivity is the result that all organizations seek, but every day it is more difficult to achieve it and especially in the current context such as the pandemic generated by the Covid-19 virus, this need for transformation has provided new areas of opportunity throughout the world. world, generating new techniques, jobs and knowledge. This is the case of the present investigation that focuses on the realization of a technical report in the citrus exporting companies of the southeast of the area, taking as a reference the company GM citrus This report is carried out through a systemic approach and comprehensive, considering the use of the Comprehensive Technical Productivity Assessment tool (TIEP) that integrates within its application the evaluation of 10 priority elements to achieve productivity and therefore the quality of organizations. It should be noted that the information that integrates the tool and the elements is taken directly from the experts linked in the context of the study. It is of great importance to mention the participation of the personnel who collaborated to compile the information, as well as the experts who advised to be able to integrate a comprehensive scheme of the organizational scenario.

Productivity, "Citrus GM", COVID-19, Transformation

Resumen

La productividad es el resultado que todas las organizaciones buscan, pero cada día es más difícil conseguirla y sobre todo en el contexto actual como la pandemia generada por el virus de la Covid-19 esta necesidad de transformación ha brindado nuevas áreas de oportunidad en todo el mundo, generando nuevas técnicas, empleos y conocimientos. Este es el caso de la presente investigación que se centra en la realización de un informe técnico en las empresas exportadoras de cítricos de la zona sureste del , tomando como referencia la empresa GM cítricos Este informe se lleva a cabo a través de un enfoque sistémico e integral, considerando el uso de la herramienta Técnica Integral de Evaluación de la Productividad (TIEP) que integra dentro de su aplicación la evaluación de 10 elementos prioritarios para lograr la productividad y por ende la calidad de las organizaciones. Cabe señalar que la información que integra la herramienta y los elementos, es tomada directamente de los expertos vinculados en el contexto del estudio. Es de gran importancia mencionar la participación del personal que colaboró para la recopilación de la información, así como los expertos que asesoraron para poder integrar un esquema integral del escenario organizacional.

Productividad, "GM cítricos", COVID-19, Transformación

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* Correspondence to Author (Email: lop.anzurez@gmail.com)
† Researcher contributing first author.

Introduction

The export of citrus from Tabasco is now one of the most relevant economic activities for the state agricultural sector, of which the export of lemon stands out, which has increased considerably in recent years. Tabasco is among the ten leading states in citrus production and export, with the United States of America being the main recipient of the product.

The measurement of the processes allows to identify the main problems in a specific way, in such a way that it provides better understanding when locating the areas of opportunity and improvement, that is why productivity is a key pillar in any organization with the which determines a comprehensive approach that benefits all stakeholders, analyzing each of the context variables.

The lemon packaging process is a key piece to improve the development and productive capacities of the Chontalpa area of the state of Tabasco, as well as this process presupposes social development and cultural development in this region by providing employment in remote areas of the municipality of Huimanguillo, which has been a key piece for the current agro-industrial development in the lemon production sector in the state of Tabasco.

The development of companies in this region is of vital importance for economic and social well-being, to take advantage of the unique characteristics of the soil for lemon production and labor, and no less important is the consolidation of existing companies that generate jobs. and new business opportunities for the full utilization of the fruit.

The development of this project is determined by the need to evaluate the productivity in the Persian lemon packing company "GM" citrus, in order to maintain a good productive level and know the current situation of the organization, through the application of the tool "Comprehensive Productivity Assessment Technique" with the purpose of analyzing the ten elements that every organization must take into account to improve the system.

Method description

To give continuity to this improvement in productivity, a tool called: Comprehensive Evaluation Technique for Productivity (TIEP) was applied, which identifies how the context variables influence the ten elements that every organization should have. To integrate the knowledge and development of the organization, these elements are essential for the comprehensive knowledge of the company and integrate a series of general and specific aspects that denote the productive scope of the company.

Elements:

1. Conceptual approach of the company.
2. Knowledge of the processes.
3. Social scope of the organization.
4. Planning administration.
5. Management participation.
6. Creativity and organizational innovation.
7. Knowledge of customers.
8. Technological development.
9. Macroeconomic knowledge.
10. Comprehensive development of human resources.

The Comprehensive Technical Evaluation for Productivity instrument (TIEP) is a tool that gives us the security of being able to evaluate ten fundamental elements that every organization must have, with this generate a concrete measurement through a qualitative and quantitative analysis that relates the elements to the context variables; Environmental, Cultural, Economic, Social, Political, Technological, that could influence the productivity of the organization.

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It is considered that the evaluation is carried out in each of the departments that make up an organization and can be segmented by a group of departments, this is carried out personally so that the interviewer can start a conversation that integrates questions with which he qualifies his criterion in which way the variables influence each of the elements and their relationship.

Analysis from the method

The study of productivity through the TIEP tool allowed the organization to obtain results with a view to applying a comprehensive approach, analyzing the different elements that every organization must integrate into its work areas and identifying the impact of context variables on these, to determine the productive level of the company.

This study will focus on all the processes of the company "GM" citricos, where the following areas were taken as a reference for their study:

- Management.
- Financial.
- Shopping.
- Operations.
- Assortment.

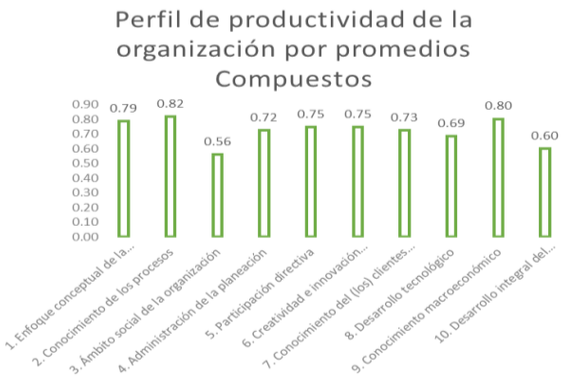
The application of 5 instruments will be considered, one in each of the aforementioned areas to analyze the 10 elements that every organization must integrate into its organization to control and improve productivity.

