POST-PANDEMIC ORGANIZATIONAL

TRANSFORMATION FOR COMPETITIVENESS

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(Coords)

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Universidad de Guadalajara

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Contents

PREFACE

This book has been developed through various contributions made to generate an analysis of organizational transformation and its impact on competitiveness. It begins with a bibliometric study to analyze the effect of gender studies on organizational research, analyzing the limitations and methodological potential of organizational studies, and linking it with the field of gender studies, using the Web of Science (WoS) database.

It continues with a paper on the Savings and Loan Cooperative Societies (SOCAPS) in Mexico and how covid influenced them, showing how the societies' income decreased.

Concerning the study of production systems and how they are impacted in the optimization processes, it is detailed with the elements of optimization related to automation, process reliability, and administrative control present significant relevance among the factors and variables mentioned.

The next aspect deals with the cost-benefit analysis of an energy production system within the Mexican electricity industry; using Porter's five forces matrix, the economic effects of the grid are shown.

On the other hand, observations are made on the repercussion of emotional intelligence in developing an excellent leader to achieve business profitability through compromise, productivity, efficiency, professionalism, and the integration of emotions, as well as human quality and honesty as a guide.

Organizational change is analyzed in what scope it presents within the organizational philosophy in the commercial companies of AMG.

Regarding the study of generational influence to measure the incidence of organizational culture (CO) with the organizational citizenship behaviors (OCB), impacts are detected in 4 generations: Silent, Baby Boomers, X, Millennials, Z.

The study of the factors that influence the purchase of craft beer detects the scope of brand recognition to make the purchase decision and the brand capital factors that influence it.

From another angle, the meso level of the systemic competitiveness model is empirically tested with information from the Mexican states, corresponding to the period 2000-2020, where sectorial policies are analyzed, having human talent as a critical variable.

The final work on international competitiveness and how it depends on the degree of openness of the country's exports and local production, for it, Mexican barley beer in the period from 2000 to 2020, using competitiveness indices, measurements of data associated with production, exports and imports in the period 2000-2020.

The authors are All Economic and Business Sciences experts, relating the research to the context of competitiveness.

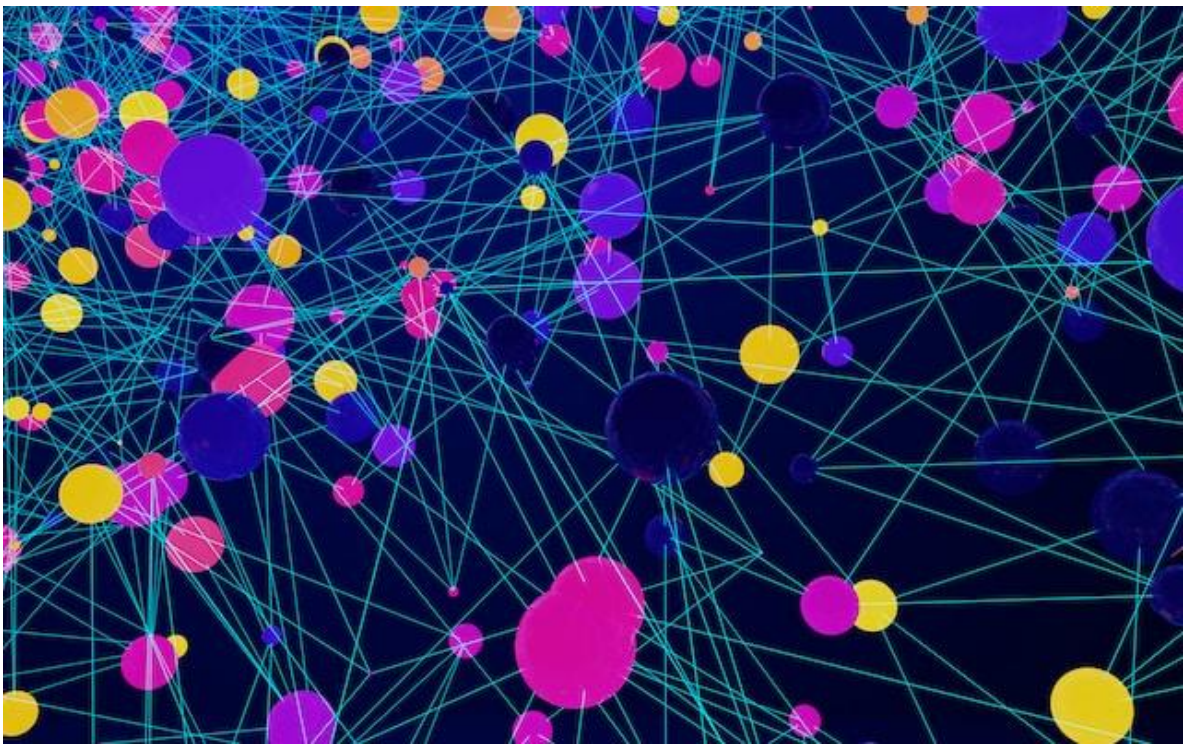
This publication was created following the best practices of the scientific edition. Turnitin was applied to favor originality. The editorial team carefully analyzed the quality and integrity of the content. Every chapter was selected, evaluated, and modified with the support of a double anonymized review.

Editors and authors hope that this book will contribute to the advancement of theoretical and practical knowledge.

José Sánchez-Gutiérrez

Chapter 1

Gender perspective in organizational studies research: a systematic review whit bibliometric analysis



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Gender perspective in organizational studies research: a systematic review with bibliometric analysis

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INTRODUCTION

Since the emergence of Organizational Studies (OS) in the seventies of the last century, a significant volume of research papers have accumulated, which places it as a field of knowledge that is explored from multiple and diverse disciplines. This has sparked interest in some reviews of the state of the art and bibliometric behavior (Ertem & Aypay, 2021; dos Santos et al., 2021; Kataria et al., 2021; Oliveira et al., 2020; Zhang et al., 2017; Martins et al., 2016; Sanabria et al., 2014; Vogel, 2012), where the authors themselves recognize the presence of some methodological restrictions such as the delimitation, collection, and analysis of the data, which focus on the field of knowledge of the OS, without being associated with the research behavior of a disciplinary field of study such as gender.

In a bibliometric work that precedes the present one, Hernández et al., (2022) identified an emerging field of research within the gender category that particularly involves women, in the different approaches from which the OS field of knowledge is approached, so that new questions arise about what is known about OS and gender, how research on this field of knowledge has evolved, as well as what are the emerging gender issues in OS. This

work made a systematic review of OS publications that include gender as part of their research focus and that are deposited in digital databases hosted in Web of Science (WoS), using bibliometric analysis to answer the questions posed. The results of this analysis showed the current state of knowledge on gender in OS and are intended to outline the path for future research in this field of knowledge.

This chapter is organized as follows: first, the methods, resources, and research process are described; then the results are presented, organized in two parts: the descriptive results of the systematic review are shown, followed by the networks and correlation maps of the OS and gender. Finally, a conclusion of the research is presented, including limitations and recommendations for future work.

SYSTEMATIC REVIEW

A systematic review involves conducting literature reviews adhering to scientific methods to reduce bias (Petticrew & Roberts, 2006), which through planning for data collection answers specific questions (Rother, 2007), and provides a descriptive synthesis on a particular topic (Aguilera, 2014). A systematic review analyzes what has already been researched and provides a synthesis of the current state of knowledge, which allows for filling research gaps and avoids replicating scopes already explored (Oh & Lee, 2020). To reduce the subjectivity of these results, there are some established guidelines for the systematic collection, evaluation, and synthesis of publications (Nagyova, 2015; Clarke, 2001). Some key strategies are suggested: a) Use academic databases as a source (Ferreras, 2016); b) design clear inclusion and exclusion criteria to recognize relevant publications (Ferreras, 2016, Nagyova, 2015); c) Develop measurements on the impact of publications; and d) Present findings in a synthesized and coherent manner (Clarke, 2001). They also recommend that this review be the result of collegial work (Oh & Lee, 2020); for this work, these guidelines were followed in developing a systematic review of publications on OS and gender.

BIBLIOMETRIC ANALYSIS

Bibliometric analyses provide an overview of large volumes of academic information (Van Nunen et al., 2018), enable the study of the structure and dynamics of scientific fields (Noyons, 2004; Van Eck et al., 2010), retrospectively identify the objects of study and recognize the potential for research on them (Allen et al., 2009). This methodological strategy is common in works such as this one, which analyzes research behavior in the OS field of knowledge and the disciplinary area of gender, through authors, journals, countries, institutions and collaborative networks among them (Li & Zhao, 2015; Van Nunen et al., 2018; Satish et al., 2020), identifies the research direction and main topics in a specific disciplinary field (Wang et al., 2014), as well as the existing gaps in them (Gall et al., 2015). From previous work on this method, common guidelines for carrying it out are identified: a) Establish the research corpus from which data will be obtained: databases and journals (Li & Zhao, 2015; Van Nunen et al., 2018; Satish et al., 2020); b) Design clear inclusion and exclusion criteria for publication searches: Search equation, search fields, temporality, document types, knowledge fields/categories (Li & Zhao, 2015; Van Nunen et al., 2018; Satish et al., 2020); c) Describe methods, techniques and tools for data analysis (Van Nunen et al., 2018; Van Eck & Waltman 2010); e) Develop metrics on the impact, reach, and networks of publications (Ovalles-Toledo et al., 2018); and e) Present findings in a synthesized and coherent manner (Satish et al., 2020).

Defining the OS and the gender perspective.

To create clear criteria for inclusion and exclusion, it is necessary to narrow down the definition of both OS as a field of knowledge and gender as a disciplinary field of study within OS, due to the lack of a single term to define them or the linguistic confusion that can become a limitation for the systematic review and retrieval of bibliometric data. At this point, it is necessary to assume that this paper does not discuss the concepts of organizational studies or gender as a category of social analysis, but only establishes the linguistic scope for the search for information.

The OS is mainly based on organizational theory (Medina, 2007; Gonzales, 2014), but is the result of the incursion of several humanistic disciplines in the study of social phenomena that go beyond the disciplinary field of organizational management, but involve the relationships between the various members that make up the organizations and reflect all the elements of the environment with which they interact (Pérez & Guzmán, 2015). While the gender perspective in OS considers the dynamics and power relations that are created from the gender or sex of the members of the organizations that promote practices of inequality or discrimination between men and women and hinder change (Calás & Smircich, 2017; Fernández & Páramo, 2017; Calás et al., 2014).

Based on these definitions as inclusion and exclusion criteria, this research excluded articles that: a) do not include gender or sex as a dimension of analysis of the OS; 2) focus on the analysis of the administrative processes of the organization; 3) include sex as a comparability variable without considering interaction or power relations; 4) contain gender and/or organization in the abstract and keywords, but do not correspond to the field of knowledge of the OS.

DATA

Source of data

Based on the inclusion and exclusion criteria of the concepts, the research corpus was obtained from the Clarivate Analytics Web of Science (WoS) server, whose collection of databases of references and citations of publications collect information from more than 100 years and is widely used by other researchers in the bibliographic field (Pilkina & Lovakov, 2022; Sarkar et al., 2022; Oh & Lee, 2020; Van Nunen et al., 2018; Wang et al., 2014). This collection of databases offers several advantages: a) it houses a large collection of publications in the OS field of knowledge; b) it provides descriptive data on authors, references, scientific categories, research area, and funding sources, among others; c) it provides metrics and citation indicators, as well as the impact factor of publications (Sarkar et al., 2022); in addition, it allows the use of software to analyze bibliometric data such as VOSviewer (Van Eck and Waltman, 2020).

Data collection

The data collection for this analysis of the gender approach in the OS was carried out on February 1, 2023, and the following procedure was followed. The number of publications retrieved is shown at the end of each step.

1. To retrieve articles with a gender focus in OS, three search equations were used: organizational studies and wom*; organizational studies and masc*; organizational studies and gender (N=7,743).
2. The search was limited to the Social Sciences Citation Index SSCI database (N=5,952).
3. The documentary typology of this analysis was limited to research articles only, excluding reviews, book chapters, books and editorial materials (N=5,619).

Once the data retrieval was done, a quality review was done to take care of the integrity of the data and it was identified that from these filters some of the articles that do not have the terms organizational studies, and gender in titles, keywords and abstracts could be excluded, or conversely, some papers on women and management of organizations that do not have the gender approach in organizational studies could be retrieved, which according to Oh & Lee (2020), this is because the use of electronic databases retrieves papers that use the same terms but do not share the focus, given the nature of the broad meaning of the search terms, so to improve the criteria for inclusion, exclusion and completeness of the data, the search was refined with the following steps:

4. Of the 3500 journals in the SSCI database, one journal specialized in organizational studies and two more on gender and organizational research were identified, so articles were retrieved from these journals: Journal of Leadership & Organizational Studies, Gender in Management, Gender Work and Organization (N=7,377).
5. Step 4 added 1,758 articles, but duplicated some papers collected in the previous steps, so 300 records were eliminated (N=8,835).
6. The authors reviewed the titles and abstracts of the collected articles to select only research papers on the gender approach in OS, retrieving the definitions with which

the observables were operationalized for analysis and using MAXQDA software for coding (N=4,983).

This review identified that, with the defined search terms, some approaches related to organizations and gender are oriented to health disciplines such as medicine or psychiatry, adding non-relevant publications associated with women's and/or men's health, as well as research on leadership styles, but not analyzed from a gender perspective, which did not make significant contributions to the objective of the work. The data collected corresponds to studies dating back to 1989, since the first study on the subject was recorded in that year, and 2022 was established as the closing date for obtaining results for complete years. Therefore, previous or subsequent studies are not included.

METHOD

For this research work, we resorted to a bibliometric analysis that allowed us to recognize the behavior of the gender approach in organizational studies. The first part describes the frequencies and impact indicators[1] on the selected publications, since they show the influence and transcendence of the works on the disciplinary field of the subject of analysis (Ovalles-Toledo et al, 2018); The publications with the highest frequency of citations are also presented, both by publication, as well as by authors, journals, institutions and countries, which although it is true, does not directly show the research trend, allows recognizing how some research works are significant and important over time.

The second part analyzes the frequency of connection and interaction between authors, institutions, keywords and references, in addition to mapping the structure and scientific networks on the scope of research. VOSviewer is used for the analysis of networks and density maps, which through nodes represent the distance between articles, authors, keywords, and lines and the degree of connection between them (Van Eck et al., 2020; Van Nunen et al., 2018; Van Eck & Waltman 2010). Concerning citations, this type of analysis uses direct citations, co-citation, and bibliographic linkage. Citation measures the frequency

[1] JCR (Journal Citation Reports); CitieScore; SJR (Scimago Journal Rank); SNIP (Source Normalized Impact per Paper) and H. Index.

of direct interactions between two articles, but it is rare because citation networks are sparse. Co-citation reflects when two papers are cited by a third party. Coupling reflects the opposite of co-citation, if two papers cite the same publication, they are coupled; this indicator shows the similarity between the references that two articles have in common (Van Eck et al., 2020). This work reflects co-citation and bibliographic coupling, as it allows to significantly broaden the range of data analyzed since it adds other types of important publications on the topic that are not included in the main WoS collection (Oh & Lee, 2020).

Text mining of VOSviewer software was also used to measure the frequency of co-occurrence of a set of keywords in titles, abstracts and the author's own words. The frequency, trends, and changes in lines of research over time were analyzed. A so-called complete count was used for this analysis, which gives equal weight to all words (Van Eck et al., 2020). To ensure the completeness of the analysis, a thesaurus was manually constructed, in which general terms were eliminated and synonyms were substituted (for example female for woman). Finally, the temporal density by research topics is identified, since this allows us to recognize the trends and limits of knowledge on organizational studies with a gender focus and to identify future lines of research.

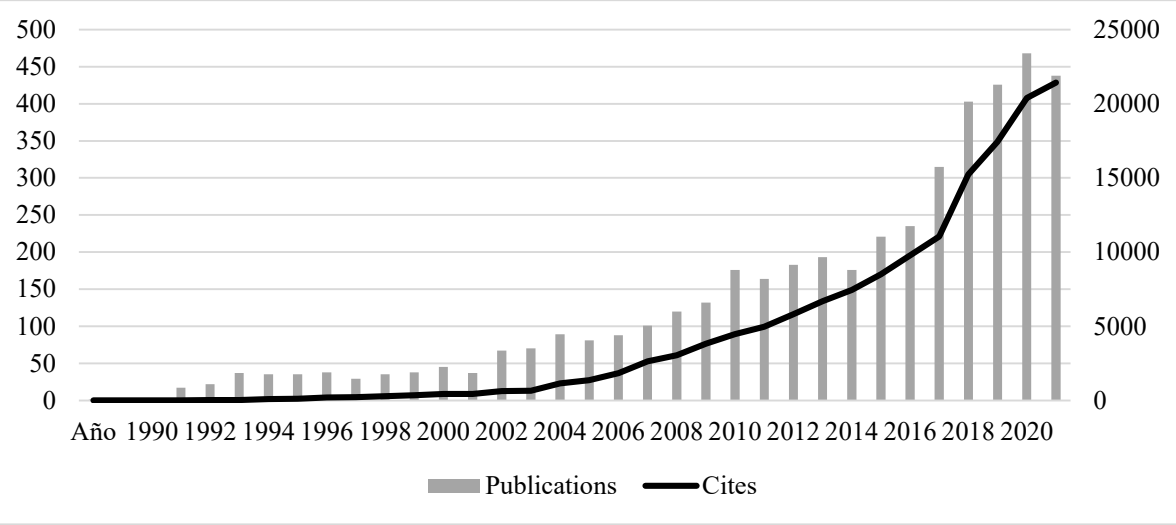
RESULTS

Descriptive Bibliometric Analysis

This section presents the descriptive analysis of the 4,983 articles on OS that address the gender approach and that have been published from 1989 to 2022. Figure 1 shows the citations and publications of articles on OS with a gender focus in WoS during this period, which shows an increasing trend in the metrics presented.

Figure 1

Number of publications and citations on gender approaches in OS by year.



The authors who have carried out the greatest number of research works on the gender approach in the OS during the study period are described in Table 1. The results are presented in order of the number of publications as first author, followed by the total number of research papers in which they collaborate, with Tammy Allen, with 16 research papers, 6 as first author, being the one who has made the greatest contribution to the disciplinary field from the gender approach in OS.

Table 1

Main authors of articles on OS with a gender approach.

Author	Affiliation	FA	TP	TC	C/P	H.Index
Allen, Tammy D.	State University System of Florida	8	16	1430	89.38	60
Burke, Ronald	Canadian Psychol Assoc	8	15	401	37.53	36
Rumens, Nick	Oxford Brookes University	6	13	410	31.54	4
Benschop, Yvonne	Radboud University Nijmegen	5	18	1087	60.39	18
Van Den Brink, Marieke	Radboud University Nijmegen	5	14	563	37.53	3

The 4,983 articles were published in a total of 909 journals, among which Gender Work and Organization stands out, accounting for 18% of the publications on the gender approach in OS, with the categories of Organizational Behavior and Human Resource Management and Gender Studies grouping the largest number of publications on this field of knowledge.

Table 2

Main journals with publications on gender approaches in OS.

Publication Titles	No.	JCR	SJR 2021	H Index	Subject area	Category
Gender Work and Organization	914	5.428	1.301	80	Business, Management and Accounting Social Sciences	Organizational Behavior and Human Resource Management Gender Studies
Journal of Leadership Organizational Studies	323	3.611	1.227	47	Business, Management and Accounting	Organizational Behavior and Human Resource
Gender in Management	284	3.337	0.777	54	Business, Management and Accounting Social Sciences	Organizational Behavior and Human Resource Management Gender Studies
Journal of Vocational Behavior	67	12.082	2.805	161	Business, Management and Accounting	Organizational Behavior and Human Resource
Frontiers in Psycology	66	4.232	0.873	133	Business, Management and Accounting	Business, Management and Accounting (miscellaneous)

For the thematic areas, WoS classifies the same publication in different categories; in the case of organizational studies with a gender focus, there are up to five. The analysis of WoS results by research area shows that most of the papers in this field of knowledge are classified as Business and Economics Research, followed by Women's Studies (Figure 2). In the specific analysis of the documents, it is identified that 55% of the papers coincide with the classification of the main WoS category, however, while for WoS, the second place is for

women's studies, less than 1% of the documents have this as the first area of research (Figure 3).

Figure 2

Ranking of WoS category and research publications.

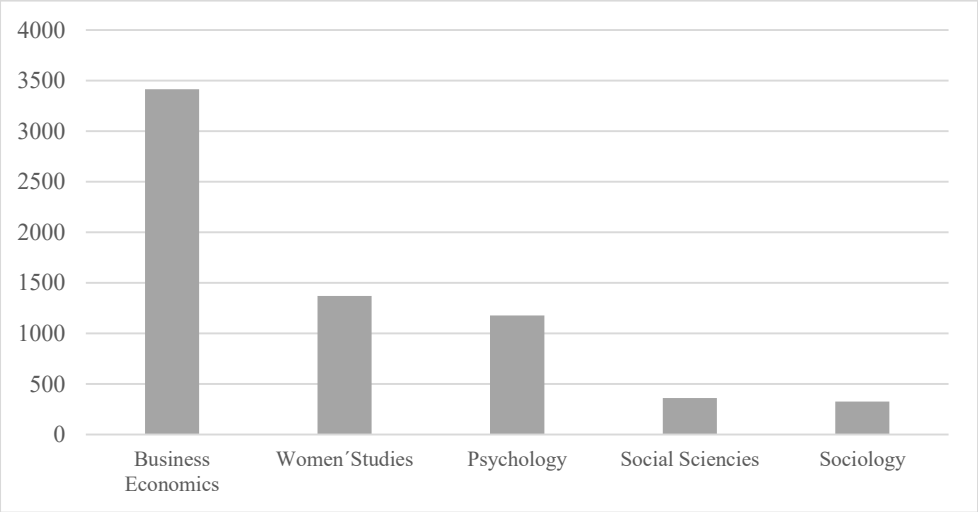


Figure 3

Ranking of the first category of research by publication retrieved from WoS.

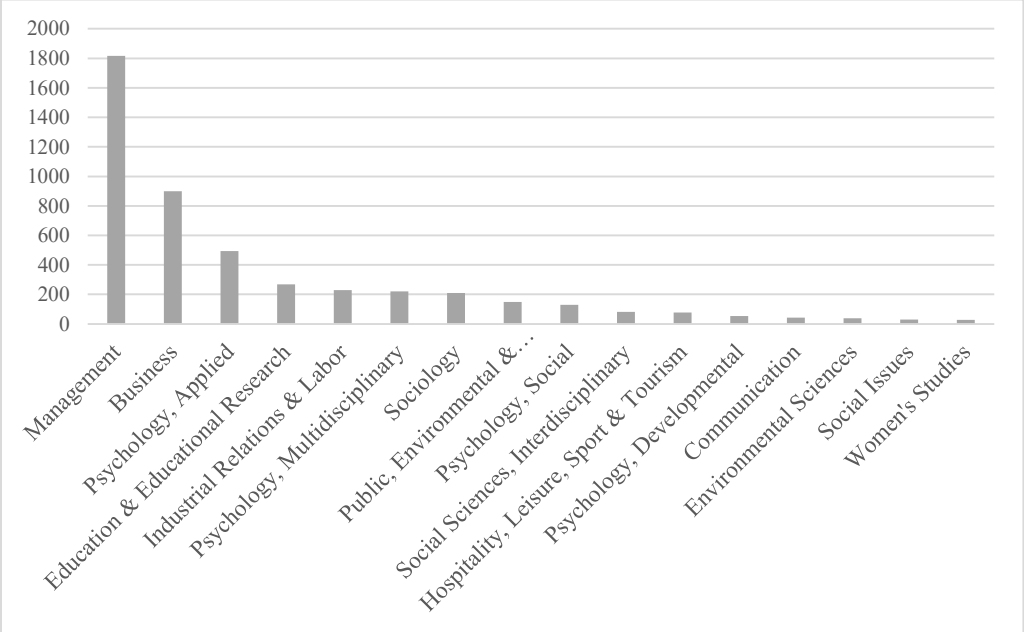


Table 3 contains a list of the main countries that contribute the most to the work on the gender approach in OS. As in the rest of the disciplines, the country that generates the most publications is the United States with 38% of the publications and 86,915 citations, followed by Great Britain with

13% of the documents and 18,790 citations, which shows the dominance of North American authors in this disciplinary field.