Results

Graphic 1 Organization productivity profile
Source: Author's elaboration, 2021

In the integral graph of the productivity profile of the organization the relationship of each of the areas is observed and it is summarized in the following, the areas are at a balanced level downwards given the interpretation of the graph, however there is the impact of the variables on each of the elements, this greatly influences the results and, as can be seen in the graph, the weight of the variables in the elements is notable, above all there are more notable points for the variables; economic, environmental, political and social.

The items with the lowest score; Social scope of the organization, integral development of human resources represent the incidence of the variables, as well as a performance with areas of opportunity, which by means of the design of an improvement model, those points that would specify and help to raise the score can be identified of the organization.



Graphic 2 Organization productivity profile
Source: Author's elaboration, 2021

In the following Graphic we can see more clearly, where this score leans, which is one of the red flags for the institution. The social scope of the organization is of great importance for all organizations since that is where what we know as the work environment comes from, during the measurement a system was not found in which the social scope was measured and it was not considered important. In the organization.

In the same way, a higher score is presented on the element "Comprehensive development of human resources", this despite having a low score, is directly related to the previous one, since the company does not have measurement indicators to know how the human resource development, the Tampóco company has a human resource retention system, there is no monthly or annual indicator of the people who are no longer working in the organization.

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The development of human resources is observed as one of the most relevant points in the study, but the one with the least focus on the part of the organization.

Proposal

The GM citrus company is an organization committed to the processing industry, lemon export, and regional development, it is a company that is in the process of development and consolidation, currently occupies a place within the ten lemon exporting companies of the region. Which leads us to mention that in the measurement of its areas it was possible to determine that it is at a stable level with a negative perspective, given the scores obtained in the, it was found incidence of the variables in the elements evaluated in each area, determining that the impact of these influences to a great extent the performance and achievement of the objectives.

Various areas of opportunity were found detected by the measurement of the elements and their interaction and incidence of the context variables, the organization whose main objective is economic stability like that of any other organization, has neglected the importance of planning Therefore, retaking and establishing the review of the strategic plan of the company is one of the main proposals for the organization, and include a system of indicators in which all the processes that are carried out on the site can be integrated, and with this, having the ability to improve the growth of the company.

It is recommended to integrate all the processes to a quality management system, with this having the certainty that everything meets the necessary standards for each of the processes, and the door is opened to meet the requirements of any audit system and having a passing audit can help develop new business with other clients.

Another area of opportunity detected is the high staff turnover that the company has, although this was documented in the interviews, there is no turnover indicator, therefore, it is not measured and cannot be improved, staff turnover is an element that is influenced by various factors, for which the creation of a human resource development program is proposed.

Productivity improvement model

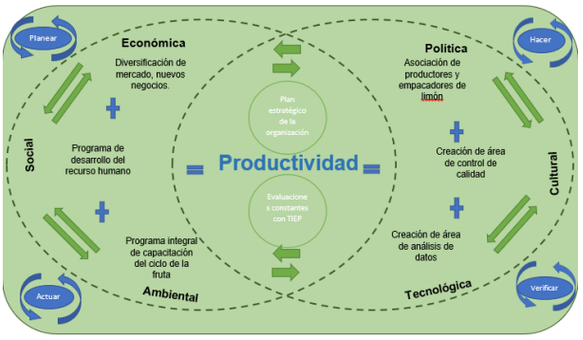

Figure 1 Productivity improvement model
Source: Author's elaboration, 2021

In the model presented, all the interaction that exists in the system that is the company is visualized, like a Venn diagram, where what is sought by the two circles is productivity. On the external side are the cycles of continuous improvement where we begin with planning, doing, verifying and acting, the continuous cycles of continuous improvement affect the entire model for the organization, it is relevant to understand that all the actions that are carried out carried out in the organization must be marked by root cause analysis and true corrective actions.

Below we present some initiatives that are stipulated in the model to achieve productivity improvement:

Diversification of new markets: 70% of its sales are for export, the rest remains in the national market, but due to the pandemic, its main client lost a chain of retail sales in the United States of North America, its sales They had a decrease of 20%, therefore diversifying other businesses, such as sales to commercial chains in Mexico and special businesses such as supply centers, bars and tea companies. Human resource development program: This program seeks to have information first of all about the rotation that exists in the company, and develop the capacities and abilities of the staff, first it is recommended to have a job description, and create a matrix of skills, to always know the human resource that the company has, do a battery of courses starting with an institutional one and then, depending on their position, those that are required to fulfill their obligations.

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Comprehensive training program of the fruit cycle: This program is ambitious, since it seeks to intervene in the culture of certain suppliers, to facilitate the knowledge of the cycle of the characteristics of the fruit and with this have a strength with your suppliers and with your own workers.

Association of lemon producers and packers: Since Huimanguillo is the municipality with the highest lemon production in the state, it is necessary to seek to have a regulator and policy facilitator for the benefit of the region, in this there is not a strong impact on the part the company, but it can be the one that manages some of the actions with the current government.

Creation of quality control area: It is recommended to create this area for the creation of the necessary documentation and the inspection process upon receipt of the products upon arrival to have greater certainty in the quality of the products.

Creation of data analysis area: In every current company there must be a data management area, due to the amount of information that is generated in all companies and particularly in a company where external variables add an important force in the taking of daily decisions.

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This research is the result of the effort and cooperation between the organization and all those involved in its development, who gave full support and consideration to the author.

We are grateful to the colleagues who were involved in the development of this research, as well as the advice provided to obtain feedback on the work.

Conclusions

As a conclusion to this research, it is determined that the GM citrus company is at a stable negative level, however, it is shown that the context variables and their impact on the elements can influence the results obtained at a given time.

It is suggested that the organization start as soon as possible with changes or improvements to the system, since this will greatly benefit the staff as well as the organizational performance, providing a better service based on quality and productivity.

The review and scheduling of the strategic plan of the company is recommended for its review and update in the points that are necessary, it is of relevant importance that the company can create a manual or electronic system of indicators, to have a visibility in time and form of what for the company generates value and waste within the process, those activities that are within the immediate and in which you do not have to have such an unexpected monetary investment for the budget, it requires time and teamwork for the assignment of activities for the revision of these points.

The materialization of the model can be specified in its application, taking as a starting point the research given here, as these are internal aspects of the organization and to a large extent none affect the processes of this, you can continue with the activities In its normality, however, the review of the strategic plan is of high importance, to carry out the recommendations mentioned, as well as carry out periodic evaluations using the TIEP tool, since it ensures concrete and stable results that seek the full benefit of the organizations.

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Competitiveness of grain oats in Mexico since 1996 to 2017

Competitividad de la avena grano en México de 1996 al 2017

GÓMEZ-GÓMEZ, Alma Alicia†, BAUTISTA-MARTINEZ, Laura and LUQUEZ-GAITAN, Carlos Ernesto*

ID 1st Author: *Alma Alicia, Gómez-Gómez* / **ORC ID:** 0000-0002-7820-6629, **CVU CONACYT ID:** 15624

ID 1st Co-author: *Laura, Bautista-Martínez* / **ORC ID:** 0000-0002-9423-4400, **CVU CONACYT ID:** 919922

ID 2nd Co-author: *Carlos Ernesto, Luquez-Gaitan* / **ORC ID:** 0000-0002-2863-0851, **CVU CONACYT ID:** 631756

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Abstract

Oatmeal is one of the most important due to the diverse use it has. The objective was an analysis of the competitiveness of grain oats in Mexico through the study of its main indicators in the period from 1996 to 2017. Production shows a decrease from 106,214 tons in 1996 to 72,091.81 tons in 2017. The main states Producers are Chihuahua, State of Mexico, Durango, Zacatecas, and Hidalgo, together they account for 96% of the total production nationwide. Indicators such as the relative trade balance (BCR), the tradability indicator (Tij) and the trade dependency coefficient (Glij) were analyzed. The BCR for Mexico in this period ranged between -0.998 and -0.995, there is no comparative advantage in the international market. The tradability indicator fluctuated between -0.28504 and -0.64688, the sector is considered an importer. Oats are uncompetitive.

Relative trade balance, Tradability, Competitive advantage

Resumen

La avena es uno más importantes debido al uso tan diverso que tiene. El objetivo fue un análisis de la competitividad de la avena grano en México a través del estudio de sus principales indicadores en el periodo de 1996 al 2017. La producción presenta una disminución de 106,214 toneladas en 1996 a 72,091.81 toneladas en el 2017. Los principales estados productores son Chihuahua, Estado de México, Durango, Zacatecas e Hidalgo, en conjunto suman un 96% de la producción total a nivel nacional. Se analizaron indicadores como la balanza comercial relativa (BCR), el indicador de transabilidad (Tij) y el coeficiente de dependencia comercial (Glij). La BCR para México en este periodo osciló entre -0.998 y -0.995, no existe ventaja comparativa en el mercado internacional. El indicador de transabilidad fluctuó entre -0.28504 y -0.64688, el sector se considera importador. Se considera que la avena no es competitiva.

Balanza comercial relativa, Transabilidad, Ventaja competitiva

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* Correspondence to Author.
† Researcher contributing first author.

Introduction

Oats were introduced to Mexico in the late twenties of the twentieth century by a group of Mennonites, from then on it acquired a singular importance mainly in the states of: Mexico, Coahuila, Zacatecas, Chihuahua among others. At an international level, data from the United States Department of Agriculture (USDA) show that oats occupy the seventh place among the grains and cereals produced in the world. The sowing season defines not only the yield and other agronomic aspects of the crop, but also the expression of some quality attributes, presence or absence of harmful organisms in the seed, so the one that allows obtaining the best yields and quality (Forsberg and Reeves, 1995).

Grain oats are unique in their uses and attributes compared to most other grain cereals. First, it is used with the whole grain; in contrast, the germ and large portions of the bran are removed from other grains before being introduced to manufacturing processes. Second, the oats are processed at high temperatures to inhibit the enzymes that catalyze the oils in the grain to preserve the product against rancidity. Edible products from processed oats include rolled or rolled oats, oatmeal, pasta, and some cereals. The oat grain has an excellent balance of amino acids and fiber and the highest level of protein.

The cultivation of oats is of great importance in Mexico, since its sown area has increased in the last 15 years. Oats are grown in Mexico mainly for forage production and to a lesser extent for grain production. Approximately, the cultivation of oats represents 4.5% of the total world production of small grain cereals, but it is one of the most widespread foods for livestock feed (Sánchez, 1988: 38).

Of the thirteen oat-producing states in Mexico, four account for 96% of the volume and almost 98% of the production value, the main being Chihuahua, which accounts for 63% of the volume and 71% of the value generated. They are followed in importance by the State of Mexico, Hidalgo and Zacatecas. The price of oats has increased by 28% between May 2011 and May 2014, reaching $ 5,050 per ton in the last month mentioned.

In the international panorama, according to the United States Department of Agriculture (USDA), among the main producers of grain oats worldwide are Russia (22%), Canada (14%) and the United States (6%), which together contribute 42% of total world production. Mexico produces only 0.39%.

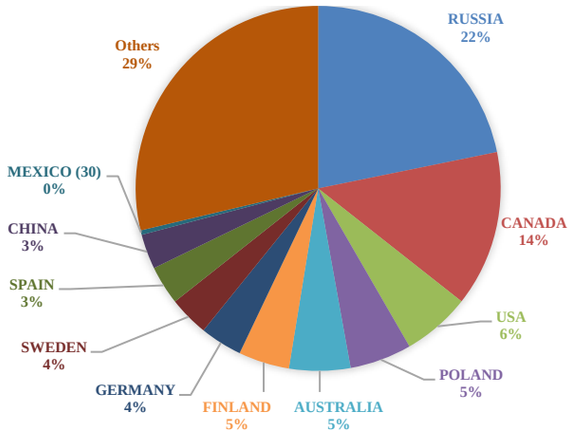

Figure 1 World average distribution of production 1996-2017
Source: Own elaboration with information from FAOSTAT 2020

In terms of exports, the main highlighted countries include Canada (55%), Finland (13%) and Sweden (10%). Mexico only exports 0.0051%.