Table 3

Contributions by country on OS with a gender perspective.

Country	Publications	%	Citation	Citation/Publication
United States of America	1845	38.21	86915	47.11
England	622	12.78	18790	30.21
Canada	308	6.42	7132	23.16
Australia	290	5.88	6917	23.85
Peoples Republic China	252	5.08	6045	23.99

Figure 4 shows the percentage distribution by country of the contribution of research papers on the gender approach in SWs. The articles originate from 105 different countries, which, when classified by continental regions, it is possible to recognize that OS with a gender approach are associated with the level of economic and technological development of the countries (Van Nunen et al, 2018) and have an ethnocentric view located in North America and Europe (71%).

Figure 4

Density of publications on OS with a gender perspective by region.

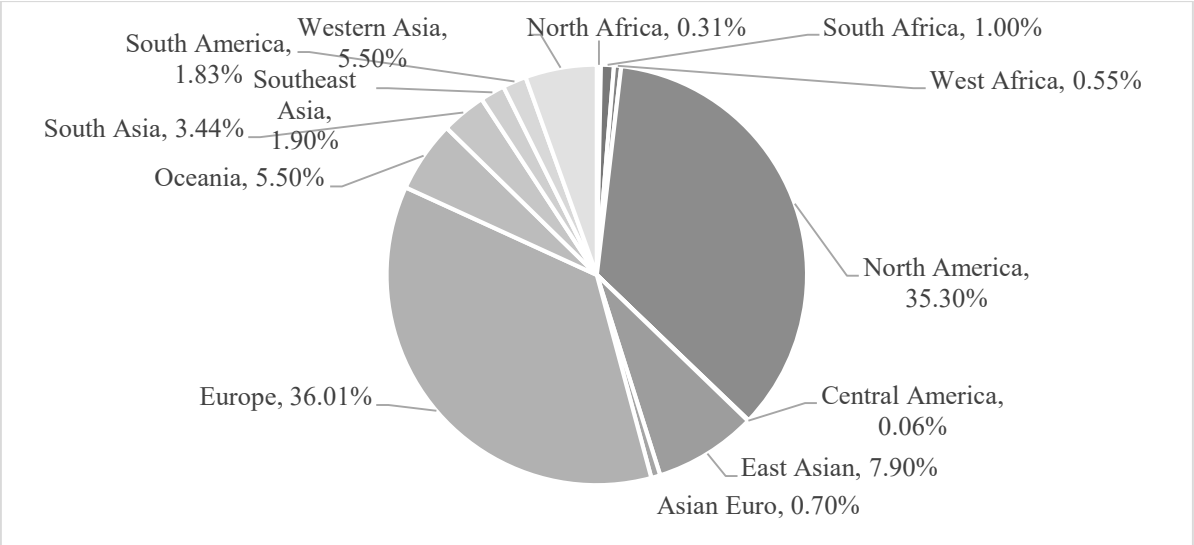


Table 4 shows the institutions that allocate the most funding to research projects on the gender approach in the SBs. Of the 4983 publications, only 34% report funding sources, all of them less than 2%, including public organizations based in China, the European Union and the USA.

Table 4

Institutions that finance research projects on gender approaches in SO´s.

Organization	Function	Location	TP	%
National Natural Science Foundation Of China Nsfc	Gestión del Fondo Nacional de Ciencias Naturales	People's Republic (of) China	54	1.084
European Commission	Poder legislativo de la Unión Europea	Belgium	46	0.923
National Science Foundation Nsf	Agencia gubernamental que impulsa investigación y educación	USA	39	0.783
Uk Research Innovation Ukri	Organismo público no departamental patrocinado por el Departamento de Negocios, Energía y Estrategia Industrial	Great Britain	38	0.763
Economic Social Research Council Esrc	Economic and Social Research Council (ESRC)	Great Britain	33	0.662

Table 5 identifies the five publications that, based on their impact indicators, have the greatest influence on research work in the area of OS knowledge from a gender perspective, with the work of Venkatesh et al, published in 2003, being the one that has received the greatest number of citations since its publication, with an average of 700 citations per year.

Table 5

Articles on OS with a gender focus with the highest number of citations

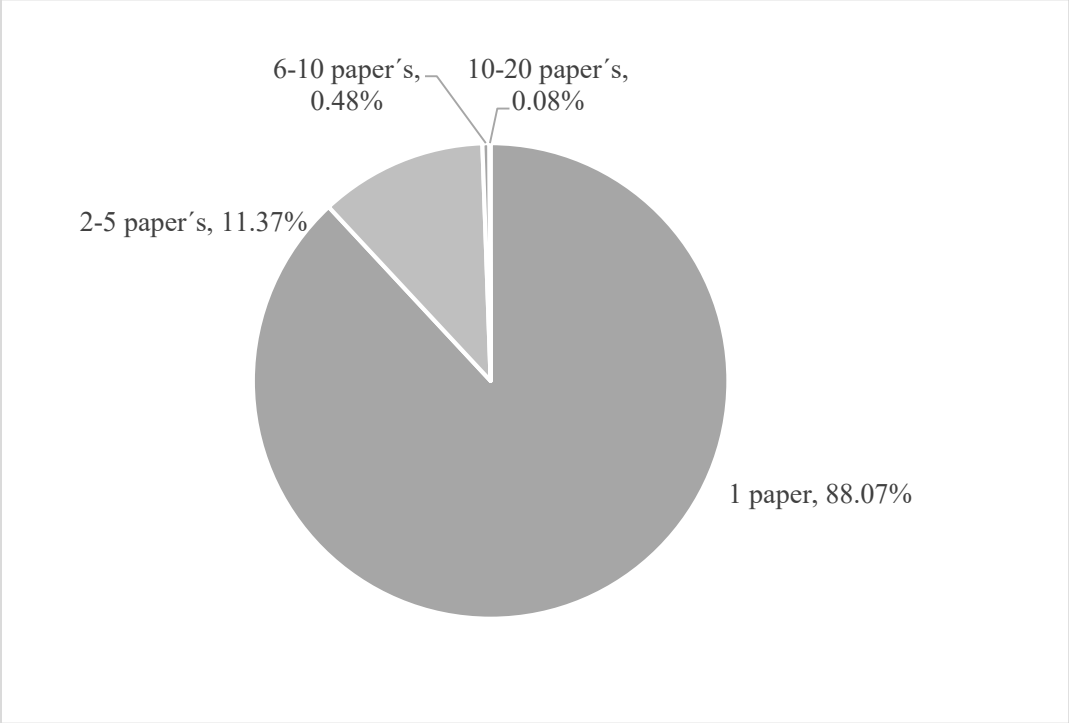
TC	Author	Title	Keywords of abstract	Year	Source Title	Average per Year
14773	Venkatesh, V; Morris, MG; Davis, GB; Davis, FD	User acceptance of information technology: Toward a unified view	Sex-Role Orientation; Innovation Characteristics; Intrinsic Motivation; Decision-Making; Gender	2003	Miss Quarterly	703.48
1531	Acker, Joan	Inequality regimes - Gender, class, and race in organizations	Gender; Class; Race; Intersectionality; Organizations	2006	Gender & Society	85.06
1102	Ibarra, H	Homophily and Differential Returns-Sex Differences in Network Structure and Access in an Advertising Firm	Social Network; Organizations; Women; Power; Communication; Technology; Management; Patterns; Roles; Work	1992	Administrative Science Quarterly	34.44
1003	Gefen, D; Straub, DW	Gender differences in the perception and use of E-mail: An extension to the technology acceptance model	Technology Acceptance Model; Gender Differences; Cross-Cultural IT Research; IT Adoption And Diffusion; E-Mail	1997	Miss Quarterly	37.15
876	Seibert, SE; Crant, JM; Kraimer, ML	Proactive personality and career success	Dispositional Approach; Job-Performance; Organizations; Satisfaction; Gender	1999	Journal 0f Applied Psychology	35.04

Bibliometric Network Analysis

The 4,983 publications were written by a total of 12,994 different authors, of which 88% (11444/4983) of authors have one publication, 11% (1478/4983) with up to 5 publications, 0.48% (62/4983) with up to 10 publications and 0.08% (10/4983) with up to 20 publications (Figure 5). This behavior is not exclusive to the gender approach in OE, since in most areas of knowledge it is a small group of authors who contribute significantly (Danvila et al, 2019; Liu et al, 2012; Crane, 1972).

Figure 5

Articles on gender focus in the OS by author.

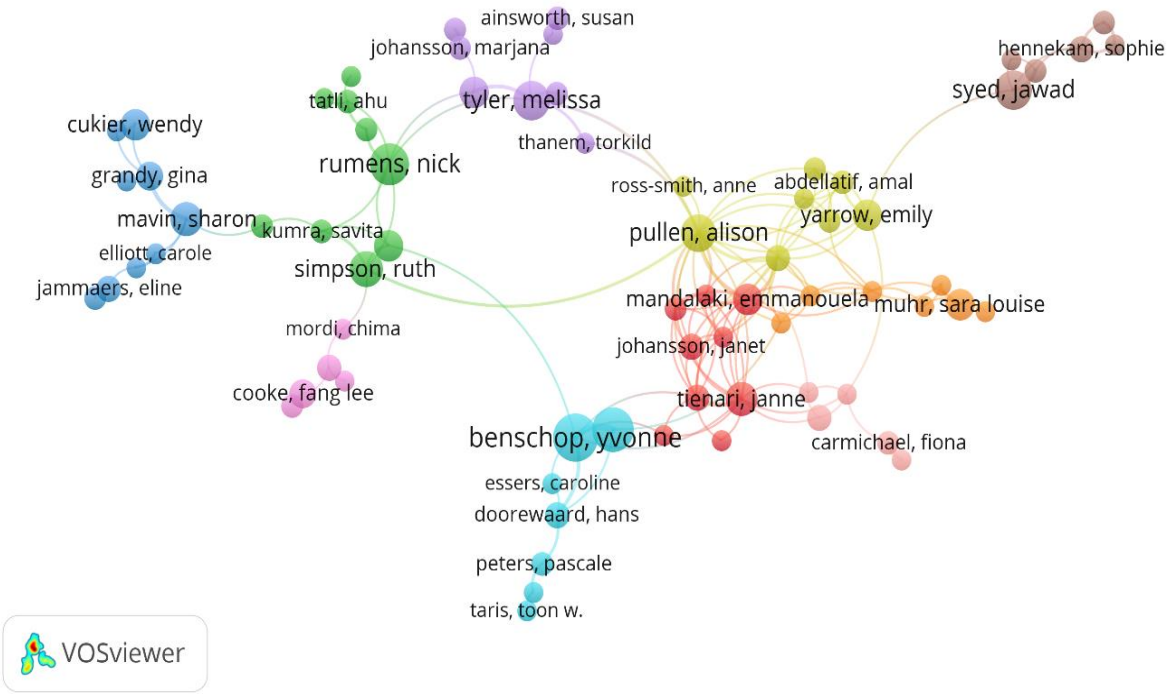


The average number of authors per publication was 2.6 (4983/12994). Twenty-three percent (1142/4983) of the publications were written by one author, 32% (1159/4983) by two authors, 24% (1597/4983) by three authors, 13% (629/4983) by 4 authors, 4% (224/4983) by

5 authors; the remaining 4% were written by 6 to 26 authors[2] (188/4983). The gender approach in OS is generated as a product of collegial work, 77% of them are the result of the work of two or more authors in which as in other disciplines there is synergy for collaborative work (Wang et al., 2014). The behavior of collaborative publications (co-authorship) on OS with a gender focus was analyzed with VOSviewer, where authors who have written three or more publications on the topic are presented. Authors who are not connected with others are not included. The results are presented in figure 6, the size of the circles represents the number of publications and the line between them represents the collaboration between them. Each color represents a collaboration cluster. In the collaboration network, 10 main clusters of authors can be identified; the principal investigator of the network is Yvonne Benschop (blue cluster appearing at the center at the bottom), followed by Alison Pullen (yellow cluster placed at the center) and Melissa Tyler (purple cluster located at the top center). The rest of the authors are connected to these.

Figure 6

OS Author Clusters



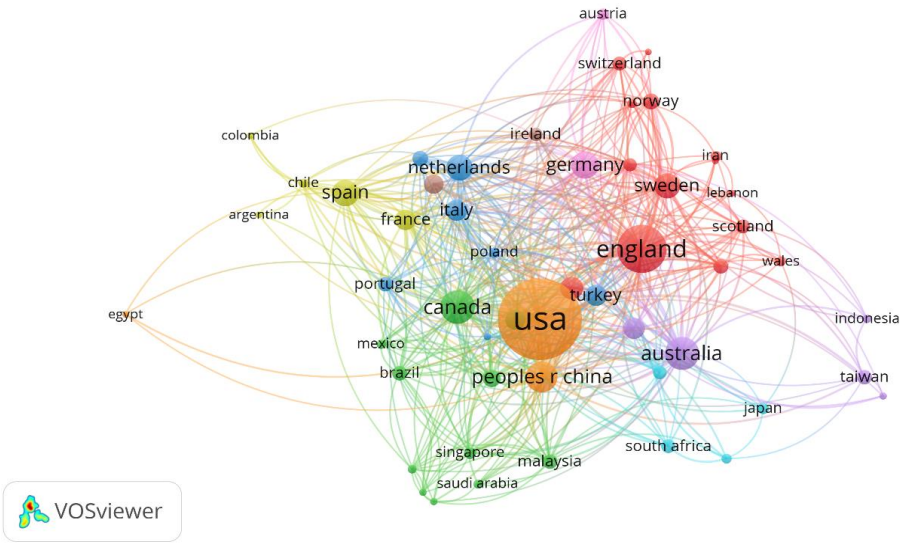
[2] It corresponds to the publication entitled: A new tool for academic quality at work (AQ@workT) to assess the quality of life at work in the Italian academic context.

As with the authors, collaboration networks between countries are identified based on their place of origin; these are between countries of the same continent and intercontinental countries. The cluster of collaboration (co-authorships) between countries publishing on the gender approach in OS was analyzed with VOSviewer. Countries that published at least 10 publications on the topic were included; countries that are not connected to other countries in the network were not included. Figure 7 presents the result of the collaboration network between countries, the size of the circles represents the number of publications per country and the lines the interaction between the collaborations; the colors show the collaboration clusters.

Nine nodes of interaction between countries researching OS from a gender perspective can be recognized. Eight of them are intercontinental and only one is made up of countries from the same continent. The one with the largest number of countries is red, made up of 14 countries from three continents (Europe 9, Asia 5, Oceania 1) and is headed by England; the second node of the network (green) is made up of 11 countries from three continents (America 3, Europe 4, Asia 4), with Canada leading the cluster. The third node (dark blue) is made up of 7 countries from Europe (5) and Asia (2) and is headed by the Netherlands; the fourth cluster (yellow) is made up of 5 countries (2 European and 3 American) and is headed by Spain. Node five (purple), headed by Australia, is also made up of 5 countries (4 Asia and 1 Oceania). The sixth smallest cluster, in light blue, is made up of 4 countries (2 Asian and 2 African) and is headed by South Africa; the next node, the seventh, made up of three countries, represents the largest number of investigations (orange) and is made up of two Asian countries (Russia and China) and the United States of America, which heads it. The last two nodes are integrated by two countries, cluster 8 (brown color) by Ireland (Europe) and Israel (Asia); finally, the pink one, the only intercontinental one integrated by Austria and Germany, a situation that can be explained from two factors: geography and language that strengthen collaboration between countries (Zheng et al., 2016).

Figure 7

Cooperation networks between countries



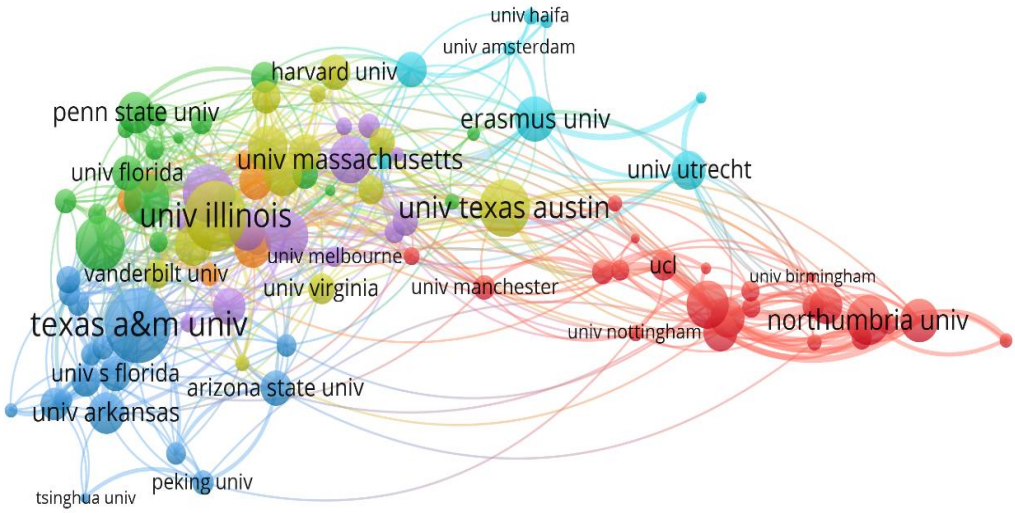
To collaborative networks between institutions, 3055 institutions are participating in 4983 articles (an author can have more than one affiliated institution, or a publication can be written or financed by authors from different institutions). Of the total number of institutions, 60% (1739) only participated in one publication, 26.8% (819) between two and five publications, 7.8% (240) produced between 6 and 10 publications; 5.6% (174) between 11 and 20 publications. The remaining 2.7% (83) participated in more than 20 publications on Organizational Studies with a gender perspective, reaching 142 publications from the State University System of Florida. One of the limitations in analyzing the results of collaboration between institutions is that WoS does not record the type of funding or the type of organization of the affiliation of the authors who generate the publications, so the search for this data must be done manually; however, including this information in the databases would make it possible to identify the areas of interest: political, social, economic and by sources of funding: public and private, in which research on the gender approach in the OS is located.

The cluster of collaboration (co-authorships) between institutions publishing on OS was analyzed with VOSviewer. The 100 institutions that published at least 10 publications on the subject were included; institutions that are not connected to the network were not included. Figure 8 presents the result of the collaboration network between institutions, where the size of the circles represents the number of articles, the lines of the relationship

between collaborations, and the colors of the collaboration clusters. Seven research clusters are identified; the largest cluster (red color), made up of 23 institutions located in England, with the University of Essex and North Umbria University standing out; a second cluster is made up of 18 institutions in the United States (green color), among which is the one with the most research papers on the gender approach in OS, the State University System of Florida. The third cluster, made up of 17 institutions, is also located in the United States (bright blue) and is headed by the University of Texas System. The next cluster (yellow) is made up of 14 institutions also located in the United States, headed by the University of Illinois System; cluster five (purple) is also made up of 14 institutions located in the United States and Canada, headed by the University of Massachusetts System. Cluster six (light blue) is made up of 8 institutions of European and West Asian origin, where Erasmus University Rotterdam stands out. The last cluster (orange) is made up of 6 institutions from the United States, where the University of North Carolina stands out.

Figure 8

Cooperation networks between institutions



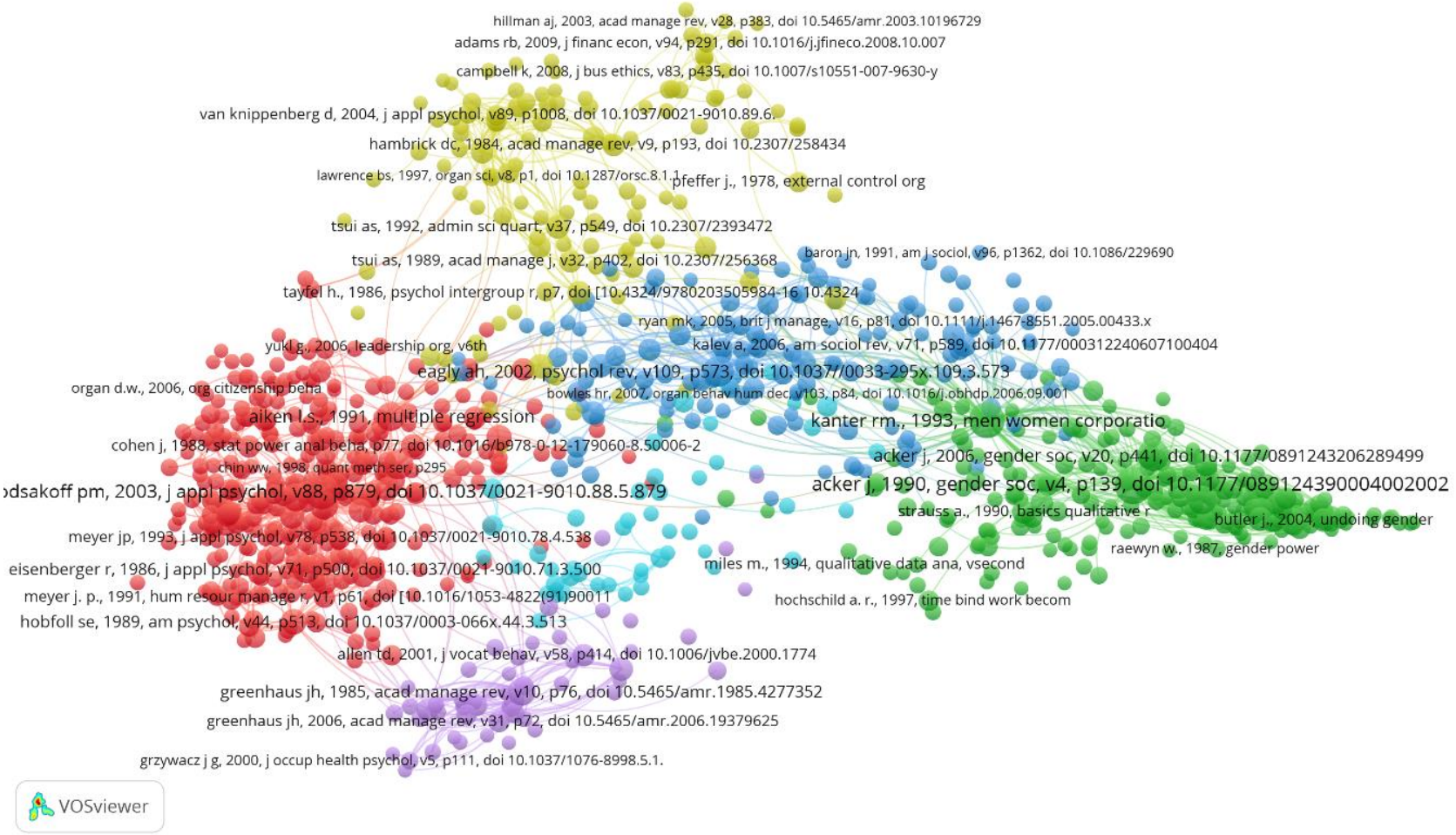
Citation and co-citation networks, allow recognition of the sources with the highest number of citations and their characteristics (Hauke et al., 2017). The analysis can be focused

in two directions: 1) to analyze the references used in the publication (citation analysis) and 2) to track third-party citations through the analysis of references in publications (co-citation analysis) (Li & Hale, 2015). Citations are under two assumptions: 1) that their number reflects the quality of a publication (Van Noorden, et al, 2014; Kim et al., 2006) and 2) quantity does not always reflect quality but rather measures its visibility (Civera et al., 2020; Walter et al, 2003; Chiu & Ho, 2007). The number of times a publication is cited correlates with the time that has elapsed since its publication, so the older it is, the greater the possibility of being cited (Martín et al., 2018). For this paper, the citation analysis provides the number of times that OS publications with a gender focus have been cited by other publications. In total, the 4983 publications have been used as references in other publications 339,381 times. At the date of data collection, the average citation per publication is 68, however, 13% (652/4983) of the publications had not been cited on any occasion; 39% (1955/4983) were cited up to 10 times; 34% (1688/4983) up to 50 times; 8% (412/4983) up to 100 times; 3.5% (176/4983) up to 200 times; 2% (82/4983) up to 500 times; and .5% (18/4983) more than 500 times.