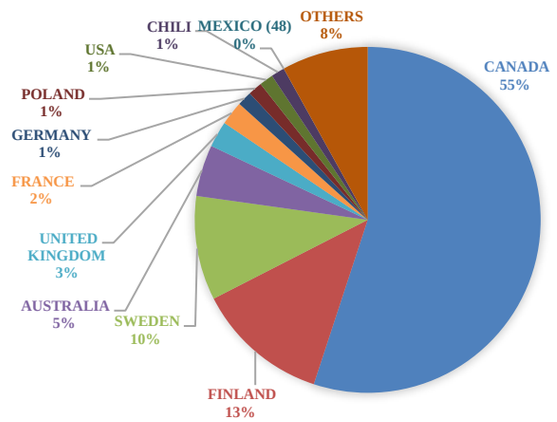

Figure 2 World distribution of exports, average for the period 1996-2017
Source: Own elaboration with information from FAOSTAT 2020

The main importing countries of grain oats are the United States (61%), Germany (8%) and Mexico (3%) in third place, which shows a negative trade balance if cereal imports are taken into account.

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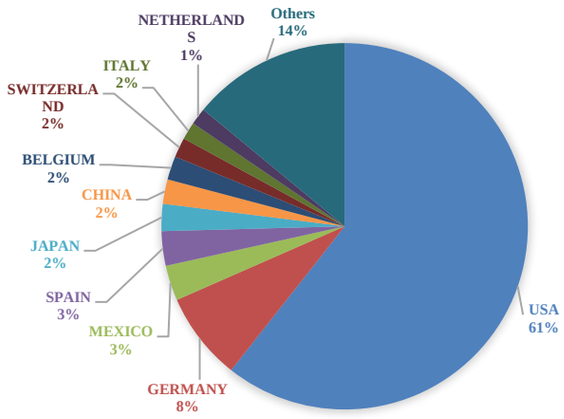

Figure 3 World distribution of average imports from 1996-2017
Source: Own elaboration with information from FAOSTAT 2020 Comparative advantage

The theory formulated by David Ricardo in 1817 that explains the origin of the enormous profits that free trade generates beyond the explanation given by the theory of absolute advantage. The theory of comparative advantage is an explanation of international trade based on differences in labor costs between producing countries.

Comparative advantage refers to the ability of a country (or region) to produce a good or service at a lower cost in relative terms, that is, in relation to other goods or services, which are also produced in the country and compared to the relative cost of producing it in other countries (or regions).

Competitiveness

The concept of competitiveness acquires a crucial importance, especially in manufacturing activities. Although there is no single conceptualization of competitiveness, various approaches refer to its multiple determining factors; factors that, in one way or another, influence the ephemeral and robust nature of the competitive position of companies and / or entire sectors of production (Porter, 2009).

Competitiveness analysis continues to refer to the concept of "comparative advantages", despite the fact that modern theory no longer considers it relevant. Recent theories move from the concept of "competitive advantages", based on cost reduction and product differentiation, that is, on the ability to innovate, the State being responsible for creating a favorable environment and stable macroeconomic policies.

Competitiveness indicators

According to Hernández (2008), the indicators adopted for the measurement and comparison of competitiveness refer to 4 blocks:

In the first place, the indicators of "revealed" competitiveness that indicate the capacity of the products or agro-productive chains to maintain or penetrate markets, these are:

Trade balance balance

The trade balance is the difference between the monetary value of exports and imports in the economy of a country during a certain period. A positive balance is known as a trade balance surplus, which consists of exporting more than what is imported. A negative balance is known as a trade deficit. The trade balance is sometimes divided into products and services (Bobadilla, 2014).

Relative trade balance indicator

The relative trade balance measures the relationship between the balance of a product's trade balance (exports minus imports) and the total sum of a country's exports and imports. With this indicator it is possible to identify net importing countries, which are possible potential markets; It also makes it possible to identify net exporting countries, which is indicative for the supply of products or to rule them out as possible markets. Additionally, this indicator allows a measurement of the degree of existing comparative advantage or disadvantage and its evolution over time depending on the behavior of the indicator (Nazif, 1997).

The tradability indicator

It measures the relationship between net exports (exports minus imports) and apparent consumption (domestic production plus imports minus exports). For foreign trade, it is used to track the gain or loss of the export capacity of the country that produces the good. This is built on two other sub-indicators, the degree of export openness that indicates the share of exports of a product over apparent consumption and this refers to the degree of penetration in a specific market, and degree of import penetration, which shows the relationship between imports of a good or sector and its apparent domestic consumption (Schwartz, Ibarra, & Adam, 2007).

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Trade dependency ratio

It is the proportion of apparent consumption that is supplied with imports, for this coefficient, it is necessary to analyze at least the statistics of five consecutive years, as this indicator is greater than the competitiveness of the production chain, which is lower, also called index of import penetration degree (Schwartz, Ibarra, & Adam, 2007).

Materials and methods

The information for this thesis was obtained from the statistical database of the Food and Agriculture Organization of the United Nations (FAO), the Agrifood and Fisheries Information System (SIAP) and the Agrifood Information System for Consultation (SIACON) of Mexico for the period 1996-2017. The main indicators used are the growth rate and the competitiveness indices.

The production variables (planted area, harvested area, production value, production, yield) and trade variables (import and export) were analyzed. For the results, the following indicators were analyzed: Relative Trade Balance Indicator (BCR), Transability Indicator (IT) and the Trade Dependence Coefficient (CDC).

Growth rate

The percentage growth rate is a useful indicator to observe whether the quantity of a variable is increasing or decreasing in a particular area. The main variables analyzed were exports, imports, harvested area, yield and production volume. The calculation procedure is:

Formula:

$$TC=VFVI-1*100 \quad (1)$$

Where:

VF = Final value; VI = Initial value.

Competitiveness indices

Competitiveness indicators in the international market were calculated, which were the relative trade balance, the tradability indicator and the trade dependence coefficient.

Trade balance balance

The balance of the trade balance is determined by making the difference between the monetary value of exports and imports in the economy of a country during a certain period.

Formula:

$$SBC=X-M \quad (2)$$

Where:

SBC = Balance of the Trade Balance; X = imports; M = exports

Interpretation:

We speak of a trade surplus when the balance is positive, that is, when the value of exports is higher than that of imports, and of a trade deficit when the value of exports is lower than that of imports. If net exports are zero, its exports and imports are exactly the same, the country is said to have balanced trade.

Relative trade balance

The relative trade balance measures the relationship between the balance of a product's trade balance (exports minus imports) and the total sum of a country's exports and imports.

Formula:

$$BCRi=Xij-MijXij+Mij \quad (3)$$

Where:

BCR_i = Relative trade balance of country j with respect to product i; Xij = Exports of product i by country j to the world market; Mij = Imports of a product i by a country j to the world market or a specific market.

Interpretation:

If BCR: -1 and 0, the country is a net importer of the product and lacks a competitive advantage

If BCR: 0 and 1, the country is a net exporter of the product and has a competitive advantage

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Tradability indicator

It measures the relationship between net exports (exports minus imports) and apparent consumption (domestic production plus imports minus exports).

Formula:

$$Tij=Xij-MijQij+Mij-Xij \quad (4)$$

Where:

T_{ij}= Indicator of tradability; Xij = Exports of product i from country j; Mij = Imports of product i from country j; Qij = Domestic production of product i of country j.

Interpretation of the model

When the indicator is greater than zero, the sector is considered an exporter, since there is an excess supply, that is, it is a competitive sector within the country.

When the indicator is less than zero, the sector is a substitute for imports, since there is an excess demand.

Trade dependency ratio

It is the relationship established between the value of exports and the value of production over a period of time.

Formula:

$$Glij=MijQij+Mij-Xij \quad (5)$$

Where:

Gl_{ij} = Degree of import penetration of product i in country j; Mij = Imports of product i from country j; Qij = Domestic production of product i of country j; Xij = Exports of product i of country j.

Interpretation of the model

As this indicator is higher, the competitiveness of the production chain is lower. If the indicator has a range between 0 and 1, it means that as the indicator approaches zero, the competitiveness of the sector or productive chain is greater, and that imports can become zero, even managing to dedicate part of the national production for export.

Results and Discussion

Trade balance balance

According to Figure 4, in which the graphs of imports, exports and the balance of the trade balance were superimposed, it can be determined that the balance of the trade balance of oats in Mexico is negative, that is, that exports, throughout the study period, are less than imports by far. Therefore, since the graph of the balance of the trade balance is below the plot of exports in the period from 1996 to 2017, our country can be considered as a net importer of grain oats.

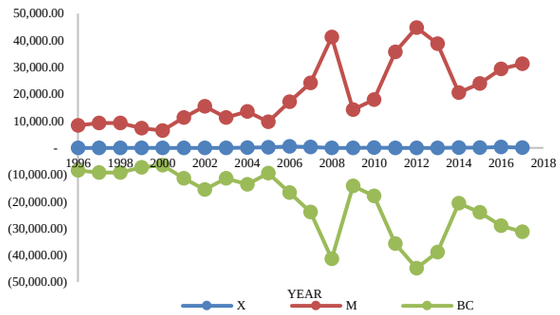

Figure 4 Behavior of the balance of the national trade balance 1996-2017 (thousands of dollars)
Source: Own elaboration with information from FAOSTAT 2020

Exports of oats in the period from 1996 to 2017, had an almost constant behavior and imports had a growing trend over the years. Given that imports are greater than exports in all years, therefore, the balance of the trade balance is negative and makes Mexico a country with a deficit in production for domestic consumption of barley.

Variable / year	1996	2001	2007	2012	2017
Exports	9.00	15.00	336.00	4.00	77.00
Imports	8388.00	11336.00	24236.00	44814.00	31283.00
Balance of trade	-8379.00	-11321.00	-23900.00	-44810.00	-31206.00

Table 1 Behavior of the value of oats exports and imports in Mexico, 1996-2017 (thousands of dollars)
Source: Own elaboration with information from FAOSTAT 2020

Production behavior

Production has had an almost constant trend throughout the period from 1996 to 2017. The lowest production occurs in 2000 with 31,884.76 tons, a point that is well below the trend line and the highest point registered in 2006 with 152,496.16 tons nationwide

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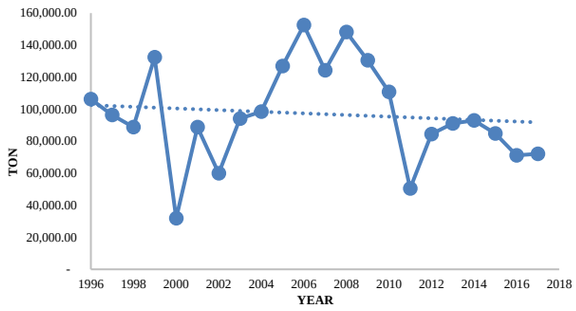

Figure 5 National production of grain oats in Mexico 1996-2017
Source: Own elaboration with information from SIAP 2020

Regarding the harvested area of grain oats in Mexico, in the study period, it has had a decreasing trend, the damaged area has been highly fluctuating, on the other hand, yields have increased as well as production.