The analysis of co-citations within the 4983 publications on gender in OS presented a total of 192358 references used (VOSviewer, co-citation, cites references, 2023), this analysis describes the interaction between publications and publications that have been co-cited in other publications, which identifies the similarity between them (Li & Hale, 2015). To analyze co-citation between authors VOSviewer was used, and it was established that OS publications shared at least 20 references. Of the 192358 references, 944 publications reach this condition. The result of the co-citation analysis is presented in figure 9, where the size of the circles represents the number of citations and the separation between the circles represents the similarity between publications; the references that share the same colored circle represent the greater similarity between publications. The co-citation map on OS with a gender focus presents 6 dominant clusters, the first one composed of 335 publications in red color; followed by the green cluster, composed of 246 references. The third cluster is blue, made up of 145 citations. The fourth cluster, yellow, is made up of 117 references. The fifth cluster, purple, is made up of 51 citations. Finally, the smallest cluster is light blue, with 49 references.

Figure 9

Reference co-citation networks



Regardless of the cluster to which the references correspond, the three most cited documents in gendered OS research are Inequality regimes: gender, class, and race in organizations by Acker (2006) which appears in 436 of the references of the 4983 publications, followed by 404 citations of the book Men and women of the corporation: new edition by Kanter (2008) and 377 of the article by Podsakoff et al., (2012) entitled Sources of method bias in social science research and recommendations on how to control it. From the review of the main references of the publications of the six groups it was possible to identify a general theme for each of them: the red group focuses on organizational behavior and learning; the green on discrimination and the role of women in organizations; the blue focuses on female leadership; the yellow on gender obstacles in professional development; the purple has a greater orientation to social identity at work; the light blue focuses on women's conflicts and interdependence in the home and roles at work.

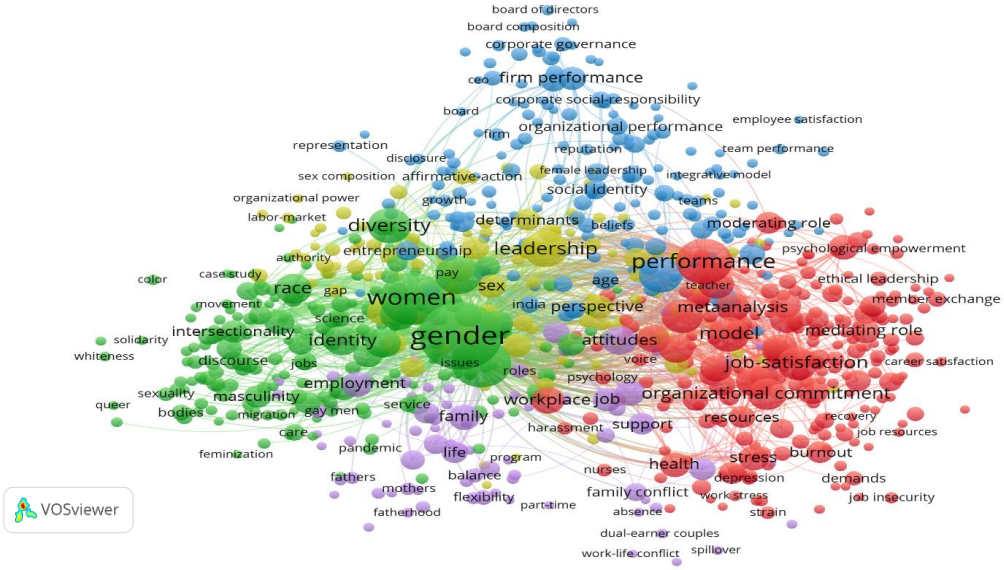
Finally, the last element included in this bibliometric analysis is the analysis of trends in the general lines of research from the 4983 publications on gender in OS, which was done using VOSviewer text mining, in which the frequency of co-occurrence of a set of words included in titles, abstracts and author's words is measured, which accompanied by temporal visualization, allows recognizing the evolution of the specific field of knowledge (Van Eck & Waltaman, 2020). General terms such as method, objective, and conclusion were eliminated. Plural and singular terms were merged. Interactions are established by counting the number of times keywords match in publications and color group clusters (Van Eck & Waltaman, 2013). The size of the circles represents the number of times a term appears, the larger the size the higher the frequency of the word among authors. The lines joining the circles allow identifying their interactions, the smaller the distance between the words, the stronger their relationship. Only words that appear in at least 10 articles are considered, where 810 terms meet these criteria.

The result of the analysis is shown in figure 10. The red cluster seems to involve publications on organizational performance and behavior and job satisfaction, associated with external factors, including terms such as performance, behavior, personality, job satisfaction, perceptions, workplace, burnout, health, and stress. The green cluster is undoubtedly the one most oriented to the role of women in organizations, words such as gender, women, management, diversity, identity, inequality, masculinity, and differences,

make this clear. The blue cluster focuses on the impact of gender differences in organizations of different natures, words such as firm, executive, entrepreneur, collaborator, financial and corporate performance, and female directors, are the most frequent terms. From the yellow cluster, research related to leadership and stereotypes is inferred, terms such as glass cliff, sex segregation, stereotypes, career, managers, and networking, are the most recurrent. Finally, the purple cluster, which is the smallest, seems to focus on the conflicts between the roles played by women in the home and in organizations, terms such as work life balance, family, employment, flexibility, time, mothers, fathers, child care, are indicative of this approach.

Figure 10

Co-occurrence analysis of terms



CONCLUSIONS

The starting point for this bibliometric review was the compilation in WoS and analysis of articles on the gender approach in organizational studies. Given the complexity of the field of knowledge in organizations, this study is extensive and complex, showing constant and permanent growth. The bibliometric analysis included 4983 articles on the gender approach in organizational studies written by 12,994 authors, 909 journals, 105 countries, and 5055 institutions. Five general lines of research on the gender approach in OS can be distinguished: a) Organizational behavior, job satisfaction and organizational performance; b) The role of

women in organizations; c) Gender differences in organizations; d) Leadership and gender stereotypes in organizations; e) Role conflicts and gender stereotypes and organizations.

For the descriptive and network analysis of productivity, Lotka's Law (Tran & Aytac, 2021) was used, which explains the behavior of various indicators:

- Most authors (88%) have one publication and only a small group of authors wrote a representative part of the research (0.56% of the authors published at least 10 articles).
- Of all the journals that publish on the subject, 31% are published in 3 journals, the remaining 69% are published in 878 journals.
- Of the regions that publish on OS with a gender perspective, 86% of the articles were produced by 10 countries, while the remaining 14% of the publications were produced by 95 countries.
- 60% of the institutions participated in one publication, and 2.7% of the institutions produced at least 20 publications on the gender approach in the OS.
- A large proportion of the publications on gender focus in OS have not been cited by other researchers (13%) and only a small number of publications (0.5%) were cited more than 500 times.
- Tammy Allen, the most productive author on gender research in OS, is affiliated with the State University System of Florida, her research interests are in Psychology Business & Economics Public & Occupational Health Women's Studies.
- Twenty-three percent of the publications were written by a single author, so co-authorship networks are relevant in OS with a gender focus, since 77% of the articles were written by two or more authors.
- The most cited article is Acker's (2006) Inequality regimes: Gender, class, and race in organizations.
- The journal Gender Work and Organization is the key journal for publications on the gender approach in OS with 914 articles published.
- The United States, England and Canada are the countries that dominate research on the gender approach in OS. In the cooperation network, other countries are linked, directly or indirectly, with some of these countries (China, Australia, Germany, and the Netherlands). Europe and North America are the regions that dominate the production of research on the subject.

- The National Natural Science Foundation Of China (NSFC) is the leading institution in productivity on gender focus in OS.
- Authors on the gender approach in OS that are influential in other research on this topic include Kanter (2008) and Podsakoff et al., (2012.

Concerning the challenges involved in research on organizational studies with a gender approach, it can be pointed out in the first place, a lack of multidisciplinary integration, since most publications are classified in the areas of management and business, due to the fact that they have been largely absorbed by the study of organizations, without considering the social role of individuals (Montaño, 2020).

There is also a geographical inequality in the research on the gender approach in the OS, which is related to globalization and the economic and social development of the regions. The participation of Central America, South America, and especially Africa is very limited, so few sources of consultation reflect the cultural and social role of the South in gender differences and their dimensions within the study of organizations.

Finally, it is necessary to recognize some limitations of this bibliometric analysis. First, the search for publications was limited to WoS, which, although it is a recognized database and considered one of the largest scientific databases in the research world, does not contain all the publications in the disciplinary field of a gender focus in OS. Additionally, the bibliometric analysis uses quantitative methods, therefore, the content of the publications cannot be interpreted (Dunk & Arbon, 2009), which may imply that some of the publications that were included in the analysis address a topic other than gender in OS. Another limitation of bibliometrics is that the analyses are performed on the information and classification generated by the database itself (WoS), so information such as the identification between theoretical and empirical discussions and some other data such as the method and scope of the research is omitted, so it is recommended to complete these works with content analysis for future research on the gender approach in OS.

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Chapter 2

Consequences of the COVID-19 pandemic on Savings and Loan Cooperatives in Mexico

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Consequences of the COVID-19 pandemic on Savings and Loan Cooperatives in Mexico

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INTRODUCTION

In recent years, the financial sector has faced a more competitive scenario and more frequent economic crises that have also affected savings and loan cooperatives in Mexico, in aspects such as the increase in delinquency. This has become more evident since 2008, due to the global financial crisis that arose a year earlier in the United States (Chávez, 2015; Cobián et al., 2016).

Recently, in 2020, the economic crisis produced by the COVID-19 pandemic has impacted all countries and the institutions that make up their financial systems, including cooperatives dedicated to savings and loans. The foregoing is because the economies have had to close and paralyze their activities, and, to the quarantines to which citizens have had to submit; Therefore, the governments and central banks of several countries, such as the United States, Japan, the United Kingdom, and Mexico, have applied fiscal and monetary policies to reduce the economic effects that the pandemic has caused (Rebucci et al., 2020; IMF, 2021; BANXICO, 2021 a).

In particular, in Mexico, the economic crisis caused by the COVID-19 pandemic caused a drop in the Gross Domestic Product (GDP) of 8.5% in 2020 and extended into early 2021. Likewise, although some economic indicators point to a recovery, this seems to be slow (INEGI, 2021 a).

Due to this situation, the *Comisión Nacional Bancaria y de Valores* (CNBV, 2020a, by its initials in Spanish) has implemented actions to support the Savings and Loan Cooperative Societies (SOCAPS by its initials in Spanish) and their partners, among these actions are the restructuring of the commercial, consumer and housing loans of borrowers. However, these measures are based on solutions applied in other types of financial institutions, such as banks; Therefore, they do not take into account the particularities of SOCAPS -such as their operational limitations, the pursuit of a social purpose, and the adoption of cooperative principles-.

Thus, based on what is indicated in the previous paragraph, the evolution of SOCAPS in Mexico, during the economic crisis caused by the pandemic, is uncertain, both economically and financially, due to the scope of the actions raised by the authority, which may be positive, but possibly insufficient.

That is why it is relevant to examine the performance of the critical areas of the SOCAPS in the context of the economic crisis caused by the COVID-19 pandemic; which will make it possible to determine how the economic crisis affects these entities, as well as to identify their most resistant and most affected areas. Through this, the strengths and weaknesses of the SOCAPS and the most immediate implications that economic crises have on them will be known, to determine possible preventive and corrective actions that affect their strength and permanence.

The main objective of the research is to establish the impact of the economic crisis caused by the COVID-19 pandemic in the finance area of the Savings and Loan Cooperative Societies (SOCAPS) of Mexico. Which, this research was structured as follows: in section two, the theoretical framework is presented where the most important aspects of the study are addressed; in section three, the methodology applied in the investigation is shown; in part four, the results of the investigation are exposed, which are discussed; and, finally, section five shows the conclusions that were reached as a result of the investigation.

THEORETICAL FRAMEWORK

Savings and Loan Cooperative Societies of Mexico

Savings and Loan Cooperative Societies (SOCAPS) are cooperatives whose function is to capture the savings of their members/clients and distribute them among their members/clients through loans. SOCAPS are institutions that belong to the Mexican financial system and that are distinguished from other financial institutions such as banks, by how they are organized, because their main purpose is social, and because they seek to provide financial services to the population that has less access to these. Also, due to their characteristics, SOCAPS play an important role in financial inclusion in Mexico which, in the context of this country, is relevant, since there are still communities and sectors with little or no access to financial services (García de León, 2019; Cruz & Rosado, 2020).

One of the characteristics of the SOCAPS is that they carry out activities in areas where traditional financial intermediaries do not operate, for reasons such as the low density and income of the population. Also, the SOCAPS seek to maintain an infrastructure close to their partners/clients, to offer their financial services, and hold partner assemblies; likewise, they offer the possibility of carrying out transactions of low monetary value; so that, due to their characteristics, these entities belong to the social sector of the Mexican economy, since they prioritize their social purpose over the monetary one (Cobián & Núñez, 2019).

By the SOCAPS regulatory framework, these are supervised and regulated by the *Comisión Nacional Bancaria y de Valores* (CNBV by its initials in Spanish). The CNBV classifies SOCAPS twice based on two criteria: The first is based on the number of its assets, with which it groups SOCAPS into four categories, plus the basic level, which is the group where the SOCAPS are located. SOCAPS lack savings protection mechanisms for their members. The basic level SOCAPS operate in geographically dispersed places with low economic development, have little formalization in their management and are the largest group. The second classification only applies to authorized SOCAPS, that is, of the four categories, and for this classification, the CNBV uses the Capitalization Level (NICAP) which is an indicator designed by the CNBV to assess the financial status of SOCAPS, issue

early warnings and implement preventive measures, which can be: minimum corrective measures and additional special corrective measures (LRASCAP, 2021; CNBV, 2021a).

It should be noted that to survive in a complex and globalized environment, SOCAPS have been forced to reconcile their operations with their social purpose and with cooperative principles and values; insert themselves into financial systems, and become highly competitive, despite being subject to special regulations and operational and financial limitations (Martínez & Espinoza, 2013; Chávez, 2015).

In this scenario, SOCAPS have faced economic and financial crises, such as that of 2008, which caused, among other things, an increase in delinquency and a decrease in the demand for credits; which caused some governments, such as the Spanish one, to implement rescue measures for financial institutions; however, in other countries, such as Mexico, the effects on savings and loan cooperatives were less severe. Likewise, these cooperatives applied their strategies to face the 2008 crisis, one of these was to reduce the growth of their facilities and, it was found that due to their particularities, savings and loan cooperatives are protected against various financial risks, which This places them in a better position to deal with this type of event than other types of financial institutions such as banks (Calvo & Paúl, 2010; Peláez, 2011; Martínez & Espinoza, 2013).

Regarding this, Böve & Pfingsten (2008) indicate that one of the particularities of savings and loan cooperatives, which can represent an advantage that allows these institutions to have lower provisions for insolvency situations, a lower loss rate, and lower profitability The greater is their specialization, since they are focused on certain sectors and services, which causes them not to have a level of diversification as high as that of other financial institutions such as banks.

The economic crisis caused by the COVID-19 pandemic

The COVID-19 pandemic has caused an economic crisis that puts the economic growth of countries at serious risk. The foregoing is because countries have had to close and paralyze their economic activities and the quarantines to which citizens have had to submit; which will have effects in the short and long term on supply and demand at the aggregate and sectoral level, the magnitude of which will depend on factors such as the internal conditions

of the economy, world trade, the duration of the epidemic, the vaccination programs and social and economic measures to prevent contagion (BM, 2020; BANXICO, 2021a).

On this, Bittihn et al., (2021) comment that several countries face the decision to put the economic and mental well-being of their citizens at risk and the appearance and reappearance of COVID-19 in their countries. The authors add that the countries have implemented strategies trying to mitigate the effect of the crisis, which they have been adjusting as the situation progresses.

In the specific case of Mexico, the first cases of COVID-19 were registered on February 29, 2020. Given this situation, the authorities implemented sanitary measures to prevent contagion. These actions were hardened by March 24 of the same year, because the virus advanced in its spread, and by May 2020 a strategy for the reopening of activities was established, which was based on a system of traffic lights that indicate the activities for which there are restrictions. COVID-19 and the sanitary measures applied had an impact on the Mexican economy, which became noticeable in March 2020, the date on which it affected various sectors such as the financial sector and led to a GDP drop of 8.5% in 2020 (INEGI, 2021a).

Among the various economic effects caused by this crisis are: the increase in interest rates; economic contraction; disruption in value chains; the reduction of global demand; the increase in risk premiums; the increase in world unemployment; increased volatility in financial markets; and, the decrease in liquidity. On the other hand, some of the concerns that have been raised are the size and response of consumers, the impact on bank lending, and the cost of borrowing (Andersen et al., 2020).

In particular, the effect of the economic crisis caused by COVID-19 on financial institutions began to be investigated. In this line, Hasan et al., (2020) addressed the restrictions on access to credit in companies of different sizes caused by the economic crisis that arose from the COVID-19 pandemic; For their part, Dursun-de Neef & Schandlbauer (2021) studied bank loans in the United States, where they found that the banks that were in areas with the greatest exposure to COVID-19 were the ones that had an increase in deposits. their clients at the beginning of the pandemic; while Andersen et al., (2020) studied consumption in Denmark in the context of COVID-19 through bank transactions, establishing that aggregate spending fell by approximately 27% and that the restrictions

imposed on mobility had different effects between consumption categories; and, Syahruddin & Karim (2020) investigated Makassar savings and loan cooperatives, in which they found that these types of cooperatives have been used by micro-entrepreneurs to capitalize.

It should be added that Hasan et al., (2020) indicated that the economic crisis that arose from the COVID-19 pandemic has similarities with the 2008 crisis since in both crises the global economies were pressured through bankruptcies, shortages of liquidity, and other elements. Also, the authors add that the economic crisis of COVID-19 comes at a critical moment because confidence in globalization and multilateralism has been deteriorating due to causes such as the world crisis of 2008.

Likewise, it should be added that the growth of the global economy during the period from 2011 to 2019 has been low, averaging a world growth rate of 2.8% (ECLAC, 2020), an example of low growth is Mexico, which in 2019 had negative economic growth of -0.1% (IMF, 2021).

Faced with this economic crisis caused by COVID-19, institutions from different countries will implement policies that support lenders and borrowers, for example, in Mexico, where the CNBV carried out actions to help the different credit institutions that exist in Mexico to restructure the credits from its clients (CNBV, 2020a); and the *Asociación de Bancos de México* (ABM, by its initials in Spanish; 2020a; 2020b,), which announced that it would apply policies to help pay customers' loans.

In parallel, the governments and central banks of several countries have applied monetary, fiscal, and social policy actions, to counteract the negative effect caused by the economic crisis derived from the COVID-19 pandemic and ensure liquidity. of organizations (BANXICO, 2021a). Some examples of these measures are the United States Federal Reserve, which applied the policies of buying long-term assets, and the Quantitative Easy; and the European Central Bank, which implemented a package worth 750 million dollars, which was used to purchase sovereign bonds. Along these lines, a monetary policy that the vast majority of the world's central banks decided to use was the reduction of interest rates to reduce borrowing costs and increase loans. In the particular case of Mexico, the reduction was gradual, going from 7.25% to 4.25% in October 2020 and by May 2021 to 4% (CEPAL 2020; BANXICO, 2021a; 2021b; Rebucci et al., 2020).

Specifically, *Banco de México* (BANXICO by its initials in Spanish) implemented monetary policies whose main purpose was to strengthen credit channels and provide liquidity, to sustain the development of the financial system, through a program worth one hundred million dollars, which were used to purchase sovereign and corporate bonds. However, these policies have had a limited impact, which is due, in part, to the low interest shown by banks in giving credit to SMEs that do not lack sufficient collateral. On the other hand, regarding the fiscal policies implemented in the country, these have been insufficient, because, for the most part, they were limited to reorienting public spending (BANXICO, 2021a; 2021b).

It should be added that other financial institutions in Mexico, such as the ABM (2020a; 2020b), have chosen to apply measures that mitigate the impact of the economic crisis and support different financial credit institutions, among which are Financial Companies Populares, giving them facilities so that they can restructure the credits given to their clients. In particular, the CNBV carried out various measures to support SOCAPS, from levels one to four (CNBV, 2020a). These actions are similar to those proposed to other financial institutions and are aimed at helping to restructure the loans given to their partners.

On the other hand, BANXICO (2021a) forecast an economic recovery in 2021, although he adds that this is not expected to be the same in all countries, since it will depend on factors such as the speed with which certain policies are implemented, among them: monetary support policies against the COVID-19 pandemic; vaccination programs; and, the elements of the structures of the economies of the countries, such as the degree of contribution to the economy of certain sectors that could be more affected by the crisis, such as tourism. In this way, it is estimated that many economies will recover the size of their GDP before the COVID-19 pandemic in 2022 and, in some cases, it will be until 2023. A unique case was China, which recovered its level of GDP in 2020.

METHODOLOGY

The main purpose of the methodology is to achieve the objective of the research, which is to establish the impact of the economic crisis caused by the COVID-19 pandemic in the finance area of SOCAPS in Mexico. For this, five Chow structural analysis tests were carried out on

five representative variables of the SOCAPS finance area. The information used for the analysis was extracted from the CNBV (2021b) and is from all the SOCAPS of levels one, two, three, and four, therefore, the basic level ones are not included. Table 1, shown below, shows the representative variables of the SOCAPS finance area and its temporality.

Table 1

Variables examined are classified from the area of finance and its temporality.

Area	Variable	Temporality and type of database
Finance	$Delate\ payment\ ratio\ (IMOR*)$.	January 2010 to March 2021 (monthly).
	$Coverage\ ratio\ (ICOR*)$.	
	$Liquidity\ ratio$.	
	$Return\ on\ assets\ (ROA)$.	
	$Return\ on\ equity\ (ROE)$.	

Note: CNBV (2021 b).

*By its initials in Spanish

In Table 1, it can be seen that five variables from the finance area were analyzed, which are: the $delinquency\ rate\ (IMOR)$, the $coverage\ ratio\ (ICOR)$, the $liquidity\ ratio$, the $return\ on\ assets\ (ROA)$, and the $return\ on\ equity\ (ROE)$. Also, in Table 1, it is shown that the temporality of the databases is monthly and that the analysis period covers from January 2010 to March 2021, therefore, each variable has 135 observations. It should be added that the five variables are from the total SOCAPS of levels one, two, three, and four (CNBV, 2021b).

Likewise, the five variables that can be seen in Table 1 will be examined through Chow's structural analysis tests, therefore, five tests will be carried out. In each of the five tests that will be carried out, the date that was examined to establish whether there was a structural change caused by the economic crisis caused by the COVID-19 pandemic will be March 24, which was the date on which they began to apply the most drastic measures in Mexico (INEGI, 2021a). Now, Table 2 presents the formulas and descriptions of the five variables that will be analyzed and that belong to the finance area.

Table 2

Formulas and description of the variables of the finance area.

Variable	Formula	Description
Delate payment ratio (IMOR*).	$\left(\frac{overdue\ portfolio}{total\ portfolio}\right) * 10$	Rate or percentage that represents the overdue portfolio of the total portfolio of the SOCAP.
Coverage ratio (ICOR*).	$\left(\frac{Preventive\ estimates\ for\ credit\ risk}{past\ due\ portfolio}\right) * 100$ balances at the end of the month	Rate or percentage that covers the preventive estimates for credit risk to the past-due loan portfolio.
Liquidity ratio.	$\frac{Short-term\ assets}{short-term\ liabilities}$	It is a financial ratio that measures the liquidity margin. High values of the current ratios imply less risk that the company will experience a cash deficit shortly.
Return on assets (ROA) (12-month cash flow)	$\left(\frac{The\ net\ result\ of\ 12-month\ flows}{Average\ total\ assets\ 12\ months}\right) * 100$	It measures the profit or operating profitability after taxes that the SOCAP has.
Return on Equity (ROE)	$\left(\frac{The\ net\ result\ of\ 12-month\ flows}{Average\ stockholders'\ equity\ 12\ months}\right) * 100$	Measures the net profit or return on capital of the SOCAP.

Note: CNBV (2021 b); Brealey et al., (2010); Berk &De marzo (2008).

*By its initials in Spanish

To carry out the five Chow structural analysis tests, the methodology shown by Gujarati & Porter (2010) will be used. Thus, according to the authors, the events that could have caused a structural change in the five SOCAPS variables examined were first identified; this event is the economic crisis arising from the COVID-19 pandemic. Once the date of the event has been established, three regressions must be carried out for each of the five Chow structural analysis tests that will be carried out to study the five variables, these regressions

are a) one of the entire data series, b) one from the period before the event, and c) another from the period after the event. Table 3 shows the temporalities of these regressions.

Table 3

Temporalities of the regressions.

Area	Complete temporality	First regression	Second regression
Finance	January 2010 to March 2021.	January 2010 to February 2020.	March 2020 to March 2021

Note: CNBV (2021 b).

The three regressions that will be made will have the form of Equation 1:

$$Y_t = \beta_1 + \beta_2 X_t + \beta_3 X_1 + \beta_4 X_2 + u_1 \quad (1)$$

Where:

$Y = One\ of\ the\ five\ variables\ in\ the\ finance\ area\ (total\ SOCAPS).$

$\beta_1 = the\ regression\ intercept.$

$\beta_2 = partial\ regression\ coefficient\ of\ the\ time\ variable.$

$X_t = time.$

$\beta_3 = partial\ regression\ coefficient\ of\ the\ competition\ control\ variable.$

$X_1 = control\ variable\ of\ competition.$

$\beta_4 =$

$coefficient\ of\ partial\ regression\ of\ the\ control\ variable\ of\ economic\ activity.$

$X_2 = Control\ variable\ of\ the\ economic\ activity.$

In Equation 1, it can be seen that control variables (X_1 y X_2), were added, so that they were taken into consideration and kept constant, and thus the results obtained are more representative. The selected variables are the competence of SOCAPS (X_1) and economic activity (X_2). In this way, in X_1 the total current credit portfolio of the commercial banks of Mexico will be used, to represent the competition of the SOCAPS, this database will be extracted from the BANXICO website (2021c).

For its part, the variable that will represent economic activity will be the Global Index of Economic Activity (IGAE by its initials in Spanish), which, the database will be extracted

from the INEGI website (2021 b). The IGAE was chosen because its frequency is monthly, which makes it more convenient for this research than the GDP, which is quarterly.

In this way, three regressions will be made for each of the five variables of the finance area of the total SOCAPS, which will have the form of Equation 1. Subsequently, the $Residual\ Sum\ of\ Squares$ (SCR) of the three regressions. The $SCRs$ of the regressions separated by the event are summed to obtain the $unrestricted\ SCR$ (SCR_{NR}). Next, the F value calculated based on Equation 2 is estimated.

$$F = \frac{(SCR_R + SCR_{NR})/K}{(SCR_{NR})/(n1 + n2 - (2k)} \quad (2)$$

Where:

$k = number\ of\ regression\ variables.$

$n1 = number\ of\ observations\ before\ the\ structural\ change.$

$n2 = number\ of\ observations\ after\ the\ structural\ change.$

$SCR_{NR} =$ residual unrestricted sum of squares.

$SCR_R = Restricted\ residual\ sum\ of\ squares\ (of\ the\ complete\ series).$

Using Equation 2, the calculated F value is obtained, which is compared with the critical F value. The latter is searched for in the F distribution tables with K in the numerator, where K is the number of regression variables; and, $n1 + n2 - (2k)$ in the denominator. Also, the α value of the critical F is 0.05, that is, 5%. Once the calculated F value and the critical F value have been obtained, the decision criterion of the Chow structural analysis test presented in Equation 3 is applied.

$$Reject\ the\ parametric\ stability\ hypothesis\ if: F_{Critical} < F_{Calculated} \quad (3)$$

The decision criterion of the Chow structural analysis test shown in Equation 3 indicates that in cases where the calculated F is greater than the critical F, the structural stability hypothesis is rejected, which indicates that there is a structural change.

RESULTS

Table 4 shows the results of the Chow structural analysis test of the total SOCAPS of five variables in the finance area, which are: $IMOR$, $ICOR$, $liquidity\ ratio$, ROA, and ROE; where it can be seen that, in the five variables, the calculated F value is greater than the critical F value; therefore, the hypothesis of structural stability is rejected, indicating that the economic crisis caused by the COVID-19 pandemic caused a structural change in the five variables analyzed in the SOCAPS finance area.

Table 4

Results of the Chow structural analysis test of the variables of the finance area of the SOCAPS of Mexico.

Variable	Calculated F value	Critical F value	The structural stability hypothesis is accepted
$IMOR$	4.41	3.07	Is rejected
$ICOR$	9.39		
$Liquidity\ ratio.$	37.04		
ROA (flow 12 months)	23.76		
ROE (flow 12 months)	17.58		

Now, Table 5 presents the regressions, before and after the structural change, of the five variables, since evidence of this was found. In these, it can be seen that the structural change caused a change in sign in the slope (time-variable) of the $IMOR$, going from negative to positive. This shows that delinquency had been decreasing, but, since the economic crisis caused by the COVID-19 pandemic, the trend changed upward. On the contrary, concerning the $ICOR$, it can be seen that the structural change caused its slope (time-variable) to change the sign from positive to negative, which shows that before the economic crisis caused by the COVID-19 pandemic, the $ICOR$ was increasing, but after the crisis, it began to decrease. In other words, the SOCAPS made use of this fund to face the credit risks caused by the COVID-19 pandemic. Similarly, the slope (time-variable) of the liquidity ratio changed sign, going from positive to negative, reflecting a decrease in SOCAPS liquidity caused by the COVID-19 pandemic.

On the other hand, in the ROA and ROE, there is no sign of change in their slopes (time-variable), which, before the crisis, were already negative; however, it should be noted that this situation increased, showing greater generalized losses. In this way, the results support that the economic crisis caused by the COVID-19 pandemic caused a structural change in the five variables of the SOCAPS finance area.

Table 5

Regressions before and after the structural change of the five variables of the SOCAPS finance area.

	$IMOR$		$ICOR$		$Liquidity\ ratio.$		ROA		ROE	
	Before	After	Before	After	Before	After	Before	After	Before	After
Interception	14.35	4.68	28.93	121.01	21.24	186.96	-3.77	8.89	-27.67	39.15
Time (pending)	-0.01	0.07	0.02	-0.70	0.28	-1.00	-0.0008	-0.10	-0.05	-0.57
Bank credits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IGAE	-0.05	-0.05	0.63	0.63	0.39	0.39	0.03	0.03	0.26	0.26

DISCUSSION

The results show that, in the area of finance, the SOCAPS in Mexico were affected by the economic crisis caused by the COVID-19 pandemic. In this sense, Chow's structural analysis tests of the five variables of the SOCAPS finance area indicate that the economic crisis caused by the COVID-19 pandemic caused a structural change in the five variables analyzed. In particular, in the $IMOR$ variable, it was found that the economic crisis caused by the COVID-19 pandemic caused its trend to change, going from negative to positive. This means that before the economic crisis, delinquency was decreasing, which is good for SOCAPS income. However, the crisis caused a change in its trend, turning it positive, which means that delinquency is increasing. This situation hurts the income of the SOCAPS since the collection of interest on the loans given to their members is their main source of income (Vera & López, 2020; Fuentes, 2008).

The increase in delinquency is also appreciated in the $ICOR$ since the economic crisis caused it to change its trend from positive to negative. This indicates that the funds to face

credit risks were growing before the crisis, but, once the crisis arrived, the SOCAPS made use of this fund, causing it to decrease. The fact that the SOCAPS used this fund to protect themselves against credit risks, shows that the increase in delinquency had an impact on the income of the SOCAPS. This situation shows the operational limitations of the SOCAPS, because the collection of interest on the loans, given to their partners, is their main source of income, and if it is affected, it generates significant financial risks for the SOCAPS, which leads him to use his special resources to deal with them.

In this sense, some of the causes attributed to the increase in delinquency in financial institutions in Mexico are an increase in the unemployment rate, and variations in the exchange rate and the monetary base (Mosso & Lopez, 2020). These variables have been impacted by the economic crisis caused by the COVID-19 pandemic, which could explain the increase in SOCAPS delinquencies. Also, these results agree with what was indicated by Hasan et al., (2020), who point out that the economic crisis caused by the COVID-19 pandemic affected traditional financial institutions such as banks, generating credit risks, being one of them, the increase in delinquency. For this reason, the CNBV opted to apply measures to support SOCAPS authorized to operate, helping them to restructure their credits.

On the other hand, the results of the analysis of the ROA and ROE variables of the finance area indicate that the economic crisis caused by the COVID-19 pandemic caused a structural change and caused a decrease in the generation of its profit. The latter is because the ROA and ROE of the SOCAPS increased their negative value, which indicates that these have had a lower generation of profits. These results are supported by those obtained in the SOCAPS $liquidity\ ratio$ variable, in which it was found that the economic crisis caused by the COVID-19 pandemic caused a structural change and went from having a positive to a negative sign. The latter shows that the economic crisis arising from the COVID-19 pandemic caused the liquidity of the SOCAPS to decrease. The deterioration of these financial indicators shows the negative impact that the economic crisis caused by COVID-19 caused on the SOCAPS, likewise, they support what was found in the $IMOR$ and the $ICOR$, since as the delinquency of the SOCAPS increases their income decreases, which negatively affects these financial ratios.

Thus, due to the impact of the economic crisis caused by the COVID-19 pandemic on financial institutions in Mexico, organizations such as BANXICO and the CNBV developed

strategies to support institutions that belong to the Mexican financial system. In particular, the CNBV (2020a) designed specific strategies for SOCAPS authorized to operate. One of them consisted of applying measures to support the restructuring of credits granted by SOCAPS. This measure is an adaptation of those made for other types of financial institutions. In this sense, the results of the study cannot determine the impact that these strategies had on the SOCAPS, however, they show that, despite these measures, the SOCAPS were affected by the economic crisis derived from the COVID-19 pandemic.

Regarding these measures, it should be noted that they are adaptations of others developed for other types of financial institutions, therefore, the impact of these measures on SOCAPS may not be as desired. This is because it has been shown that the strategies implemented to support traditional financial institutions in periods of economic crisis do not have the same impact on savings and credit cooperatives. This is for reasons such as that they do not contemplate the particularities of these institutions. It must be added, that these characteristics make it difficult to develop strategies to support these institutions (Peláez, 2011; Chaves & Savall, 2013).

It should be added that, during the economic crisis of 2008, savings and loan cooperatives chose to implement their measures, but trying not to neglect their social purpose. One of these strategies was to reduce the growth of its facilities (Calvo & Paúl, 2010). Regarding this issue, the number of branches of the SOCAPS in Mexico was examined, in this analysis, it was found that the SOCAPS maintained a positive trend before the economic crisis caused by the COVID-19 pandemic, this is because in March 2020 there were 2,173 branches and by June 2020, the number of branches increased by five units, reaching 2,178. But, in September 2020, the number of branches contracted by eight units, bringing the number down to a total of 2,170 branches. However, by December 2020, the trend was positive again, since growth occurred, due to the increase in the number of branches, reaching a total of 2,181 units (CNBV, 2021 c).

Finally, it has been indicated that the particularities of SOCAPS protect them from economic crises because they prevent these institutions from being exposed to various financial risks. Examples of these particularities are their level of specialization since they are focused on certain sectors; and, that they do not have a great level of diversification. But, it should be added that it has been pointed out that these characteristics can be limiting in

their operations (Soler & Melián, 2012; Böve & Pfingsten, 2008). On this, the results show that although multiple variables in the finance area have been impacted by the economic crisis caused by the COVID-19 pandemic, SOCAPS have managed to remain and this can be attributed to their characteristics. However, it should be noted that one of the areas of weakness of the SOCAPS is their limitations regarding their sources of income because this was impacted by the economic crisis that arose. What caused the emergence of credit risks that SOCAPS had to face?

CONCLUSIONS

The objective of the research was to establish the impact of the economic crisis caused by the COVID-19 pandemic in the finance area of SOCAPS in Mexico. Thus, five representative variables of the finance area of the Mexican SOCAPS were examined. Likewise, in each of these variables, the total SOCAPS, which is the sum of all SOCAPS that are authorized to operate, was examined. Chow's structural analysis test was applied to these databases and partial regressions (before and after the structural change) were obtained to establish the trend change of the slope.

The results of Chow's structural analysis tests indicate that the finance area of the SOCAPS in Mexico was significantly affected by the economic crisis caused by the COVID-19 pandemic. In this sense, Chow's structural analysis tests indicate that there was a structural change in the liquidity ratio, ROA, and ROE variables. In the case of the liquidity ratio, the structural change caused a significant change in the slope, which went from positive to negative. Regarding ROE and ROA, it was found that the structural change did not cause a significant change in the slope, which remains negative, however, it is of greater magnitude.

For their part, the results of Chow's structural analysis tests indicate that there was a structural change in the $IMOR$ and $ICOR$ variables. Regarding the $IMOR$, the structural change caused a change in the sign of the slope from negative to positive; for its part, in the $ICOR$, there was also a significant change in its slope from positive to negative.

Likewise, the results of examining the number of branches show that in March 2020 there were 2,173 branches and that by June 2020 these increased by five units, reaching 2,178, but, in September, these were reduced by eight units, remaining with a total of 2,170

branches. However, by December 2020 the growth trend recovered, due to the increase in the number of branches, with a total of 2,181 branches.

In this way, based on the results, it is concluded that the economic crisis caused by the COVID-19 pandemic impacted the SOCAPS in Mexico in the finance area, which was directly reflected in their income; and, in the increase of delinquency. This situation caused SOCAPS to use its funds to face credit risks.

Among the limitations of this study, it is found that the basic level SOCAPS were excluded; also, the temporality of some databases; and, the availability of information. It is suggested how future lines of research show the particularities of the SOCAPS that had greater resilience in the face of the economic crisis caused by the COVID-19 pandemic and some case studies.

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Chapter 3

Status of Production Systems in Relation to the Application of Optimization Techniques

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Status of Production Systems in Relation to the Application of Optimization Techniques

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INTRODUCTION

Production systems take great importance, once mass production becomes present as a fundamental part of the development of nations (Dosi & Virgillito, 2019) so that the existing competitiveness in these manages to be placed as one of the main objectives of the study of production, to ensure that the GDP is constantly on the rise (Moral, 2019). This situation, forces the analysis of production systems and their evolution, with this we can immediately observe the enormous difference that exists between organizations; while some are always concerned about developing and positioning themselves as industrial references worldwide, in the preference of customers and as generators of employment (Cuadrado & Tagliati, 2018), so as a result, they become owners of the competition; likewise, other organizations constitute the majority, which by their nature and few expectations become followers of those that manifest themselves as transnational companies.

The question is to determine what these companies have done to position themselves in the preference of customers (Fujimoto, 2012) and to be at the forefront of the market; It is worth mentioning that those considered worldwide have managed to effectively link concepts of competitiveness with the development of their production systems, to the point of designing their own (Heller, 2002), so that the so-called follower companies must in the first

instance, even in a basic way, establish the structural support that supports the arrival and continuity of their operations at the levels at which those considered as the best companies worldwide (Manikas et al, 2020).

On the other hand, the globalization in which the market has been immersed since the last quarter of the 20th century forces the value chains of the different products to develop efficiently in a very competitive environment dominated by large companies (Rodríguez-Castellanos and San Martín-Albizuri, 2020), so the follower companies must acquire forms of work that enable them to support themselves in this task (Villa, 1989) and can aspire to become transnational companies as well.

It is essential, when the organization wants to improve and update itself systematically, to work constantly on people, capital, systems, information, materials, methods, techniques, and technologies, among others (Mack et al, 2016; Berger-Vachon et al, 2018; Marchau et al, 2019), which shows that the company aims to work in an orderly manner and always with the mentality of positioning itself in the market preference and has understood that although in the beginning, the company did not need to look for customers, since they were only waiting for the product, currently it is necessary to keep in mind the internationalization of organizations (Llanos, 2016), which has become a natural movement of the company, there are still some companies without the necessary global vision, so this natural movement becomes a threat and these in turn, threats to society.

In our case, in Aguascalientes prior to the 80s, the garment industry was in vogue and a large part of the population depended on it, there were also some metal mechanical workshops and of course the railroad, they produced what was required; however, as a result of globalization, foreign products arrived to the region at very competitive prices and due to the effect of competition, local producers were left out, which became maquiladoras of big brands and local production practically disappeared; However, something positive also happened, such as the beginning of the automotive industry and the arrival of foreign companies to the region, the industrial takeoff occurred in the 80s of the twentieth century, however, the local industry was not up to the task of becoming suppliers of multinational companies, a situation that revealed the difference between the way of producing local industry and the world level industry that arrives to the region, this difference, despite the

time still exists significantly, so we want to know what this is and how to reduce it (Montejano et al, 2021).

THEORETICAL FRAMEWORK

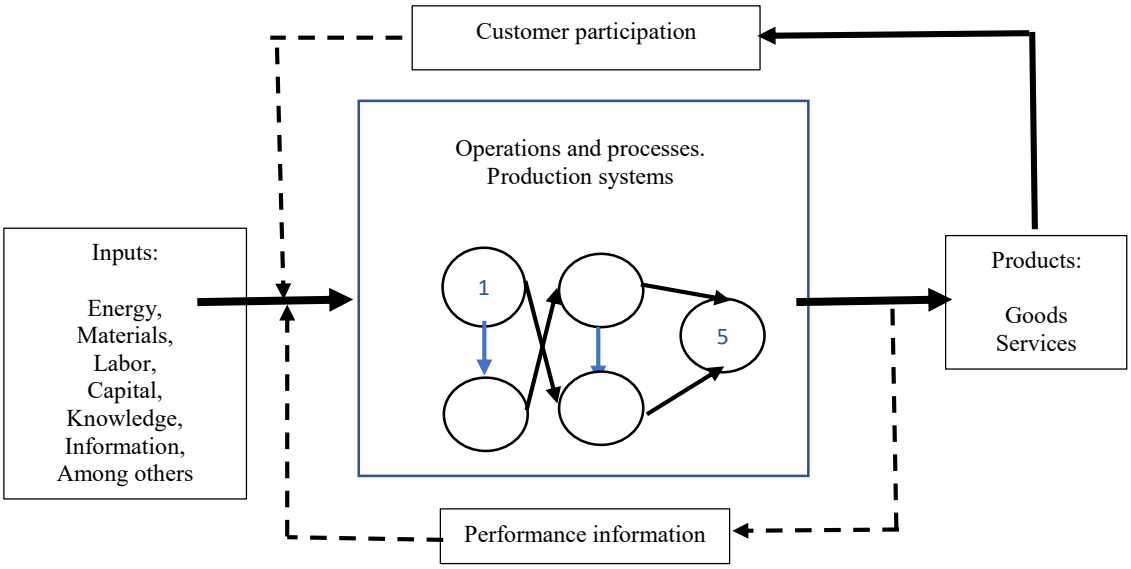
Production systems.

The production systems, during centuries maintained with small changes, it can be said that practically they were conserved without alteration, and the demand for products was conserved without variation since the people assimilated the idea that they did not have the possibility of having products that only a few possessed. However, this way of thinking changed with the industrial revolution, since the opportunity of mass production means that products now have the possibility of having goods just like anyone else, since they can reduce prices and increase supply, generating at the same time a great influence on the economic situation of countries, because a robust industrial sector is synonymous with growth for society (Moral, 2019) since when the production capacity of countries is strong, as a consequence their economy is also strong; But when the industrial sector is weak or collapses, the economy is also weakened (Moral & Pazó, 2015).

Initially, the production process described in Figure 1, basically consists of three stages during which the inputs are converted into products after having been combined and transformed in the production plant, through production systems established for this purpose, which have evolved, according to the availability of new technologies and application of knowledge on this subject, and are then taken to the customer. This concept was managed in this way until the time came when the supply was exceeded by the demand, although it was due to the need for variety in the product (Teece, 2007), as well as the number of products requested, giving way to flexible production, which in turn gave rise to just-in-time and material requirements planning (MRP) (Samaranayake & Toncich, 2007).

Figure 1

Description of a production process



Note; Taken from Carro & González (2012).

Originally this sequence of activities generated through the production process, from the selection and procurement of inputs to the delivery of the product to the customer, was called value chain, it was found that there were activities of value to the product such as transfers, storage, inspections so the terms value-added activities were used, these change the shape of the product as the required operations are performed according to the process, and value-added activities that do not add value to the product, these do not change the shape of the product when applied (Buciuni & Finotto, 2016), however they consume resources so special attention was given to reduce them or even if possible eliminate them, but they are inherent to the realization of the product and their elimination became difficult and their administration complicated since the customer is more demanding every day, so the production systems were separated from the management of the logistics of the product that is composed of activities that have to do with obtaining inputs, storage and delivery to the customer, which is called supply chain or logistics (Montejano et al, 2022). It is very important to accept that although there is a division of tasks within the value chain, the area of production continues to have its special importance since the organization as a whole is due to the realization of products and customer satisfaction (Noori, 1997).

Historically, it is in the production area where the operation of the organization and the updating of its work systems is manifested, in any of its other areas. Before the industrial revolution, there were a series of events related to production systems, during which equipment and work aids were developed focused on increasing personal production capacity, with the basic objective of doing more work with less direct labor. In the first phase, attention was paid to the mechanization of agricultural work and family workshops (Burns, 1957). Subsequently, but in the same sense, during the artisanal era, what is considered the second industrial revolution, arises in 1850 (Chiavenato, 1997); due to the strong evolution that arises from the production systems that took place at this time, this is mainly characterized by the great development from which new steel manufacturing processes arose.

These changes occurred mainly to improve the artisanal performance of the time, to achieve the increase of efficiency by exploiting to the maximum the personal effort for the reduction of process times thus increasing productivity, however, with the invention of the steam engine, which is considered as the industrial revolution, a series of machines were introduced into the production system that, although very robust and with greater capacity than physical effort, was also not very efficient due to the loss of energy during their operation, which nevertheless manifested a production that had not been seen until then, so the creation of companies that were considered very efficient was developed, replacing the artisan world of the time.

Defects of that time were visualized by Frederick W. Taylor who, as a result, started the organization of management and the improvement of production systems. Taylor, as a result, started the organization of management and the improvement of production systems, taking the levels of study to the work methods and systems to improve personal performance during the performance of tasks and control of the production flow, later scholars such as Pareto, Smith, Weber, Fayol, Urwick, and Gilbreth, are considered pioneers in the study of production systems (March, 2007), during this time it was considered that the production area was composed only by the operations that add value to the product but Henry Ford's vision motivated the analysis of production systems incorporating the movement of materials during the processes, with which the assembly line is born, with which they establish the basis of mass production (Carro & Gonzales, 2012), by integrating planning and control

functions for best performance of production processes (Wilson, 2016) and revolutionized the industry.

Therefore, this situation forced artisans who were owners of small workshops to lose competitiveness, and to survive they had to be hired as skilled workers in companies that acquired the new forms of work, this being only the beginning of the importance of industrial competitiveness and the transcendence of the established production systems. Since 1930, quality is recognized as one of the ways to compete, but with the situation in favor, since, although incipiently trade between countries begins to develop, this movement is manifested during the 60s, in which Japan takes the industrial lead based on the quality of its products, which were required and accepted worldwide, a situation that was not for all producing countries (Rajadeli & Sanchez, 2010).

This new dynamism forced companies to change again their production schemes since mainly customers demanded the development of new products, which forced them to produce different and changed from mass production to production in small batches that are combined with a wide range of products, which gave rise to what we call flexible production (Carro & González, 2012), making necessary a greater administrative control of the production process, forcing them to improve the requirements of materials (Mabert, 2007) and establishing again the difference between competitive and non-competitive companies.