Value / year	1996	2000	2005	2010	2015	2017
Harvested area (ha)	64181.00	22725.50	76461.00	66475.50	47254.98	43310.10
Damaged area (ha)	196.00	53398.00	7082.00	1377.00	1388.00	31.00
Performance (ton / ha)	1.29	1.19	1.77	1.90	1.68	2.42
Production (ton)	106214	31884.76	126989.05	110902.64	84788.78	72091.80

Table 2 Behavior of harvested, damaged area, yield and oat production in Mexico, 1996-2017
Source: Own elaboration with data from SIAP 2020

Competitiveness indices

Likewise, the calculations of indicators such as the relative trade balance (BCR), the Tradability indicator (IT), the Trade Dependence Coefficient (CDC) were carried out, obtaining the following results:

Relative Trade Balance Indicator

The relative trade balance in the study period shows an almost constant trend in the commercialization of grain oats, going from -0.998 in 1996 to -0.955 in 2017. According to the theory, if the relative trade balance is between -1 and 0 in a given period, the country is a net importer of the product in question and therefore lacks a competitive advantage in the international market. That is, Mexico does not produce enough grain oats, so it is necessary to import large quantities to meet national demand.

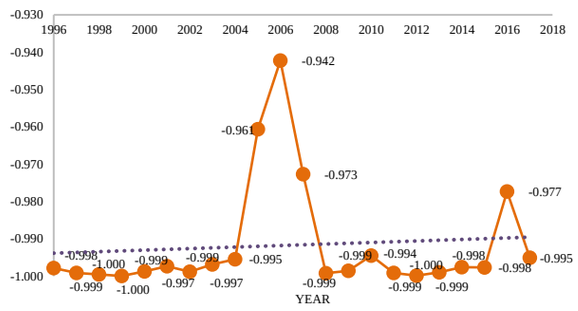

Figure 6 Behavior of the relative trade balance, Mexico 1996-2017
Source: Own elaboration with information from FAOSTAT 2020

Tradability indicator

As can be seen in Figure 7, the results of the indicator throughout the period are negative and therefore less than zero, which means that the sector is a substitute for imports, given that there is excess demand.

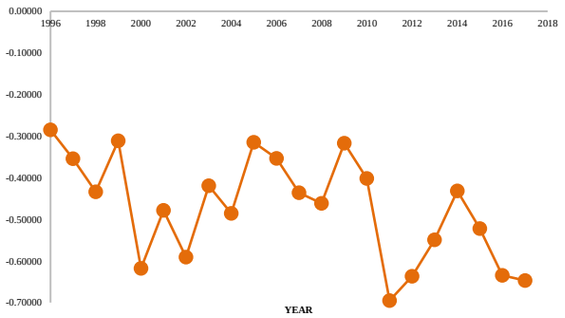

Figure 7 Behavior of the tradability index, Mexico 1996-2017
Source: Own elaboration with information from FAOSTAT 2020

Trade dependency ratio

This coefficient represents the proportion of apparent consumption that is supplied with imports, according to what can be observed in Figure 8, throughout our analysis period, the results obtained in the indicator are increasingly greater than 1, which is This means that the competitiveness of the oat production sector is lower, and that, therefore, imports cannot be dispensed with, since they are the main source of supply for national demand.

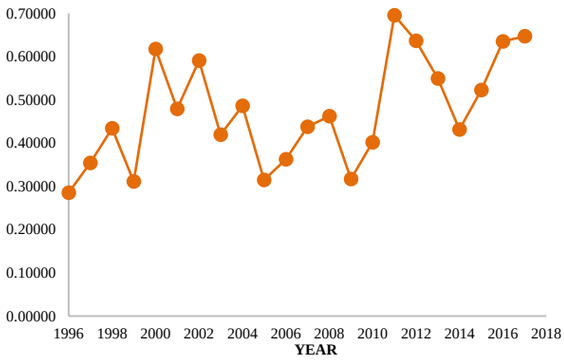

Figure 8 Behavior of the trade dependency ratio, Mexico 1996-2017
Source: Own elaboration with information from FAOSTAT 2020

Conclusions

According to the results obtained from the analysis of trade variables, exports have a decreasing trend, going from 49 tons at the beginning of the period to 36 tons at the end of the study period, on the other hand, imports have had an increasing trend since 42,395 tons in 1996 to 132,099 tons in 2017. Therefore, the balance of the relative trade balance is negative and in deficit, given that imports are, to a great extent, greater than exports.

The results of the relative trade balance are between -0.998 and -0.995, which is why it is concluded that Mexico is a net importer of grain oats, given that the quantities of imported cereal are much greater than the quantities that are exported, which which indicates that the national product is insufficient to supply domestic demand and therefore there is no production that can be destined for the international market.

With regard to the tradability indicator, the results obtained are less than zero, which indicates that the sector is a substitute for imports, given that there is an excess demand, and therefore, it follows that oat production grain is not a competitive activity in the international market. On the other hand, the results obtained in the commercial dependence coefficient are greater than 1 in all the years of the period studied, this implies that most of the apparent consumption is covered by imported product, and the competitiveness of the oat production sector it is very low, so imports cannot be dispensed with and therefore there is no production necessary to export to the international market.

Finally, it is concluded that, based on the results obtained from the competitiveness indicators analyzed in this work, Mexico has a trade deficit balance, since it imports much more than it exports, which makes it a clearly importing country. Thus, it does not have the conditions or productive capacities to generate a surplus, since it requires foreign product to cover the national demand and this in turn leads to the country having a great comparative disadvantage in the production of grain oats.

According to the results, the trade variables are negative and therefore the competitiveness indicators are also negative, but it is important to note that the production variables, at the national level, are positive, so at this point, it would be It is profitable to implement policies that provide oat producers with the conditions and support necessary to increase both the quantity and quality of the national product, and thus be able, in the future, to put Mexican oats on the international market.

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Assessment of the perception of quality in mexican municipal sports services

Valoración de la percepción de calidad en los servicios deportivos municipales mexicanos

MORQUECHO-SÁNCHEZ, Raquel†´, SOLIS-GONZALEZ, Jesús´´, GONZALEZ-CASTRO, Juan Carlos Arturo´ and ACOSTA-GONZALEZ, Ariana Linette´

´*Universidad Autónoma de Nuevo León, Faculty of Sports Organization, Mexico.*
´´*Universidad Autónoma de Nuevo León, Faculty of Public Accounting and Administration, Mexico.*

ID 1st Author: *Raquel, Morquecho-Sánchez* / **ORC ID:** 0000-0003-4993-8027

ID 1st Co-author: *Jesús, Solis-Gonzalez* / **ORC ID:** 0000-0002-9551-1051

ID 2nd Co-author: *Juan Carlos Arturo, Gonzalez-Castro* / **ORC ID:** 0000-002-2610-3636

ID 3rd Co-author: *Ariana Linette, Acosta-Gonzalez* / **CVU CONACYT ID:** 887928

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Abstract

The objective of the present investigation was to assess the perception quality of municipal sports services of the city of Allende, Nuevo León, Mexico. For the analysis of the data the statistical software SPSS v.24 was used. The instrument used was SERVQUAL, adapted to the Mexican sports context, which consists of 22 items grouped into 5 dimensions (tangible, empathy, reliability, responsiveness and safety). The sample of this study was 100 subjects, in a range of 16 to 60 years, of which 57 (51.6%) belong to the male gender and 43 (48.4%) to the female gender. The descriptive and correlation analyzes of the sample were carried out. Among the results obtained, the study presents acceptable quality values for said municipal complex. In conclusion, the evaluation, monitoring of the objectives and indicators of the municipal sports services are of vital importance to perform an adequate follow-up of the expectations, perception and satisfaction of its users, which will make municipal sports management more efficient.

Perception, Sports services, Quality, Municipalities, SERVQUAL

Resumen

El objetivo de la presente investigación fue valorar la percepción de la calidad de los servicios deportivos municipales en Allende, Nuevo León, México. Para el análisis de los datos se utilizó el software estadístico SPSS v.24. El instrumento utilizado fue el SERVQUAL, adaptado al contexto deportivo mexicano, el cual consiste en 22 ítems agrupados en 5 dimensiones (tangibles, empatía, fiabilidad, capacidad de respuesta y seguridad). La muestra de este estudio fue de 100 sujetos, en un rango de 16 a 60 años, de los cuáles 57 (51.6%) pertenecen al género masculino y 43 (48.4%) al género femenino. Se realizaron los análisis descriptivos y de correlación de la muestra. Entre los resultados obtenidos, el estudio presenta valores de calidad aceptables para dicho complejo municipal. Como conclusión, la evaluación y el seguimiento de los objetivos e indicadores de los servicios deportivos municipales son de vital importancia para realizar un adecuado seguimiento de las expectativas, percepción y satisfacción de sus usuarios, lo cual hará más eficaz la gestión deportiva municipal.

Percepción, Servicios deportivos, Calidad, Municipios, SERVQUAL

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* Correspondence to Author (E-mail: raquel.morquechosn@uanl.edu.mx)
† Researcher contributing first author.

Introduction

The sport and its management have been acquired greater importance, more and more users demand sport activities in public and private places. In this way, there is a great concern to improve the provision of municipal sports services, with leads service organizations to a great degree of demand.

In this sense, municipal sports services are obliged to strategies based on improving user satisfaction, incorporating plans that help improve the quality of their services. Consequently, we find new management models, new strategies, where research has gained importance to find the right formula to achieve effectiveness and efficiency, the management of services and all the element involved towards quality in this management provision, since the quality of the service not only refers to an internal experience of each persona, but to the assessment of attributes external to the service (Sánchez-Hernández *et al*., 2009).

Nowadays the request and also the expectations of users regarding public sports services have increased, and they aren´t longer satisfied with access to practice and a space to develop it, but they demand a high variety of physical activity programs, qualified professionals, adequate facilities as of image, dimensions, hygiene, safety, etc. and the administrations have the obligations to confront all these demands and accomplish with the expectations through sports services that reach satisfy. In this sense, the municipal sports services must be concerned about the quality of the services offered, for these reasons the objective is to assess the perceived quality of municipal sports services, in the Bicentenario Park, located in Allende, Nuevo León.

Methodology

Study design

The present study id non-experimental, cross-sectional, quantitative and with a descriptive-correlational scope.

Population

The population of this research is made up of users who carry out sports and recreation activities within the Bicentenario Park, in different activities offered by the municipality such as soccer, basketball, volleyball, table tennis, fronton, gym and swimming, among others during the year 2019.

Sample

The selection of the participants was through a non-probabilistic convenience, with the participation of 100 subjects, which 57 (51.6%) belong to the male gender and 43 (48.4%) to the female gender, in an age range between 16 as the minimum age and 60 as the maximum age.

Statistical analysis

The data analysis is descriptive in nature; its objective is to summarize the information by means of the elaboration of explanatory graphs, as well as the inclusion o frequency tables. The data obtained were processed using the SPSS version 24 statistical package.

For the treatment of the data, first, descriptive analyses of frequency and central tendency, reliability analysis of the scales using Cronbach´s alpha were performed to determine the reliability of the instrument. Subsequently, correlation analyses will be carried out to observe the relationship between the study variables.

Instrument

The instrument used was the SERVQUAL, which is a scale for measuring the quality of service, consisting of a scale of 22 items on the expectations and perceptions of users, referring to a category of service, and the 22 items are grouped into 5 dimensions: reliability, responsiveness, safety, empathy, and tangible elements.

Procedure

Authorization was requested from the Director of Sports of the municipality of Allende to apply the questionnaires.

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The surveyors applied the instrument once the physical activity session was over, the instructions on how to answer the questionnaire were explained to them and they were informed that the questionnaire was confidential; it is worth mentioning that the surveyor was always present during its application.