Once the improvement applied directly in the production systems did not give significant results, the view was changed to other aspects related to efficiency losses, although they are part of the same operation, since these aspects analyzed generated losses caused by waste. However, they were considered as parts of the work, these, once analyzed and studied could be minimized or eliminated (Carrillo, 2019), so what is called lean manufacturing arises, which is characterized by the realization of activities that only contain productive actions eliminating as much as possible peripheral activities that are not related to changes in the product during its process. (Fujimoto, 2012); until currently reaching the application of six sigmas.

Optimization techniques.

Once the evolution of production systems began violently after the industrial revolution, the improvement of processes has existed in line with the performance of activities carried out throughout the company, since by nature there is always a desire to do things in the best way from the productive point of view, and where a super important factor is precisely the productivity with which all work is performed within the organization. According to Niebel and Freivalds (2009), the content of work is distributed in productive and unproductive, and establishes that of the total work only 32% of this is considered productive, the rest is unproductive due to causes such as inefficient production methods 15%, deficiencies in management decision making 25%, time attributable to the worker 16%, due to deficiencies in design or specifications 12%, which includes the amount of rework or defects that are generated, time lost due to lack of control, excessive movement of materials and people, time lost due to equipment failure, hygiene deficiencies, time lost due to lack of control in production; all these are situations that can be improved or optimized as long as there is a culture and the application of measures aimed at increasing the productivity of the company.

Figure 2

Basic content of the work developed during the realization of a production process.

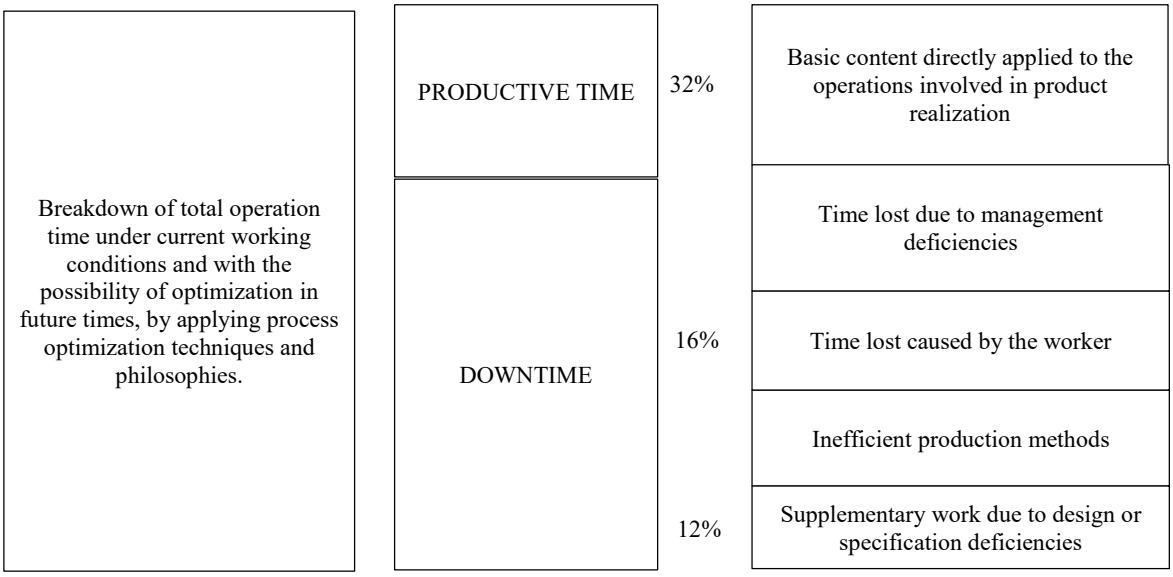


Figure 2 shows that unproductive time due to different causes, in which different areas of the organization are involved, is much higher than productive time, a situation that changes with how companies carry out the administration of their value chain. Frederik W. Taylor based his improvement proposals mainly on the analysis of methods and reduction of standard time, which was specifically aimed at the performance of the worker (Taylor, 1983), so this method is considered a form of exploitation, although this is not true. At the time the results obtained are considered significant, but over time the performance for this work was increasingly lower since an improved work has less possibility of improvement, it is then that with the support of technology, especially since the advent of the computer, the improvement analysis was extended to other parts of the organization through the value chain, and later with the emergence of philosophies such as JIT, lean manufacturing, six sigma, among others as expressed in Table 1 again takes importance optimization, although the new philosophies are still based on the techniques developed in the early twentieth century (Venkata & Kalyankar, 2014). Table 1 expresses the relationship between techniques and philosophies that are applied related to the part of the value chain to be improved.

Table 1

Improvement within the value chain and techniques and methodologies applied for this purpose.

Improve labor	**Standard method, training, and coaching, Kaisen.**
Improve products	Deployment of quality functions, Taguchi Method.
Improve processes	Process diagrams, method engineering, time and motion analysis, and man-machine diagrams. Machine diagram.
Improve procedures	Flow Diagrams, Process Diagrams, Block Diagrams
Improve planning and control	MRP, Inventory Control, Forecasting Application, Theory of Constraints, Line Balancing, Kanban.
Improve quality	Continuous improvement, Total quality, Six sigmas, Lean manufacturing.
Improve equipment and facilities	Operations and automation analysis, economic engineering analysis.
Improve distribution	Plant engineering analysis, Route diagrams.
Improve systems	Flow charts, Diagram of responsibilities.

It should be considered that the support of information technologies is indispensable in the application and development of these techniques, which fulfills the function of speeding up and providing safety and quality in the processes, as well as automation in the operations (Míguez, 2008), achieving that the productive time of the work rises to standards higher than 70%.

Relationship between Optimization Techniques and Production Systems.

In markets as competitive as the current ones, it is necessary to be better than the competition that is characterized by the ability to offer good products at prices achievable by the market (Santos et al, 2018), we see then that practically those who are prepared to compete with the outside are those who are concerned about improving all their production systems, so applied to design new techniques or optimization methodologies to achieve these objectives (Fujimoto, 2012), since being competitive demands effort from the organization, since the customer is more demanding every day in quality, cost, delivery time and respect for the environment (Cantú, 2011), of course, it is essential to recognize that if you work with this vision of change, you can scale from internal to external competition and become an exporting and world-class company.

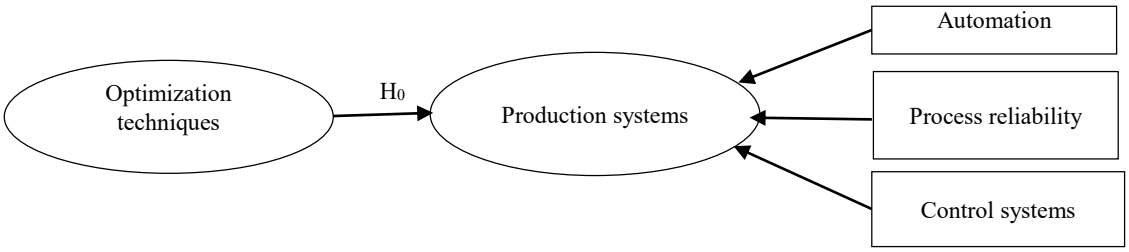
To convert this basic concept for the optimization of production systems, it is important to visualize the fact that in a system such as this, there is necessarily the performance of people as a whole, i.e. mind and physical effort, in interrelation with the instruments, equipment, and machinery; it is also very important to consider the influence that exists in this triple relationship, the availability, and management of inputs, which must be organized and managed for the realization of the products requested by the customer to satisfy most of them.

It is important to mention that there are companies that may not have among their objectives to export their products, such as those that are committed to providing services to the population, or that are engaged in public administration, such as government offices, public transportation, water supply, electricity, among others; However, this situation does not place them outside the need to apply optimization techniques to position themselves as world referents, however instead of applying them to achieve competitiveness, it seems that

they want to solve everything via subsidies, which directly harms the users because of the bad service and those who are captive taxpayers because their taxes are not well managed, the productivity of countries is not a matter of capitalism or communism, but of being productive or consumers (Llanos, 2016), but without discussion the production capacity of rich countries and the benefit of its citizens is observed, in contrast to the need for the lack of production in the so-called poor or third world countries, however if they were more willing to improve their production systems, they would substantially improve their living standards (Alvarez & Myto, 2016).

Figure 3 shows the research model, which shows the relationship between the application of optimization techniques and their effect on production systems in organizations, and which would explain the differences between global companies and those that only compete locally, as well as between exporters and local manufacturers.

Figure 3
Research model relating the use of Optimization Techniques to the state of the Production Systems.



According to the research model, we have the following hypothesis:

H_0 The application of optimization techniques has a significant impact on the state of production systems.

METHODOLOGY

This research seeks to determine the degree of application of process optimization techniques, as well as the state of their production systems concerning their automation, process reliability, and management of their administrative control systems, in the manufacturing industry in Aguascalientes, Mexico. For this purpose, information was obtained from 317 companies. A survey was designed with 7 questions for optimization techniques, and 21 questions for production systems, distributed in three dimensions. The

research is transversal, non-experimental, and quantitative, and a five-point Likert scale was used for the treatment of the results, whose meanings are shown in Table 2.

Table 2

Operationalization of variables

Construct	Reply	Qualification of variables
Process Optimization Techniques	1	Process optimization techniques are not applied.
		Some process optimization techniques are applied sporadically.
		Some of the best-known process optimization techniques are applied.
		Most process optimization techniques are applied.
	5	All process optimization techniques are applied.
Production Systems	1	There are no formal production systems.
		Some production systems are used empirically.
		The production systems are basic and of general use.
		Most of the production systems are current.
	5	Production systems are up-to-date and superior to the competition

To confirm the congruence in the answers of the respondents, a reliability analysis was carried out on the answers employing Cronbach's Alpha, the results that were generated are shown in Table 3, in which it can be seen that the value of all the resulting indexes of the test carried out is higher than 0.7; which is the minimum value recommended by Nunnally & Bernstein (1994) to accept that these can be used in the research, therefore, it is concluded that there is the necessary relevance to consider the congruence of the survey responses. Finally, it was concluded that the use of process optimization techniques has a positive and significant influence on the production systems of the company in Aguascalientes.

Table 3

Cronbach’s Alpha values for the constructs analyzed and their dimensions.

Construct or dimension analyzed	Cronbach's Alpha	Construct or dimension analyzed	Cronbach's Alpha
Process optimization techniques	0.913	Production systems	0.879
		Automation	0.843
		Reliability	0.863
		Administrative control	0.937

RESULTS

A statistical analysis was made of the answers given by the businessmen in Aguascalientes to know the application of the process optimization techniques used for the analysis of the work in the value chain, as well as the state of the operation of the production systems in the organizations, the results are shown in Table 4, which shows the resulting average response for each construct and its associated dimensions during the development of this research. According to the information obtained, it can be observed that the result in the application of process optimization techniques has an average response of 3.2582. This result reveals that in Aguascalientes the companies use only some of the known techniques for process optimization, in addition to applying them empirically and without following the recommended methodology.

Table 4

Mean response values for the analyzed constructs and their dimensions

Construct or dimension analyzed	Average response	Interpretation
Process optimization techniques	3.2582	Some of the best-known process optimization techniques are applied.
Production systems	2.8408	The production systems are basic and of general use.
Process automation	2.7403	The operation is performed with traditional equipment and very little automated equipment.
Process reliability	3.4321	There are few compliance problems with customers, due to causes attributable to the process.
Administrative control of processes	3.0072	Some problems originated in the process due to a lack of administrative control.

On the other hand, the average response for the state of the productive systems is 2.8408, which indicates that in general, they are at basic levels of operation, which places them chronologically far from world-class companies, it is necessary to emphasize that it is

necessary to apply themselves in this area to position themselves as real competitors of transnational companies. In this sense, the process automation dimension, with an average value of 2.7403, shows that in general, the degree of automation is very limited and that most companies use traditional, manually operated equipment and machinery.

Next, the process reliability dimension, with an average value of 3.4321, shows that in this sense, there are few problems of compliance with customers, so it is thought that reliability is acceptable, although it does not place us as the first option among them. Finally, for the administrative control of processes dimension, we have an average value of 3.0072, which indicates that there is little control of these and that it could be greatly improved since we regularly have problems with this concept, and although they are solved quickly, it does generate certain problems with customers.

Table 5 shows the results of the percentage of the frequency of the different answers for the use of the different optimization techniques in the companies in Aguascalientes, from this table, it can be concluded by adding the results for low and high use of optimization techniques, it can be seen that 49.8% of the businessmen mention that there is little use of process optimization techniques since only some of the techniques for process optimization are used, while the rest, that is, 50.2% of them specify that in their respective companies, most of the techniques that exist in the business environment, which are designed for process optimization, are used.

Table 5

Percentages of the frequency of response for the Process Optimization construct

The percentage for each condition	**Situations encountered in the application of optimization techniques**
13.2	Process optimization techniques are not applied.
16.5	Some process optimization techniques are applied sporadically.
20.1	Some of the best-known process optimization techniques are applied.
25.3	Most process optimization techniques are applied.
24.9	All process optimization techniques are applied.

Likewise, Table 6 shows the cumulative percentage that indicates the number of businessmen that are located by the state in which the production systems and their dimensions are in their respective companies in Aguascalientes.

Table 6

Percentages of the frequency of response for the Production Systems construct and its dimensions.

Dimensions to qualify the Operations Management construct.	We do not have modern systems and processes	Most of our processes are traditional and manual	Some of the processes are modern and updated	Most of our processes are modern and up-to-date.	All operations use up-to-date systems and processes
Process automation	21.5	22.0	25.0	18.3	13.2
Process reliability	26.2	22.1	22.1	16.4	13.2
Administrative control of processes	12.6	14.5	15.8	25.9	12.3
Production Systems	14,2	23.3	26.9	19.8	15.8

For the process automation dimension, 68.5% of the respondents stated that in their respective companies, they still work with traditional equipment and most of the processes that are carried out are still manual or semi-automatic; on the other hand, 31.5% mentioned that their respective organizations, most or in some cases, all the processes that are required are automated.

For the process reliability dimension, 70.4% of the businessmen recognize that they have problems in this regard during the execution of the different processes carried out in the company, which in turn cause occasional non-compliance with customers; on the other hand, 29.6% mention that the reliability of their processes ensures that problems with customers are few and have simple and quick solutions so that customers are very satisfied with their performance.

As for the dimension of administrative control of the processes, it has the best results obtained during the data analysis, since 42.9% of the entrepreneurs reveal that in their

respective companies, administrative control is carried out sporadically, so that most of their operations are controlled empirically without the existence of formal controls, but 67.1% express that in their companies there is administrative control regularly so that they have at the same time a certain degree of control in their processes.

When analyzing the construct, the result for production systems is expressed by 64.4% of the entrepreneurs in Aguascalientes, mentioning that the production systems are little evolved, so they operate in the same way they did when they started; on the other hand, only 35.6% refer to the fact that the production systems in their companies are modern and updated, so they are up to date in terms of technology and systems, a situation that places them within the preference of customers.

To analyze the relationship between the application of optimization techniques and the state of the production systems, we first carried out a correlation analysis between these two constructs, the result obtained is shown in Table 7; in it, we see that we have a correlation index of 0.738, which results in an R^2 of 0.5444, which means that 54.44% of what happens with the optimization techniques has an impact on the production systems in this case. In this sense, to make the result more explicit, graph one shows how the production systems correlate with the optimization techniques used in the respective companies. By dividing the graph into 4 quadrants, it is verified that 23.68% of the entrepreneur's mention that when the optimization techniques applied are the most updated, their production systems are modern and up to date; on the other hand, 6.43% mention that despite not frequently using optimization techniques, their production systems are modern and up to date; it can also be seen that 45. Finally, 24.17% of the entrepreneurs mentioned that in their companies, they use most of the optimization techniques existing in the business environment, but even so, their production systems are traditional and not up to date.

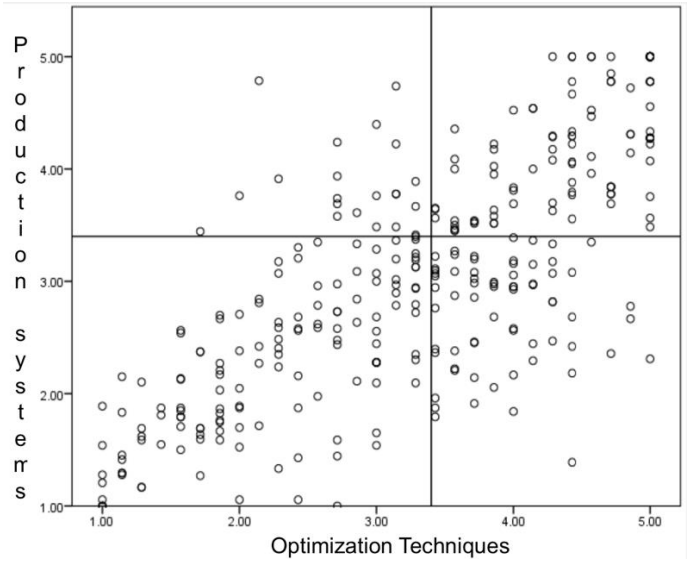
Table 7

Correlation of optimization techniques and production systems in companies in Aguascalientes.

Pearson correlation	.738**
Sig. (bilateral)	.000

Table 8.

Correlation of production systems with optimization techniques in Aguascalientes companies.



As a complement to the analysis of the impact of the use of optimization techniques on the state of the production systems, a linear regression analysis was performed, in which the use of optimization techniques was considered as an independent variable and the state of the production systems as a dependent variable, the result of this analysis is shown in Table 9.

Table 9

Results of the linear regression of the relationship between the application of optimization techniques on production systems in Aguascalientes companies

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Standard error	Beta		
(Constant)	.824	.119		6.909	.000
Optimization Techniques	.670	.035	.738	19.385	.000

To express the result of the analysis and to explain the behavior of the optimization techniques, the equation explaining the behavior was generated.

$$SP = 0.824 + 0.67\ (TO)$$

This means that effectively increasing the use of optimization techniques in the company will improve the production systems, although we must understand that this is not something magical and, of course, it is related to the interest applied by owners and managers in the continuous improvement of the company in which this exercise is carried out.

CONCLUSIONS

The correlation analysis shows that there are indeed 73. 8% of the pairs of data that move the same direction, that is to say that what happens with the use of process optimization techniques will have an effect in the same direction; therefore, if in the companies in Aguascalientes, we increase the application of optimization techniques, it will improve the state of the production processes; on the other hand through the development of the equation resulting from the linear regression, we can evaluate the impact of the improvement or the affectation; but not by force the result of the improvement applies to obtain very sophisticated results since the improvement can be reflected in improving other aspects (Mudambi & Swift, 2014), thus increasing the capacity of the organization to be able to compete with international companies until becoming exporting companies, even if they start as maquiladoras; situation recognized by Viani, (2019); generating criticism to the protectionism of the institutions instead of opting for the efficiency and good administration of the same.

The production capacity of countries establishes their economic position in the world and we see that industrialized countries, via market globalization (Villa, 2002), migrate to other countries that are not industrialized and somehow subjugate them through work that by strategy, is performed in these because they become maquiladoras; to avoid this, it is required that poor countries develop their production systems, to produce initially at least what they consume, to scale to become international level organizations (Llanos, 2016). For this reason, the existing production systems must contemplate for their development to include people, equipment, and systems to achieve the objectives that are set according to what is known in

countries as a national plan, and in companies' strategic planning, contemplating that wages are a consequence of work and not as a tool for the exploitation.

Corruption is indeed the main problem with which it is necessary to compete in organizations and as a consequence these countries; however, it is necessary to keep in mind that the more progress there is in the productive systems the more control is an important result of the work in this sense, therefore the application of optimization techniques both in the private sector and in the parastatal is of vital importance so that operations can be controlled so that the problem of corruption could also be controlled in turn.

From the decisions of the management to those of the presidency of the countries, manifest the capacity of people to achieve the development of the organization or the country, achieving the benefit for all, or otherwise to stop or eliminate the natural growth that should exist in them, so their responsibility acquired voluntarily, in most cases, is very high, considering that good or bad decisions accumulate as time goes by. It is necessary to study what each organization needs in this sense, to be able to make a tailor-made suit, according to the existing conditions, without expecting that by magic the problems will be solved, through a well-directed and applied action, the organization will be able to develop with greater scope than the others.

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Chapter 4

Cost-Benefit Analysis of a System Based on Smart Grids in the Mexican Electric Industry

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Cost-Benefit Analysis of a System Based on Smart Grids in the Mexican Electric Industry

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INTRODUCTION

Energy resources around the world are becoming increasingly scarce, and this has led countries to opt for efficient alternatives and intelligent use of these, mainly concerning electricity. Given the importance of electricity in the growth and development of world economies, it becomes a vital resource and is increasingly approached from different points of view, mainly in technical, economic, and legal aspects.

Concerning Mexican politics, during the year 2013 in which the federal government led by President Enrique Peña Nieto (2012-2018), a new energy reform was proposed that motivated the participation of foreign companies into the Mexican electricity market through contracts of electricity generation by alternative energies. This decision was traduced in an advantageous role for these companies which led to the Comisión Federal de Electricidad (CFE) to split and decrease its importance as the main company of electricity in Mexico.

However, in the governmental transition that represented the arrival of a new federal government for the period 2018-2024, energy policies changed radically, launching a new reform on electricity and other energy resources such as lithium, during the year 2021, eliminating many of the policies previously imposed in the energy reform of 2013, returning generation power and economic resources to the CFE, and leaving aside incentives in generation through alternative energies. This 2021 reform has been strongly discussed, and lately not been accepted as a law initiative.

Given the above, and due to the global changes in the electricity markets, the opportunity opens up to rethink some of the energy policies of our country, proposing a structure for a certain sector of the population and the electricity sector itself towards an operation in a smart grid scheme (Cecati *et al.* 2010). This structure opens the possibility for electricity grids to be restructured through intelligent devices for energy control, energy use, generation through clean energy, installation of advanced metering devices, direct communication between users and operators of electricity distribution networks, and opening of energy markets.

This new opportunity represented as an open market is based on the concept of a smart grid. The so-called smart grids have a strong impact on all the sectors of electricity, namely generation, transmission, and distribution (Alaqeel & Suryanarayanan, 2019). Also, two main players interact in this transition: producers and consumers. Of course, this roll-out involves the use and installation of different energy infrastructure, since it requires advanced metering infrastructure (AMI) (smart meters, for instance), telecommunications systems, and alternative source generators (PV, wind, etc.) among some other components.

From an economical point of view, different concepts of traditional power systems analysis are of concern. Precisely, this chapter examines this theory through the necessity of elaborating a Cost Benefit Analysis (CBA) of the introduction of smart grids platform into a traditional electric market.

In this research, a cost-benefit analysis is proposed to describe its economic model. The political context of Mexico in terms of energy and the proposed changes in political laws are detailed with a wide description of the Electrical Reform 2021. Also important is the Foreign Direct Investment (FDI) in energies inside of the electric Mexican system which is described. This context establishes the framework of the CBA incorporating the 5 Porter's Forces, assuming the SG is a new open market. This chapter is organized as follows: this first section is focused

BACKGROUND OF THE SUBJECT

Mexican Energy Reform

The 2013 energy reform proposed and approved by the Mexican government (2012-2018) had as one of the main goals to improve the production of electricity in our country by building up companies (basically private companies) without privatizing the principal national companies such as Pemex and the Federal Electricity Commission (Comisión Federal de Electricidad CFE) so that they could operate without affecting their autonomy. This strategy was looking to improve the environment without affecting the global economy, in contrast, by attracting foreign investment to boost the country's development. (Martinez *et al*., 2016).

In December 2013, Congress approved a constitutional amendment that was designed to greatly restructure the energy sector. The legal status of the CFE was modified to move the sector from a single vertically integrated utility company to include a generation subsector that would expand opportunities for private companies, where investments in transmission should also be opened to international investment under private sector contracts with CFE, but the responsibility for distribution activities remained in the hands of the CFE (Wayne, 2018)

Perhaps the most important change involved opening the market for competitive supply. This led to the creation of energy and capacity markets. Under the new rules, supply to the residential sector remains under regulation, while private companies can apply for a basic supply permit, many believe CFE is likely to remain the main basic supplier.

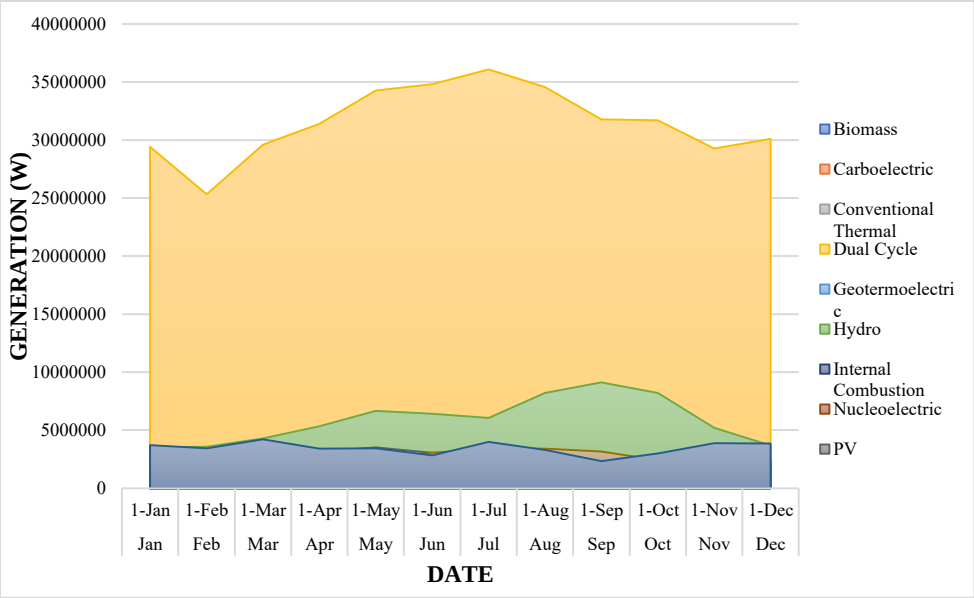
These changes meant that the new market structure was characterized by the separation of the sector into generation, transmission, and distribution activities; as well as the introduction of market-based auction processes to set prices for various activities. New market entrants included qualified users and providers, while certain activities, such as the provision of basic services, are maintained on a regulated rate of return basis (Merchand, 2015).

Following the same description of electric energy reform stated in 2013, reforms articles 25, 27, and 28 of the Political Constitution of the United Mexican States in energy

matters favor the Federal Electricity Commission (CFE) by limiting the participation of private industry in the Mexican electricity market and dismantling the regulatory institutional structure of the current electricity market.

Figure 1

Panorama of generation of electricity in Mexico 2022



The spirit and letter of the proposal are to reverse the opening of the electricity sector by guaranteeing a 54% market share of electricity generation to the CFE at the expense of private investment. Likewise, it aims to eliminate the institutional arranging that allows the functioning of the market by disappearing the regulatory bodies of the energy sector, the Energy Regulatory Commission (CRE) and the National Hydrocarbons Commission (CNH), and by integrating the National Center for Energy Control (CENACE) to the CFE. The restructuring would imply the elimination of the horizontal and vertical separation of the company into subsidiaries and affiliates to reconcentrate the activities of the electricity sector in the former State monopoly and disappear, in fact, the wholesale electricity market (MEM) (Instituto Mexicano para la competitividad A.C., 2021).

The graph of Figure 1 is describing the different ways of generation in Mexico. The older thermal power plants have been modified into the dual Cycle, registering the highest punt of generation at approximately 36 000 MW during 2022.

So, this last initiative, which reforms articles 25, 27, and 28 of the Political Constitution of the United Mexican States in energy issues, favors the CFE since it limits the participation of private investment, the key modifications that seek to reconstitute the monopoly of the CFE.

The Energy Reform aimed to modernize the energy sector without privatizing public companies dedicated to the production and use of hydrocarbons and electricity (Tapia *et al.*, 2020).

According to the government of Mexico, the objectives translated into concrete benefits for Mexicans are:

1. Decreasing electric tariffs and decrement natural gas prices
2. Achieve restitution rates from probed oil reservoirs and natural gas above 100%
3. Increase oil production from 2.5 million daily barrels currently obtained to 3 million barrels in 2018 and increasing up to 3.5 million in 2025; in the same way, increase natural gas production from 5,700 million cubic feet daily produced to 8,000 million in 2018 and elevating production up to 10,400 million in 2025
4. Create nearly a one percentage over economical increase in 2018 and around 2 percent increase for 2025
5. Create around half a million additional employees during the six-year period of the federal government, reaching two and a half million employees in 2025
6. Replace the power stations with the highest pollution contribution with green technologies stations and promote the use of natural gas in electricity generation (Gobierno de México, 2021)

In turn, Article 28 of the Constitution establishes that the exploration and extraction of oil and gas are strategic activities, and this constitutional reform establishes that the law will regulate the modalities of consideration for the exploration and extraction of oil and natural gas, including utility or shared production contracts, license, or services. of consideration to achieve the greatest benefit for the long-term development of the country. (DOF, 2021)

In summary, the proposed reform of 2021 tried to redefine the industrial policy, seeking to focus it on hydrocarbon exploration (De la Vega, 2002; Dussel, 2015; Martinez, 2016)

Mexican Reform Positive Points

- Rescue and reinforce CFE to go back as the main company in charge of Mexican electricity system
- Promote competence under equal conditions
- Guarantee clean energy production through the Clean Energy Certificates (CEL). The Energy Secretary (SENER) determines the rate of clean energy that must be generated every year according to charge necessities
- No more tax increments in real terms nor price increases
- Modification of dispatch criterion that reflects real costs of electricity generation, which avoid simulation and economical speculations
- Reject subsidies and dumping politics which favor some competitors over others
- Equal conditions to award CEL between CFE and private companies

Mexican Reform Negative Points

- The political actors that are opposites to the Federal Government initiatives, analysts and the Federal Economic Competence Commission (COFECE) think that the reform limits competition and disincentive clean electricity generation
- Apparently, the reform would give more space for electricity generation by using fossil fuels oil
- Self-supply energy permissions may be reviewed and revoked which some industrial sectors are using to operate under more sustainable conditions

Definite changes due to electricity reform proposed in 2021

These are the six key changes proposed in the 2021 electricity reform that tried to reestablish the CFE structure,

1. Modifies the criteria for dispatching electricity to the National Electric System (SEN) and cancels the permits granted to the private sector. The initiative limits competition

and free competition in the activity of electricity generation by limiting the production of the private sector to 46% of the total generated in the country

2. Reverses the horizontal and vertical separation of the CFE. The initiative would eliminate the productive subsidiary companies and subsidiary companies of the CFE – except for CFE Telecommunications and "Internet for Everybody", CFE Capital, CFE Energy, and CFE International – contrary to the provisions of the Terms for the Strict Legal Separation of the CFE (TESL). Through the TESL, the CFE has been obliged since 2016 to participate in each of the different activities that make up the electricity industry (generation, transmission, distribution, commercialization, and supply of primary inputs) independently through different subsidiary companies and affiliates to promote open access, efficient operation and competition in the sector.
3. Eliminates Clean Energy Certificates (CEL). To encourage the generation of clean electricity, the Energy Transition Law created the figure of CELs, which are granted for each Megawatt-hour of energy generated in clean plants that began operations after August 2014. These have represented the most powerful incentive to attract investment in clean energy installed capacity.
4. Disappears Energy Regulatory Commission (CRE) and Hydrocarbons National Commission (CNH)
5. Incorporates CENACE into the CFE structure. The company becomes an operator of the Mexican electricity market
6. Establishes the exploitation of lithium as an exclusive activity of the Mexican State. It is established that the exploitation of this mineral may not be concessioned to private companies (except for current concessions) under the argument of its strategic importance for the country's energy transition.

Electrical Energy Investment in Mexico

The development of any national economy in modern times requires a global vision, which allows it to have enough flexibility to adapt to its needs and maximize its capabilities, to be economically more efficient. This element transcends beyond a certain industry or sector, and for some time, has been part of the idea of integral economic development and long-term

investment that shapes globalized nations. The concept that frames this idea is Foreign Direct Investment (FDI). This type of investment focuses its objectives on the creation of more and better jobs, the transfer of technology, and the incorporation of national companies in the production processes and foreign commercial dynamics, so that local products achieve greater competitiveness, quality, and commercial projection (Guzmán, 2020).

The new energy reform will give its place to the CFE because in this initiative the CFE will have 54% of the market and 46% will be preserved for private companies. The initiative includes the disappearance of supply contracts for not being related to the production of electricity, as well as self-consumption companies that benefited large commercial chains.

Electric energy generation with alternative and clean energies rises to 37.52%, which is equivalent to 98,635 GWh that has been injected into the electric network between January to September 2021. Privates have contributed only 20.3% and, therefore, for the present government, taking advantage of all the energy sources that are available in the country is the priority.

On the other hand, the policy proposed by the current administration has undertaken a movement to force the exit of private investment in the energy sector, where the development trend of the Mexican renewable industry has viewed with suspicion the modifications in regulatory and budgetary matters that the federal government has made in recent years. in its objective to return its preponderant role to the CFE and PEMEX. This situation has left behind achievements in Foreign Direct Investment (FDI) that thanks to the Energy Reform and mechanisms such as the Long Term Auctions (LTA) made possible in terms of electricity. The third and last auction meant an investment of $2,400 million, which together with the ones made in 2015 and 2016 represented a contribution close to $9,000 million in investments for the development of energy generation projects in the national territory (Guzmán, 2020).

During the first nine months of 2021 (January-September), a preliminary amount of FDI was reported of around 5.7 higher than that reached over the same period in the previous year 2020 ($23,482.3 million)

The above fact is shown a recovery of FDI fluxes, congruent with the world's positive tendency, and according to the last data obtained from United Nations Conference on Trade

& Development (UNCTAD). Preliminary registered FDI during January-September 20221 has come from 3,259 societies with foreign capital participation: 3,721 escrow contracts and around 23 foreign moral persons. In addition, it is integrated according to the next way:

- By type of investment (origin of financing) through reinvestment of profits, 40.3%; for new investments, 38.4%; and by intercompany accounts, 21.3%
- By sector: manufacturing, 45.0%; mining, 14.0%; financial and insurance services, 10.9%; transportation, 10.0%; trade, 6.0%, and temporary accommodation services, 4.6%. The remaining sectors captured 9.5%
- By country of origin: United States of America, 49.6%; Spain, 10.7%; Japan, 6.3%; Germany, 5.3%, Canada, 5.2% and other countries have contributed with 22.9% remaining.

The methodology for determining FDI is based on international standards, contained in both the Balance of Payments Manual of the International Monetary Fund (IMF) and the Framework Definition of Foreign Direct Investment of the Organization for Economic Cooperation and Development (OECD).

Technical and Financial Situation of the Electricity

The accumulated revenues of the CFE at the end of the second quarter of 2021 amount to 285,963 million pesos which compared with the second quarter of 2020 represents an increase of 15.5% equivalent to 38,339 million pesos. Such increment results from the increase in incomes

This increase is the result of the increase in revenues from the sale of fuels to third parties and from the sale of energy, derived from the recovery in demand for electricity and fuels in the different sectors of the Mexican economy, as the effects of the pandemic were overcome. As of the second quarter of 2021, the CFE's operating costs totaled $279.168 billion, which meant an increase of $93.664 billion, equivalent to 50.5% compared to the same period of the previous year.

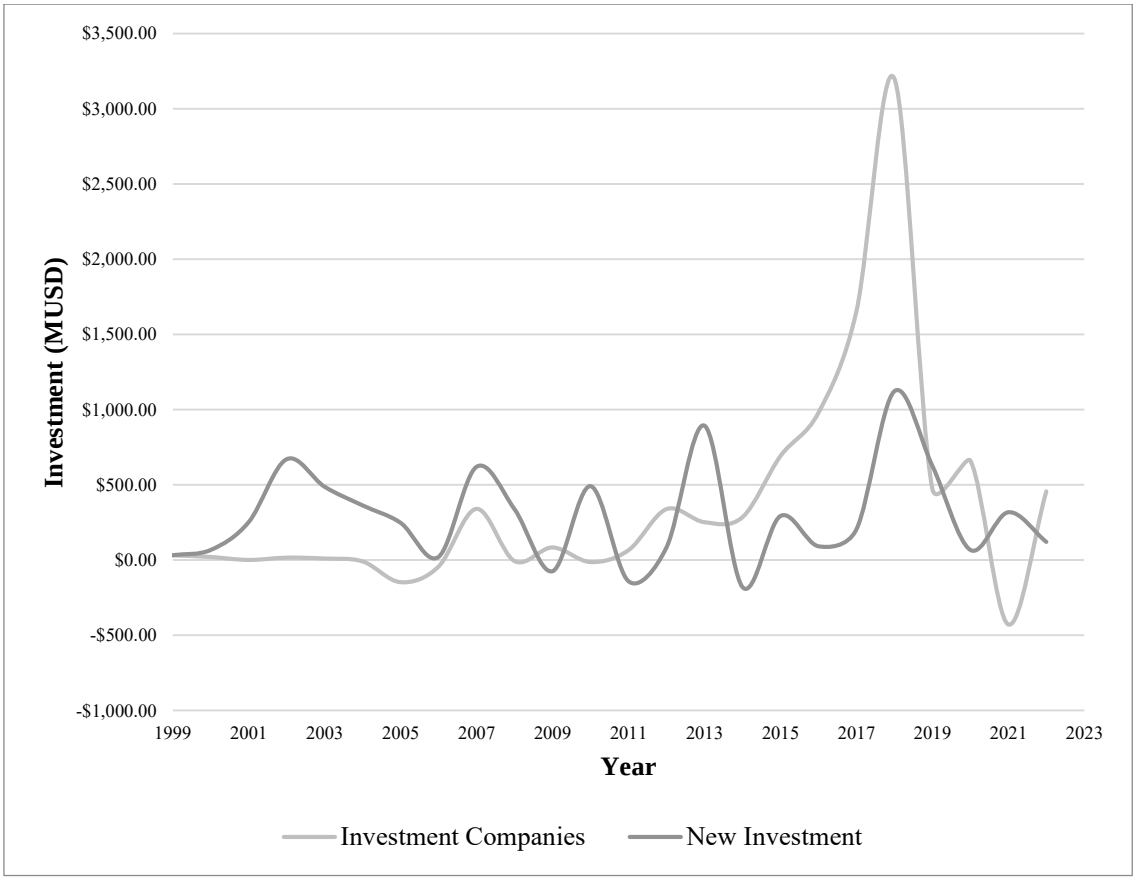
This effect is mainly due to an increase in energy and fuel costs, caused by the climate emergency in Texas registered in February. It is important to note that in the second quarter of 2021, the CFE reversed the exchange loss registered in the same period of the previous

year, generating a profit from exchange fluctuation of 9,184 million pesos in 2021, compared to the loss of 126,137 million pesos in 2020 (Estados Financieros CFE, 2021).

Regarding the Statement of Financial Position, the total value of the CFE's assets at the end of the second quarter of 2021 registered a growth of 1.9% compared to the end of 2020, standing at 2,201,290 million pesos. On the other hand, the CFE's net liabilities registered an increase of 3.3% derived, on the one hand, from a net effect of the provision of credit lines for the payment of the increase in the fuel bill for the month of February and, on the other, from the revaluation of liabilities in dollars due to the appreciation of the peso against the dollar at the end of June 2021 compared to December 2020. (Estados Financieros CFE, 2021)

Figure 2

Foreign Investments in the Energetic Sector in Mexico



Note: Elaborated with data obtained from Secretaría de Economía (2023)

According with information obtained from (Secretaría de Economía, 2023), in the period from January to September 2022, FDI in generation, transmission, distribution and

commercialization of electric energy reached around US $971M, that are distributed between investment companies (US$456M) and new investments (US$121M). This situation is shown in graphic (Figure 2) obtained with data taken from (Secretaría de Economía, 2023) in which is clearly observed the peak investment that was registered around 2018 with a dramatic decreasing in 2021 year. Apparently, from 2022 the tendency is growing as a result of recovering after the 2021 electric reform was rejected.

MODEL REVIEW

Cost Benefit Analysis

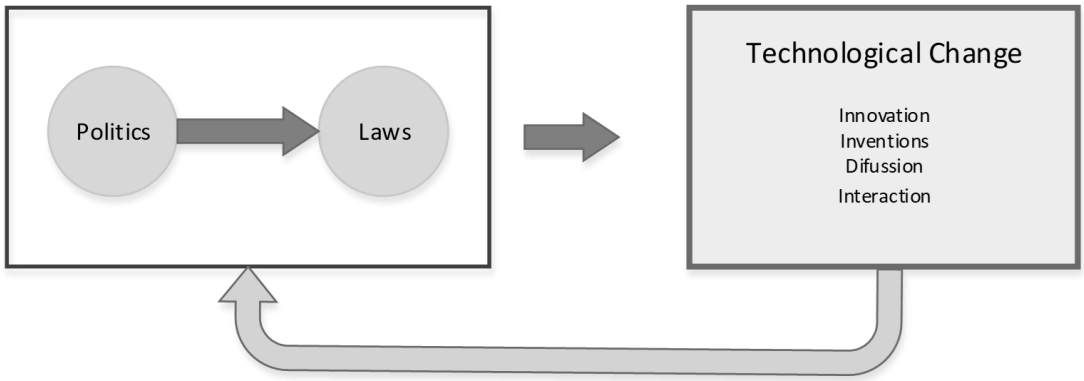
The energy sector oriented to electric energy is an industry highly regulated, which can be justified if it is considered that big amount of investments has been made along its existence and due to represent modernization and the open door to access to many benefits of modern life and services, which now is involved with sophisticated electric grids and intelligent systems such as smart grids technologies. This situation has demanded multi-million investments around the world that are traduced in political regulations and integration of electric markets (Battke, B. &, Schmidt, T. S. 2015).

The rules of operation (politics) are one of the factors that allow the inclusion of new technologies that allow their introduction into the energy market. In this area, either through a product or service, the rules established by the regulation of the market (laws) must be complied with, or if the product or service is created from a new market, it must therefore be regulated (technological monitoring). The intervention policy is justified when the target market does not comply with the pre-established policies in terms of laws.

The scheme shown in Figure 3 is describing an interaction when politics, laws, and technological changes are introduced as a new market or when a change represents a new form of life. In the case of this research, the proposal of smart grid technology introduced in a market (electric energy) that has been designed and operated for many years as a traditional system, may represent a change in paradigm that would demand a new structure, new laws, and some other socio-economical aspects in the society.

Figure 3

Interaction between politics and technological changes



Note: Adapted from Battke & Schmidt (2015)

International context about energy resources

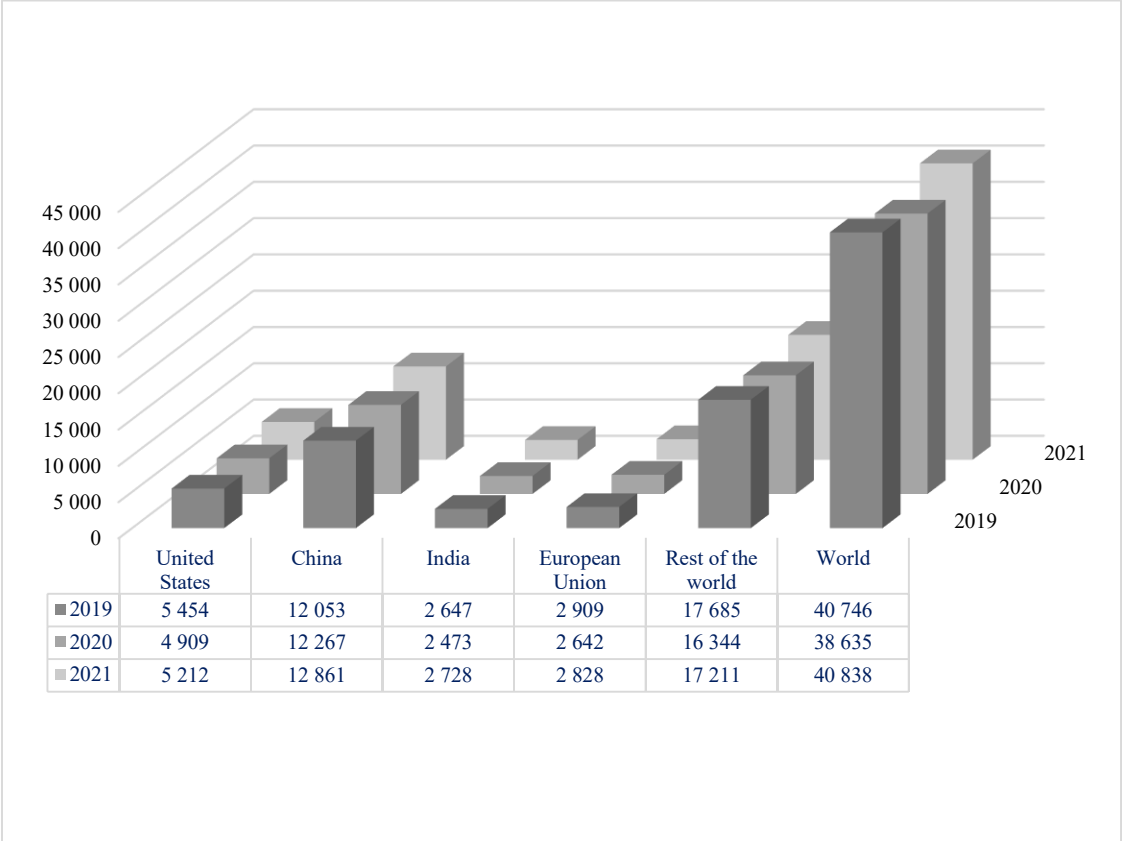
During the COP21 conference in Paris (COP Conference of the Parties) on climate change and in conjunction with the Kyoto Conference, most countries agreed to increase investment and thus greater energy efficiency in terms of generation, which implies a substantial decrease in *CO*2 emissions. The world's biggest polluters such as China, the European Union, and the United States account for more than 45% of global pollution from *CO*2 emissions and agreed on "more or less ambitious" targets for reducing emissions.

The official policy establishes emissions reductions as a goal, and a real investment policy is a key factor in achieving these goals. Electricity production is one of the largest sources of polluting emissions with more than 42% of total emissions, including heating and/or air conditioning far from industrial emissions (19%) and pollution employing transport (23%) (IEA, 2020). Higher industrial life and higher pollution agents affect the countries.

This explains why the electricity sector is focused on reducing polluting emissions. Additionally, consider the fact that other sectors plan to switch from fossil fuels to electricity (transport systems, for example), which would increase the amount of electricity demanded. Accordingly, governments will surely support technologies at lower costs that help meet their development goals.

Figure 4

Energy greenhouse CO2 emissions around the world



	United States	China	India	European Union	Rest of the world	World
2019	5 454	12 053	2 647	2 909	17 685	40 746
2020	4 909	12 267	2 473	2 642	16 344	38 635
2021	5 212	12 861	2 728	2 828	17 211	40 838

Source: Elaborated with data from IEA (2023).

The greenhouse emissions, just for mentioning some of the multiple effects that pollution and therefore *CO*2 modifying natural and weather conditions over the world, are shown in Figure 4. This graphic described the energy greenhouse emissions of *CO*2 produced by countries like the USA, China, India, the EU, and the rest of the world in comparison with the entire world (IEA 2023).

The current Mexican government, through its document entitled Program for the Development of the National Electric System (PRODESEN) (PRODESEN, 2021) has established as a goal the implementation of smart grids (SG) for the modernization of the transmission grid and distributed generation networks, which meet the electricity demand efficiently, sustainable and reliable that in turn will incorporate new technologies that promote cost reduction in the electricity sector.