Results

International consistency analysis

International consistency was calculated using Cronbach´s alpha index, in relation to the resulting factors tant make up the instrument. The reliability analysis revealed good internal consistency, showing values in this case above 0.70 for each factor (Cronbach, 1951), between a range of 0.89 and 0.94 (see Table 1). The reliability of each of the scales that make up the instrument was tested, determining the Cronbach's alpha coefficient. The value obtained was found to be within the range established by George and Malley (2003) and Nunnally (1976) to accept internal consistency.

Alfa de Cronbach	Expectations	Perceptions
	0.893	0.948

Table 1 Cronbach alpha expectations and perceptions

Descriptive analysis

The total sample consisted of 100 subjects, of whom 57 (51.6%) were male and 43 (78.4%) females, with an age range between 16 and 60 years (see figure 1).

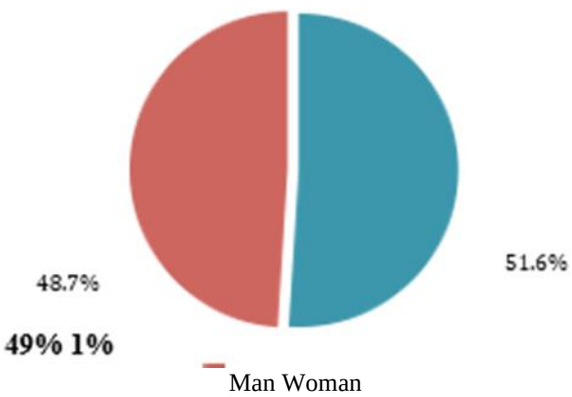
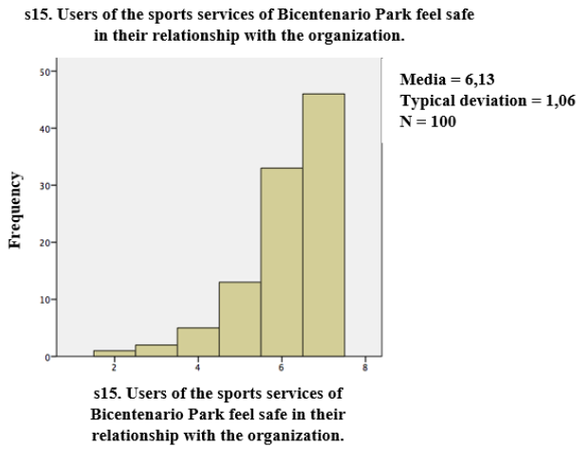


Figure 1 Distribution of the sample by gender

Graphic 1 shows that 45% of the users feel safe in the Bicentenario Park facilities, so we should consider improving this element in the organization.



Graphic 1 Safety in relation to the sports facility

In table 2, communication and interaction with the coach is presented, composed by item 10, we can observe tant we obtain a frequency value between 221% and 38% of users who agree to strongly agree, showing as a result that the user considers communication and interaction with the coach as a fundamental part, presenting satisfactory in the municipal sport facilities.

		Frequency	Porcentage
Valid	Strongly disagree	2	2,0
	Not at all agree	2	2,0
	Somewhat agree	7	7,0
	Agreement	21	21,0
	Agree	30	30,0
	Strongly agree	38	38,0
	Total	100	100,0

Table 2 Communication with users

Table 3 shows the availability of the coaches in item 15. The most significant results show that 49% of the users strongly agree with the availability of help and problem solving by the trainers, while the rest are divided between different opinion, so that new and different mechanisms of internal communication with the users should be considered, as well as effectively communicating the follow-up of suggestions or complaints, with the objective of finding a continuous improvement.

		Frequency	Porcentage
Valid	Little Agree	3	3,0
	Somewhat agree	3	3,0
	Agreement	15	15,0
	Agree	30	30,0
	Strongly agree	49	49,0
	Total	100	100,0

Table 3 Availability of trainers to assist users

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Conclusion

The evaluation of perceptions has been the line of research of different authors, who have designed instruments to measure the perceptions of users regarding the quality of serviced such as (Calabuig *et al*., 2008; Nuviala *et al*., 2008).

We agree that service should be continuously monitored (Morales-Sánchez, 2003), which is essential to ensure the processes of loyalty and maintenance of quality standards that allow comparison with other organizations or with the same organization in quality management processes (Clabuig *et al*., 2010; Morales-Sánchez, 2003).

Although quality evaluation is currently of great importance, its application to the field of sports management and specifically to the evaluation of municipal sports services is still scarce, especially in Mexico.

It is concluded that the services provided by the Bicentenario Park meet the expectations and perceptions of its users, since the results are significant. As future research, total quality can be evaluated, considering the internal and external clients of municipal sports organizations.

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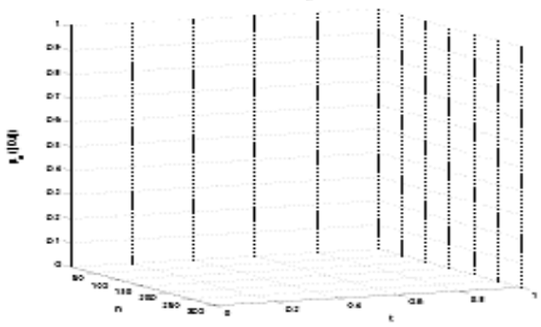

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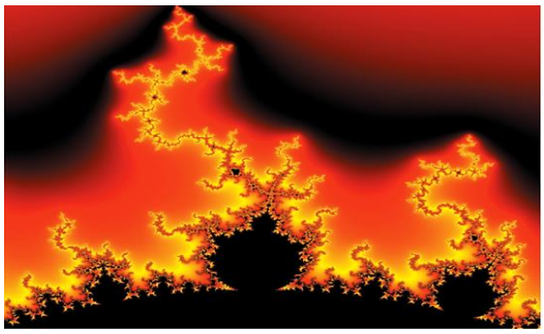

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