Some actions, strategies, and projects in this context, are described according to the:

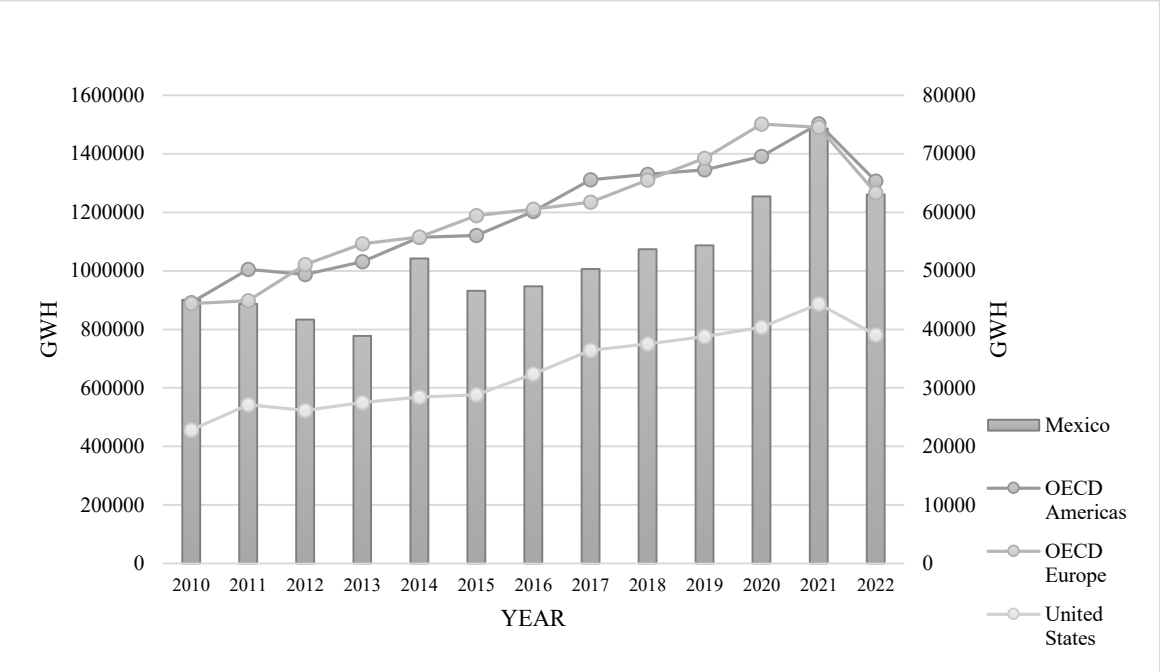
- Use of digital technologies to improve the reliability and stability of the national transmission network and distribution networks
- Integration projects of distributed generation from renewable sources
- Use of smart technologies for the measurement and communication of smart grids through Advanced Metering Systems (AMIs), such as the use of smart meters
- Information towards consumers
- Development of technologies for electricity storage and technology to demand response
- Research on the feasibility of prices to electricity consumers in real time or by periods of use

Regarding the infrastructure based on advanced measurement devices, the acquisition of such devices, the replacement of conventional meters, and the creation of infrastructure for the installation of these measuring devices are foreseen. This document (PRODESEN, 2021) specifies an investment of 6,082 million pesos in the period from 2021 to 2025, as well as the installation of around 15,000 measurement points, telecommunications systems, data analysis, commissioning that represents an investment of 7,016.06 million pesos. These amounts represent a transition from the conventional electricity system to a smart grid, an objective contemplated within the purposes in terms of electricity proposed by the government of Mexico.

Concerning the evolution of clean energy production, the graphic of Figure 5 is comparing the Mexican case concerning the USA, OECD Europe, and EOCD Americas. The double axis helps to establish that Mexico is under the average of the rest of the cases shown in Figure in the period from 2010 up to 2022.

Figure 5

Electricity production evolution. Comparison between Mexico and USA, Americas and Europe



Note: Elaborated with data from IEA (2023).

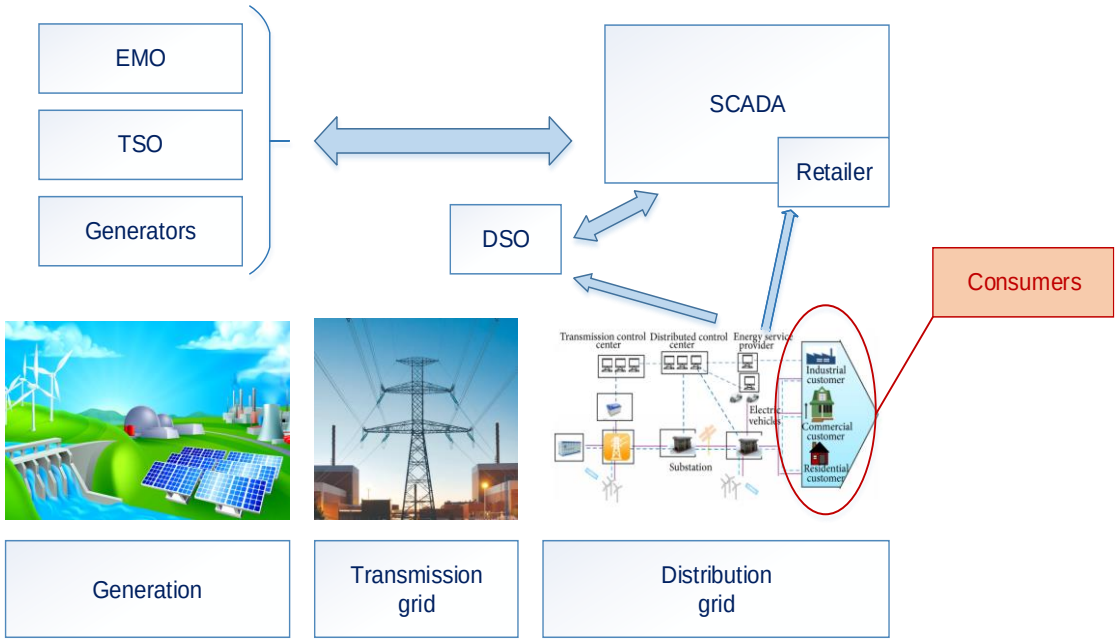
Electric Business Model

The components of an electric business environment, their properties, contributions to the grid, and overall architecture of the smart grid are shown in the diagram in Figure 6. It should be noted the leading role that the distribution network now has, through distributed generation elements, consumers who interact through an advanced control and data acquisition system (SCADA system) with the companies in charge of the market operation (EMO), transmission system operators (TSO) and generation.

It is worth mentioning that this type of business model, for the environment of the Mexican electricity system, is novel and desirable to act in this way. Although apparently, the electricity reform rejects the participation of companies (different from CFE) to participate within the electricity market environment, and technology and should make changes similar to those proposed here that involve new participants, the creation of smart grid environments, and with it, new and cleaner forms of electricity generation.

Figure 6

Electric model business



Notes:
EMO Energy Market Operator. Coordinates the place for electricity trading
TSO Transmission System Operator, Managing the transmission network
DSO Distribution System Operator, Managing the distribution network

The 5 Porter's Forces

Although the operation of the energy market is not entirely a "new product", especially in the electric world in which the operation of the energy market has several participants in the sector, for the Mexican case it would be a novel product, given that the electricity system has always been governed with monopoly tendencies (represented by the parastatal Federal Electricity Commission CFE). For this reason, Porter's 5 forces are used as a useful tool to identify the aspects and participants in this market scheme.

It is convenient to point out that electricity is not a commodity like any other. Many people perceive it as a public good, however, as such a public good is an item whose consumption is determined by society and not by individual consumers. From this perspective, electricity is not exactly a public benefit.

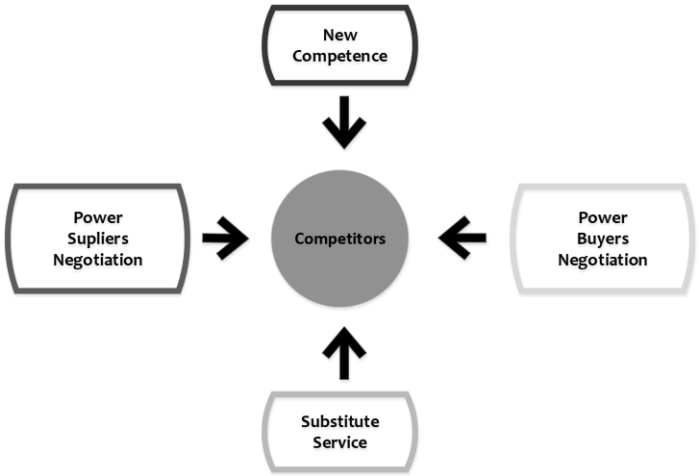
Historically, governments have been heavily involved in the development of the electricity grid and people often assimilate government actions with public services and goods. In addition, electricity can be seen as part of the national security system, which justifies some policy interventions. This at one point explains why electricity is not seen as a "classic" commodity. This is very important in the sense that changes the perception of customers, and their acceptance of new products or price evolution. Even if electricity is not a public good, it often has to be treated as such, and almost always needs political support to make major changes.

Next, a brief explanation of the elements and theory that conform to the five Porter's Forces when it is applied to the case of a new option of the electric market conceived as an SG is described. The reasoning already explained is followed, identifying competitors, suppliers, buyers, the new competence (mainly the actors of electric services), and substitute services. Description of each block can be resumed according to the following sentences:

New competitor: In the case of the distribution network operator role; Today, the electricity market is either a closed market or a restricted market. In restricted markets, there is competition and therefore the threat of new entrants. Getting a new customer usually costs 7 times more than keeping one, as a rule. This means that the new entrant would have costs at least 7 times higher to enter the market. So the threat of new entrants is relatively small. For a closed market, there are no risks.

Figure 7

5 Porter's Forces oriented to electric market



Bargaining customers: Buyers have the power to negotiate only if they are allowed to change suppliers and procedures easily. However, electricity is a necessity, so customers have less room to negotiate. The bargaining power of the client is limited and can be expressed mainly through consumer associations, which are more or less powerful depending on the country, but in our case, especially depending on the support of government decisions.

At the local level, in a Mexican city, for example, customers can influence political ideas and changes. If a smart grid and energy market implementation project is not popular, it is unlikely that the policy will support the project (such cases as daylight saving time in Mexico can be cited). And as it was mentioned previously, since electricity is considered a public good, politics has considerable influence.

Threat of substitute products and/or services: The existing products within smart grids, specifically focused on the case of advanced metering devices, such as "smart boxes", already exist and offer relatively similar services for end consumers: energy consumption management, real-time consumption measurement, complete programs with intelligent applications for users, etc. However, from the point of view of the network they are not able to offer the same services: network status, fault detection, response to the demand for complementary services.

Bargaining with suppliers*:* Smart Grids are now a product that is implemented around the world. There are plenty of research centers moving forward to build prototypes and propose SG schemes in important cities around the world. The clean energy produced by alternative energies and Advanced Metering Infrastructure, just for mentioning some of the most important elements of the SG, are under study and development. Smart meters are not very complicated to develop, so other providers can easily reproduce them. The only advantage a supplier can have is if it is complying with the most recent standards (International standards and the official Mexican standard NOM in this matter). In short, the bargaining power of suppliers is also very small.

Competitive Rivalry: In the case of the regulated market, the worst-case scenario for an existing distribution company would be a large company with a solid financial position whose situation allows it to invest in another distributor, with a clear objective of expanding and getting new customers. Otherwise, the distributor that best manages their network, with

low failure rates and rate savings for their customers, can take advantage of and win even more customers. Again, in a closed market, the risk is zero.

Conclusion: The first observation that can be established from Porter's 5 forces is that the main players depend on the type of market and the regulation in force. Another conclusion that can be drawn is associated with the fact that, in most cases, the main actor is the policymaker, who very often refers to the government and its decisions based on political interests. Porter's 5 forces allow us to understand the interaction between the main stakeholders, and interpret the results based on cost-benefit analysis (CBA). This reasoning indicates which player should pay, and for what reason, or who should be solicited to ensure a fair share. (Le Grelle M., 2016).

THE PROPOSAL

Cost-Benefit Analysis Model

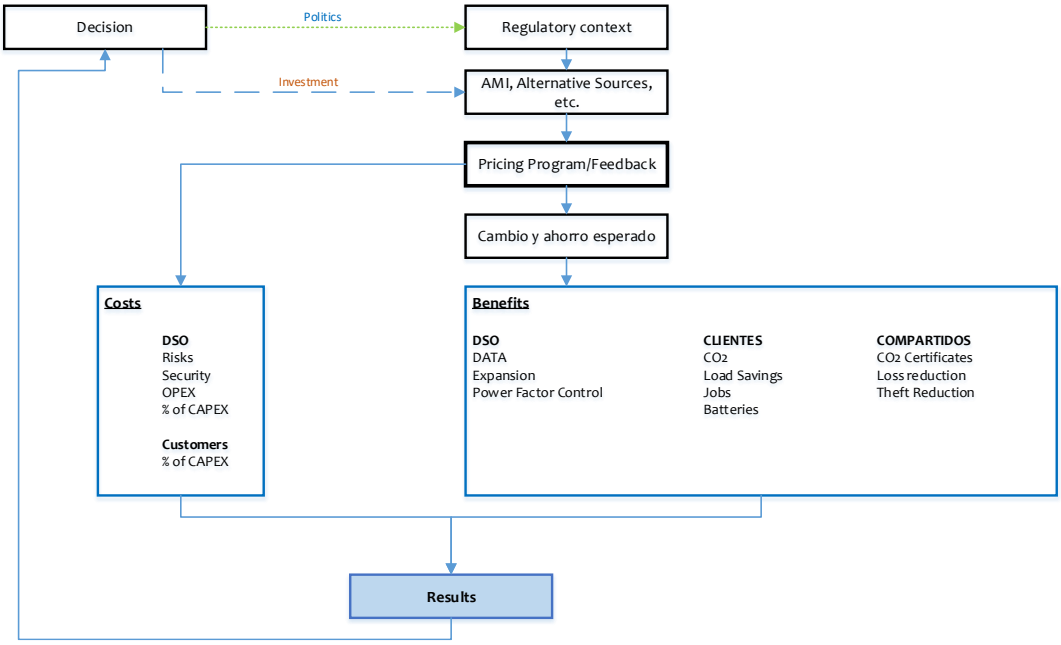
Next, the framework of the cost-benefit analysis is presented with the different factors considered and some other conditions implemented in the model. This framework presents some improvements over existing models.

This framework focuses on establishing a general methodology for cost-benefit analysis (CBA) for the application of smart grids and their advanced metering devices, whose basis is on the adequacy of the network for the acquisition and installation of smart meters in residential areas that can be adapted to specific situations. For this purpose, a list of input aspects will be established that can be divided into two categories:

- Options, which determine the operation scenario
- Data, which provides the specific information about the case

Figure 8

CBA framework



Note: Elaborated taken model and idea from Le Grelle (2016).

In some cases, the data is given by default even through an Excel sheet. But the main input of information in this Excel sheet is that it can play with various options, and observe the direct effect of CBA.

First, it details the key inputs that will determine the scenario, then goes through aspects such as CAPEX, OPEX, and risks, to then describe the benefits for electricity grid operators (DSO), society, and the opportunities created.

Figure 8 shows the scheme to understand the interrelationship between the aspects mentioned. The CBA also aims to determine or give an indication of who benefits according to their role in the model. It should be emphasized that the benefit of the network does not necessarily benefit the operator of the DSO network, so mostly the benefits will be transferred to the consumer.

Costs

Some initial considerations are based on the fact that no equipment upgrade costs or substantial changes in the equipment and technologies of the advanced measurement system are estimated, but that this change will occur within a sufficiently acceptable period to be taken into account from the beginning of the study. Traditionally the value of the asset is given by the value of its remaining economic life. Also, it is assumed that the deterioration of the SM is linear according to the time scale of the operation of the equipment (Le Grelle M., 2016).

$$R_{disc} = R_{gov.bonds\ interest} + R_{risk} \tag{1}$$

CAPEX

CAPEX is an acronym for Capital Expenditures. This index refers to the funds of a company that are intended for the purchase of properties, plants, buildings, equipment, or technology, and therefore represent an investment.

The SM is controlled remotely which provides possibilities to try to reduce costs with the different types of services they offer. SM operation involves data communication, processing, and storage infrastructure. The main categories of these costs are IT (information technology), project management, network hardware, and the installation of the device itself. The annual CAPEX is calculated as,

$$CAPEX\,(t) = No.\ of\ \ SM\,(t) \times C_{inv} \times (1 + WACC)^{t} \tag{2}$$

$$WACC = interest + risk$$

$$C_{inv} = C_{inst} + C_{tech} + C_{LAN} + C_{end} + C_{dev} + C_{web} \tag{3}$$

The WACC can be determined in different ways; here it is proposed to use the interest rate and risk premium to be able to adapt the WACC to a country and then propose different scenarios by changing the risk premium.

It is assumed that the entire capital must be secured at the beginning of the advanced measuring device installation project, because the actual WACC is extremely low compared to the last 20 years and because it is a risky investment. As opposed to the annual capital

increase, where WACC could be renegotiated every year, and would avoid locking a significant amount of capital 10 years in advance. Both methods are correct, and the WACC can change significantly depending on the method used and the bank or company (Le Grelle M., 2016).

OPEX

OPEX concept in SG is associated as a type of cost estimated for the following roll-outs (Giordano *et al.*, 2012):

- IT maintenance cost
- Network management and front-end cost
- Cost of GPRS communications
- Communication/data transfer costs
- Scenario management costs
- Replacement/failure smart meters
- Revenue reductions
- Meter reading
- Cost of consumer engagement programs

In general, as can be observed, are the costs related to IT costs (not the assets but employees, salaries, etc.).

The value of the general spending for the OPEX calculation is given by,

$$OPEX\left(t\right) = C_{cust} \times Number\ customers \times \left(1 + r_{infl}\right)^{t} \tag{4}$$

With

C_{cust} cost per customer

r_{infl} inflation rate

During the roll-out,

$$C_{cust} = C_{commun} + C_{logistic} + C_{IT} + C_{fault\ meter} + C_{educ} \tag{5}$$

For every one of the concepts here described, the authors intend in future research to adapt them to the real energy situation of Mexico, even more incorporating the particularities that represent the electrical reform that will be described in further investigation. Data from

electricity generated, transmitted, and distributed would be necessary to obtain to integrate a global smart grid model. The theoretical platform described in this Chapter must be extended to a real electric network.

CONCLUSIONS

In this chapter, the Mexican situation concerning electric energy before and after the energy reform proposed in 2021 has been described. According to the ideas exposed in this reform which allows the use of fossil fuel to produce electric energy, may be overcome into a system that is polluting and acting against the protocols followed by the rest of the countries in a matter of CO2 production. This situation opens an opportunity of proposed an alternative to the energy market offered as a Smart Grid which is a cleaner and more modern option of operation in a regularized electric energy market. The proposal is analyzed through a cost-benefit analysis, describing its model and some economical aspects such as Foreign Direct Investment, Porter´s 5 Forces, and the framework of CBA analysis. The conclusion is that the CBA could be a platform that helps to define a new energy market with smart characteristics. Calculations of factors taken into account like CAPEX and OPEX are an important part of the CBA model and must be evaluated from market realistic data. The authors leave the door open to explore a real scenario considering the CBA here described.

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Chapter 5

Influence of Leaders' Emotional Intelligence in the Work Environment to Maintain Profitable Companies

Source: Derek Coleman on Unsplash

Influence of Leaders' Emotional Intelligence in the Work Environment to Maintain Profitable Companies

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INTRODUCTION

Emotional intelligence is understood as the ability to recognize our feelings and those of others, to motivate ourselves and to adequately manage relationships (Goleman, 1995 cited by Samaniego, 2020), is configured as a key element to achieving both successes professionally as personal, as in the organization. In this way, emotional intelligence has been revealed as an increasingly important topic to the detriment of the elements of more classical intelligence.

From the above, Samaniego (2020) establishes that, In the talent search, technical skills are good for the job, but the emotional profile of employees and managers is even more so, but the emotional profile of employees and managers is even more so. But why? Starting from the definition of Daniel Goleman (1995, in Samaniego, 2020), the reasons why special attention should be paid to the importance of emotional intelligence in companies are; a) Better negotiation capacity. b) Leadership and work teams. c) Conflict resolution. d) Have a

good working environment, functional teams, and empathetic leadership, as this directly influences a company's income statement. e) Better communication skills. f) Work climate. Where maintaining good social relationships with colleagues is the basis of leadership and efficiency. g) Productivity and profitability. To seek to maintain the income statement of a company. According to Goleman himself (in Samaniego, 2020) there is a direct relationship between work environment, productivity, and profitability. In this way, we can summarize that the interest of this research is to study the relationship that exists between emotional intelligence explained as the ability of an individual to perceive, assimilate, understand, and regulate their own emotions, and those of the people in their environment to improve their leadership, conflict resolution, communication skills and most importantly from an organizational point of view, their productivity and profitability in companies in the Laguna Region.

On the other hand, understanding the impact of Emotional Intelligence on the ability to control emotions by business leaders will allow organizations to benefit from such emotional intelligence, as academic researchers have shown its usefulness since it allows the development of Key competencies for job success, which implies that Leaders have better tools to make and manage difficult decision processes, such as reducing conflicts, helping the adequate expression of emotions and feelings and improving care services. to clients, since it favors empathy and the proper management of interpersonal relationships (Hoyos-Jaramillo, 2019) in administration and senior management. In this last discipline, tools can be conceptualized to know. How the management of emotional intelligence can influence leaders? What emotions must be mastered to be a good leader? How does the emotional intelligence of leaders influence the organizational and personal sphere to maintain profitable companies?

Although there are numerous studies in the scientific community on the need and importance of evaluating the efficiency of processes through key performance indicators, said the community has dedicated different investigations of the industry in the area in the Laguna Region, particularly in the municipalities of Torreón, Coahuila, Gómez Palacio, and Lerdo, Durango, to the problem of sustainable development. The results show that in the region and particularly in the municipalities studied there is social inequity in education, health, and basic services, although the Human Development Index is medium-high to high

according to official estimates (Gómez, 2009). So companies may find themselves losing productivity and profitability. Therefore, this type of study is incorporated as of interest to the Laguna community.

The contribution of this study is the design of an instrument, validated in its content by experts and in its reliability, which deals with a relevant topic for the management of organizations in general since they are in constant evolution, therefore, they are in a favorable environment to develop Emotional Intelligence in administrative staff and senior management and can be used, as is or modified by those responsible for managing processes at the directive, managerial and middle management levels to determine if they evaluate control of emotions in the performance of their position in an integral manner, or identify which elements they should focus more attention to. The knowledge used as a tool in organizations allows for mitigating vulnerability and uncertainty in the face of adverse events and prosperity in the face of them, the general objective of this research is to demonstrate how the emotional intelligence of leaders influences the organizational and personal sphere to maintain profitable companies. The article is structured as follows: first, a review of the literature on the relevance of Emotional Intelligence in organizations is carried out; second, the research method is described and the validated elements for the research instrument are determined; third, the results are analyzed and finally, the main conclusions are presented.

CONTEXTUAL FRAMEWORK

Context of emotional intelligence

Importance of emotional intelligence**:** The conceptual paradigm of intelligence has evolved according to Dueñas Buey (2002) over time, focusing on different perspectives. In the second half of the 19th century, the interest in deepening the knowledge of the area of intelligence was confirmed, and since then certain advances have been made that made subsequent developments possible. According to Sattler (1996 cited in Dueñas Buey, 2002), the psychophysical methods developed in Central Europe, as well as the statistical studies of mental processes initiated in England by Galton, constitute the bases for all subsequent development of the area of intelligence in the 20th century. Galton conceived intelligence as

a biological quality, being the determining genetic factor. Some authors consider him the father of mental evaluation (Shouksmith,1970 cited in Dueñas Buey, 2002).

Models of emotional intelligence

Theoretical review of emotional intelligence: models and measurement instruments. The present theoretical review of emotional intelligence (EI) begins with the conceptualizations made by Galton, Binet, Stemberg Thurstone, Thorndike, and Gardner (cited in Mejía, 2013) who in their historical moment managed to lay the foundations for the birth of intelligence. emotional as a theoretical construct first introduced into the scientific literature in the 1990s. Since then different EI models have been developed and at the same time, research contributions have increased. The article proceeds to describe in detail the most representative EI models, such as; 1) the Ability Based mental ability model developed by Mayer and Salovey (cited in Mejía, 2013); 2) Goleman's model of emotional competencies (cited in Mejía, 2013); 3) the Bar-On social-emotional intelligence model (cited in Mejía, 2013). Later in this article, the author Mejía (2013) describes the most representative experimental studies and EI measurement instruments, based on the models mentioned above.

Origins, evolution, and models of emotional intelligence: Emotional intelligence is a highly controversial term. Hundreds of books and articles have been written about him due to his growing popularity and importance in the field of administration. Unfortunately, few of them have scientific rigor. This article offers a review of intelligence in general and emotional intelligence in particular from its origins, as well as the main models. The documentary research developed made it possible to identify the characteristics of the five models applied to the administration that offer empirical evidence and are the product of rigorous scientific work (Trujillo & Rivas 2005).

Emotional Intelligence and the education of emotions from the Mayer & Salovey Model: A fascinating challenge for today's schools is to educate students both academically and emotionally. This challenge is justified by the growing number of prevention and intervention programs for young people in Spain. Many of these programs include Emotional Intelligence (EI) skills but lack a theoretical and empirical framework. In this article, the

authors describe the current models of IE. In particular, they explain the Mayer & Salovey model and the instruments developed to measure EI. It is the model with the greatest empirical support, but, paradoxically, the most unknown in the Spanish educational field, and it can constitute a useful framework for EI programs in schools (Fernández & Extremera, 2005).

Emotional intelligence and its main models: proposal of an integrating model. This research has explained the concept of emotional intelligence, based on different definitions and principles observed in the literature. From here, this work aims to carry out an integrative model of emotional intelligence based on the literature. The model provides multidisciplinary use, among others: education, business, and NGO's. As a methodology, a review of the literature has been carried out from the search for secondary data; books, and articles in magazines, using the ABI Inform database and the information referring to emotional intelligence collected from the emotional intelligence seminar, carried out by the Miguel Hernández University of Elche and the ANPE union. The results obtained explained that the proposed emotional intelligence model has internal and external dimensions. The internal dimensions are; responsibility, common sense, persuasion, and the ability to learn. On the other hand, the external dimensions are; empathy, the ability to relate, the ability to communicate, the ability to create mental models, the will, and the ability to adapt to the environment (García & Giménez, 2010).

Emotional intelligence and leadership in labor performance

A) Emotional intelligence and work performance of managers. In the recent past, Guardiola & Basurto (2015), conducted a study on emotional intelligence and work performance of the managers of Adventist corporate in northern Mexico, whose main objective of this study was to know the self-perception of the level of emotional intelligence as a predictor of the labor performance.

Table 1

The Self-perception of the Emotional Intelligence of Managers

Valuation criteria	Self-perception	Frequency	Percentage
Valid	Good	3	4.1
	Very good	41	56.2
	Excellent	29	39.7
	Total	73	100.0

Note: Guardiola & Basurto (2015)

Where, according to the results obtained, it can be determined that there is a positive and significant influence of a high level of emotional intelligence on the level of self-perceived job performance by managers and that the years of service and academic levels did not show any significant difference. As shown in Table 1, we can observe the results of the frequencies and the percentage of self-perception of emotional intelligence, of the directors of the Adventist corporate.

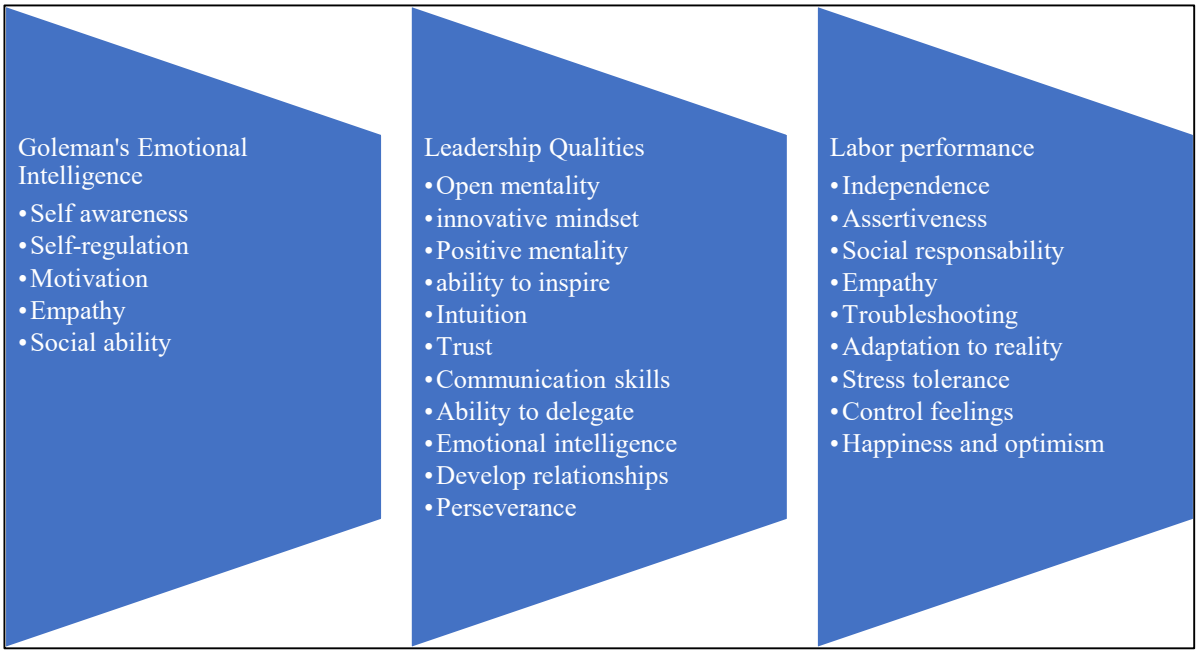
> Most of the directors perceive themselves to have very good emotional intelligence (56.2%) and there is one (39.7%) who perceive themselves to have excellent emotional intelligence and only (4.1%) perceive themselves to have good emotional intelligence. The analysis of Pearson's correlation to find out if there is a relationship between the self-perception of emotional intelligence of managers with their labor performance, found that there is a significant relationship, r=.614 p=.000. To prove that the self-perception of the level of emotional intelligence is a predictor of the self-assessment of the level of the job performance of the managers of the Adventist corporate in northern Mexico, the simple linear regression statistical test was used. The independent variable was the level of emotional intelligence and the dependent variable was the level of labor performance. The results of this procedure were the following: the predictor variable (emotional intelligence), included in the analysis, explains 66.1% of the variance of the dependent variable (job performance) since corrected R^2 is equal to .661, the F statistic that is equal to 141.094 shows us that if it is a predictor R is equal to 0. The critical p-value equal to .000 indicates that there is a significant influence (Guardiola & Basurto, 2015).

B) Emotional intelligence as a component of leadership**.** Anne Saporito (2015) refers that emotional intelligence is the ability of a person to use emotion proactively, both their own emotions and those of others around them, and both consciously and subconsciously, as a tool to improve reasoning and decision making. He also mentions that Daniel Goleman (Quoted in Saporito, 2015), the "godfather" of emotional intelligence, has published extensively on the importance of non-technical skills in the workplace. He connects the

qualities of emotional intelligence directly with leadership and argues that success in leadership does not depend exclusively on the more traditional qualities of practical and intellectual competencies. She also refers to Goleman (Quoted in Saporito, 2015) who writes: "It does not make intellectual and technical skills irrelevant. They are important, but mostly as 'threshold capabilities', that is, they are the entry-level requirements for executive positions. But my research, along with other recent studies, clearly shows that emotional intelligence is the *sine qua non* of leadership. Without it, a person can have the best training in the world, an incisive, analytical mind, and an endless supply of smart ideas, but still not make a great leader." Goleman identifies five main aspects of emotional intelligence: self-awareness, self-regulation, motivation, empathy, and social skill (Figure 1).

Figure 1

Influence of Emotional Intelligence on Job Performance



Note: Saporito (2015) and Carmona-Fuentes, (2015)

For Gardner (Cited in Carmona-Fuentes, 2015).), Intelligence (Figure 1) can be found distributed in various ways among people and especially among workers who are part of the organization, as already mentioned. All intelligence is equally important, which implies that the success of any lesson lies in the use of various activities that develop and consolidate them in the workers. In the current workplace, it is not only considered to hire a worker with

his training or experience, but a fundamental part is a way of relating to others, the interpersonal relationships of the members of an organization, are today the basis of the success of a company. Here is the importance of various and abundant studies carried out today, whose basic objective is to discover the level of importance and the influence of this intelligence on the productivity and development of modern organizations.

It is important to clarify that these bits of intelligence can be deployed and implanted in organizations; Identifying these conditions among employees is the job of management. The maturity that the person acquires throughout life and the accumulated experiences will help them to recognize and locate their emotions when familiar situations occur and face them from another perspective, thereby demonstrating the increase in their emotional intelligence.

METHOD

Research Problem

Once the literature on the topic of research has been reviewed and an outline previously described in the introduction, the research problem is delimited as follows. Leadership and emotional intelligence are closely linked to becoming a good leader. In other words, leadership implies knowing one's own emotions and knowing what each one of them means to understand how they can impact daily work and thus be able to control them. Therefore, it seeks to understand how Emotional Intelligence affects the ability to control emotions by business leaders that allow organizations to benefit from said emotional intelligence, since it favors empathy and proper management of relationships. interpersonal (Hoyos Jaramillo, 2019). Although they exist, in this way the research problem can be conceptualized to know the variables that explain the lack of knowledge of; the emotional intelligence of the leaders and its incidence in the work environment to maintain profitable companies in the Laguna Region

General objective: Know how the emotional intelligence of leaders influences the organizational and personal sphere to maintain profitable companies

Hypothesis: H_T: There is the emotional intelligence of leaders that affects the work environment to maintain profitable companies

Limits and scope of the investigation

Within the scope of this explanatory research, it seeks to know what factors influence the organizational and personal sphere to maintain profitable companies in the Laguna Region based on the awareness of the leader's emotions. It is a non-experimental investigation because none of the variables were deliberately manipulated nor were conditions or stimuli developed to which the research subjects were exposed and no situation was built to see its effects. It is field and not random since the surveys were carried out in a convenience sample. It is cross-sectional since a study was not carried out over time. This research work is useful and justified in the search to know and explain the factors that make up the emotional intelligence of leaders and their influence in the organizational and personal sphere to maintain profitable companies in the Laguna Region.

Sample size and description

A self-made measurement instrument was applied to 39 subjects, this instrument is composed of 40 interval variables with a Likert scale from 0 to 6, six nominal, and a Cronbach's Alpha of 94.5% was found, which provides us with a level very good reliability and structural validity (Hernández et al, 2014) with an estimation error of 2.56%. Said instrument was developed to measure the essential relationship between emotional intelligence and the observable response of non-observable constructs to support an explanation. The development of the same allows the analysis of the indicators and thus generates as a result some inferences between the non-observable concepts of the study (Carmines and Zeller, 1979).

The sample of subjects interviewed was made up of a great majority of women (55%), and only 45% were men, of whom 77.5% have professional studies, and 7.5% have a postgraduate degree, while the rest of education average and upper average are grouped around only 15%. It was also found, as expected, that the largest number of employees have an operating position level or another similar one (64.5%), while managers and supervisors

only represent 32.5%. Likewise, it was observed that leaders promote the sustainable development of the organization to influence the employee's happiness at work (80%). In turn, promoting the role of emotional leadership that influences organizational profitability (85%) concerning age, the vast majority of employees are of adulthood (72.5%) between 32 and 55 years of age.

RESULTS

Univariate frequency analysis

The characteristics of the sample that were obtained as a frequency distribution are presented below: As observed in Table 2, the vast majority of the interviewees according to their gender were women (55%) and only 45% were men. It also shows a frequency distribution of the level of studies that the interviewees have, among which the Professional level stands out at 77.5%, the postgraduate at 7.5%, and the rest are grouped around only 15%.

Table 2

Frequency Distribution by Nominal Variable

Unit Variable	Characteristics	Frequency	Accumulated Frequency	Percent	Accumulated Percent	Histogram
Gender	Man	18	18	45	45	|||||||||||||||||
	Women	22	40	55	100	|||||||||||||||||||||
Education level	Postgraduate	3	3	7.5	7.5	|||
	Professional	31	3. 4	77.5	85	|||||||||||||||||||||||||||||
	Preparatory	4	38	10	95	||||
	Commercial or technical career	1	39	2.5	97.5		
	Secondary	1	40	2.5	100		
Position	Executive	5	5	12.5	12.5	|||||
	operational	13	18	32.5	45	||||||||||||
	Other	13	31	32.5	77.5	||||||||||||
	Supervisor	8	39	20	97.5	||||||||
	Supervisor-Operational	1	40	2.5	100		
Sustainable development	No	6	6	15	15	||||||
	I don't know	2	8	5	20	||
	Yeah	32	40	80	100	||||||||||||||||||||||||||||||
Leadership Role	No	4	4	10	10	||||
	I don't know	2	6	5	15	||
	Yeah	3. 4	40	85	100	|||||||||||||||||||||||||||||| ||

Age	20 to 32	11	11	27.5	27.5	|||||||||||
	32 to 43	13	24	32.5	60	|||||||||||
	43 to 55	16	40	40	100	|||||||||||

In addition, a frequency distribution is observed by employee position where 32.5% operating stands out, another 32.5% of another type, while supervisory and managerial positions represent only 32.5% and a special supervisor-operative classification only presents the 2.5% (Table 2) On the other hand, the frequency distribution is observed that shows how the leader promotes the sustainable development of the organization to influence the employee's happiness at work. In it stands out that 80% of those surveyed state that they do and only 20% say that they do not know or do not influence work happiness and one of the most important statements that are shown is the one that refers to the role of leadership emotional that influences organizational profitability where 85% of those interviewed agree and only 15% accumulated between those who disagree and those who do not know.

Finally, it was found that the age of the vast majority of the interviewees ranges from 43 to 55 years (40%), a smaller amount between 32 to 43 (32.5%), and very few from 20 to 32 years of age (27.5%). %) (Table 2).

Table3

Frequency distribution by the level of most common explanation: Commonalities

Variable	variable code	Initial	explanation
ability to guide	guide33	.992	97.5%
ability to lead	direct32	.987	96.6%
have organizational skills	Organiz12	.986	96.4%
Being easy to negotiate	Business11	.987	93.8%
Find the productivity of the company	Produce10	.982	93.5%
Have the power to reorganize	Rearrange37	.978	92.9%

As can be seen in Table 3, the variables that most commonly show a greater explanation of the emotional intelligence of leadership and its influence on Labor performance, are in the first instance the ability to guide (Guide33) with 97.5%, although not Less important is the ability to lead (Dirigir32, 96.6%), as well as having organizational skills (Organiz12, 96.4%), it is required to be and has the facility to negotiate (Negoc11, 93.8%), in addition to seeking

and finding the productivity of the company (Produc10, 93.5%) and having the power to reorganize (Reorganize37, 92.9%).

Multivariable analysis

Once the data that nominally characterize the sample has been analyzed, we proceed to make a description of the most important variables of the investigation through the use of various statistical techniques.

To determine if the study contained valid variables, three initial tests were performed: Determinant of the correlation matrix, KMO, and Bartlett's Sphericity. The test shows that the validity of the study (Table 4) is based on the coefficient of the determinant of the correlation matrix with an almost zero value (1.246E-023), where a correlation is observed at a regular level of sample adequacy of the variables in 61.0% initial in KMO.

Table 4

KMO Test, Bartlett Test, and Determinant

Kaiser-Meyer-Olkin measure of sampling adequacy.		.610
Bartlett's test of sphericity	Approximate chi-square	1380.022
	Degrees of freedom	630
	significance	.000
Correlation matrix	Determinant	1.246E-023

In addition, the Chi-square (1380.02) is at an acceptable level, therefore, when correlating the variables, significant data was obtained through which the initial hypothesis was approved, the minimum validity factor in Bartlett's sphericity test is 630 whose significance is close to 0.000, which indicates that it is significant at 95% confidence ($\alpha < 0.05$).

Table 5 shows the total explained variance of 76.6% where the variables are reduced to communalities and the maximum level of explanation of the survey for the investigation is determined; a minimum acceptable level is 50%.

Table 5

Initial Self-Values and Total Explained Variance Percentage.

Factor	initial eigenvalues			Sums of the squared loadings of the extraction			Sum of squared saturations of rotation		
	Total	% variance	% accumulated	Total	% variance	% accumulated	Total	% variance	% accumulated
1	15,576	43,268	43,268	14,920	41,446	41,446	6,205	17,237	17,237
2	3,077	8,547	51,815	2,633	7,313	48,759	3,338	9,271	26,508
3	2,258	6,271	58,086	2,045	5,681	54,440	3,240	9,000	35,508
4	1,915	5,318	63,404	1,878	5,217	59,657	3,192	8,867	44,375
5	1,695	4,710	68,114	1,587	4,408	64,065	2,917	8,102	52,478
6	1,420	3,943	72,057	1,402	3,895	67,960	2,500	6,945	59,422
7	1,265	3,513	75,570	1,129	3,135	71,094	2,499	6,941	66,363
8	1,079	2,997	78,567	.944	2,623	73,717	2,337	6,492	72,855
9	1,001	2,779	81,346	1,027	2,853	76,571	1,338	3,715	76,571

The rest of Table 5 is explained with the theory contained in the literature and with this the model for the application and search of How does the emotional intelligence of leaders influence the organizational and personal sphere to maintain profitable companies? in the Lagoon Region.

Factorial Analysis

As observed in Table 9, for the effete of the significance of the factors to be studied, a Re-Test was carried out taking into account a minimum value of 0.7 for purposes of exploring the significance of individual factors. Based on tradition: the reliability value in exploratory research must be equal to or greater than 0.6; among these authors Nunnally (1995): even establishes that in the early stages of the investigation, a reliability value of 0.6 or 0.5 may be sufficient.

Based on the foregoing, the seven (7) significant factors in terms of reliability and individual validity are described in the subsequent parts, as shown in Table 9, which refers to Cronbach's alpha Re-Test.

Table 6

Re-test Factor Analysis Using Cronbach's Alpha

FACTORS	Variables that Integrate	Factor Load	Cronbach's Alpha by Factor
FACTOR 1 Leaders Achieve Goals	Produce10	.834	0.923
	efficiency14	.728	
	Goals6	.717	
	profession17	.695	
	pawn5	.679	
	Result7	.633	
	Organiz12	.615	
	Producti16	.567	
	honest30	.563	
FACTOR 2 Leaders Achieve Profitability	rentab29	.754	0.788
	CalidHuma21	.739	
FACTOR 3 Leader's Boosts	Anticipate26	.780	0.828
	stimulus25	.708	
	productivereality28	.522	
FACTOR 4 Leader Emotions	influential35	.834	0.819
	Integrated36	.629	
	TEquip3	.599	
	Understand24	.571	
	exptéc18	.546	
FACTOR 5 Leader Skills	guide33	.677	0.945
	direct32	.665	
	Business11	.602	
FACTOR 6 Adaptation to Circumstances	circuns15	.703	0.794
	adaptcircun22	.671	
FACTOR 7 Service Responsibility	Answer9	.812	0.853
	trabserv19	.794	

As shown in Table 6, the significant factors taken from the performance of a retest test using Cronbach's Alpha (greater than 0.7) are those that somehow allow us to explain how the emotional intelligence of leaders influences the organizational and personal scope to maintain profitable companies. These factors are: a) Leaders Achieve Goals, (10,923). Leaders Achieve Profitability, (0.788), Leader Incentives, (0.828), Leader Emotion, (0.819), Leader Abilities, (0.945), Adaptation to Circumstances, (0.794) and Service Responsibility, (0.853), all with Cronbach's alpha greater than 0.7 exploratories with Eigenvalues greater than one.

Table 7

Leaders Achieve Goals

FACTOR 1	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
Produce10	.834	40	0	6	5.6	6	6	1.03	5.42	0.18	-4.23	22.92	0.0000
efficiency14	.728	40	2	6	5.5	6	6	0.75	7.36	0.14	-2.66	12.98	0.0000
Goals6	.717	40	2	6	5.5	6	6	0.85	6.44	0.16	-2.03	8.1	0.0000
profession17	.695	40	2	6	5.7	6	6	0.76	7.52	0.13	-3.39	15.74	0.0000
pawn5	.679	40	2	6	5.5	6	6	0.85	6.44	0.16	-2.03	8.1	0.0000
Result7	.633	40	2	6	5.3	5	6	0.93	5.66	0.18	-1.49	5.45	0.0001
Organiz12	.615	40	2	6	5.4	6	6	0.95	5.64	0.18	-1.84	6.31	0.0000
Producti16	.567	40	2	6	5.6	6	6	0.81	6.81	0.15	-2.47	10.28	0.0000
honest30	.563	40	5	6	5.9	6	6	0.33	17.54	0.06	-2.27	6.14	0.0000

In table 7, of factor 1, on how "Leaders Achieve Goals", it was found that the majority of the interviewees almost always agree when establishing that the leadership of the companies produces expected results (Resul7, Me= 5.3) and meets the established goals (Metas6, Me= 5.5) of the companies, as well as having an organizational capacity (Organiz12, Me=5.4) dedicated to improving the company's productivity (Produc10, Me= 5.6) in general and In a personal way, in the same table 10 it is observed that a company is distinguished by having honest leaders (honest30, Me= 5.9) who carry out their work with commitment (Empeñ5, Me= 5.5), productivity (Producti16, Me= 5.6), and with efficiency (Eficie14, Me= 5.5) and professionalism (Profesi17, Me= 5.7).

Table 8

Leaders Achieve Profitability

FACTOR 2	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
rentab29	.754	40	3	6	5.4	6	6	0.74	7.26	0.14	-1.16	4.1	0.0032
CalidHuma21	.739	40	3	6	5.5	6	6	0.82	6.71	0.15	-1.35	3.77	0.0017

In table 8, leaders achieve profitability, the opinion of the interviewees is shown, who mentions that almost always (Me=5.4) leaders obtain profitability achievements (rentab29) from having human qualities with others (CalidHuma21).

Table 9

Leader's Boosts

FACTOR 3	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
Anticipate26	.780	40	2	6	4.7	5	5	1.20	3.94	0.25	-0.82	2.89	0.0856
stimulus25	.708	40	2	6	4.9	5	5 to	1.22	4.03	0.25	-1.11	3.33	0.0120
realityprod28	.522	40	3	6	5.5	6	6	0.72	7.68	0.13	-1.48	5.15	0.0001

Table 9 shows the stimuli that according to the interviewees are characteristics of a good Leader, above all it is required to anticipate situations of change (Anticipate26), Promote incentive programs for employees (Estimulo25), and also be aware of the productive reality of the company (realidadProd28).

Table 10

Leader Emotions

FACTOR 4	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
influential35	.834	40	1	6	4.6	5	5	1.31	3.52	0.28	-0.86	3.06	0.0615
Integrated36	.629	40	3	6	5.3	6	6	0.93	5.66	0.18	-1.1	3.32	0.0127
TEquip3	.599	40	3	6	5.7	6	6	0.64	8.95	0.11	-2.67	10.32	0.0000
understandC24	.571	40	2	6	4.6	5	5	1.06	4.35	0.23	-0.33	2.42	0.5099
exptéc18	.546	40	2	6	5.0	5	5	0.99	5.02	0.20	-1.04	3.84	0.0094

Table 10. Factor 4 shows the emotions that, in the opinion of the interviewees, are almost always manifested in a good Leader, since by integrating their technical experience (exptéc18, Me = 5.0) to Teamwork (TEquip3, Me = 5.7), understanding the behaviors of the employees (ComprendC24, Me = 4.6) with which it influences the personal with the employees (Influential35, Me = 4.6) and both

Table 11

Leader Skills

FACTOR 5	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
guide33	.677	40	3	6	5.5	6	6	0.88	6.25	0.16	-1.77	5.33	0.0000
direct32	.665	40	3	6	5.5	6	6	0.85	6.52	0.15	-2	6.34	0.0000
Business11	.602	40	2	6	5.4	6	6	0.98	5.49	0.18	-1.75	5.75	0.0000

Table 11. Factor 5, called leader skills, shows the opinions of the interviewees, who mention that they almost always agree (Me=5.4) that leaders have the skills to guide (guide33) and direct (direct32). to organizations and employees since they have the facility to negotiate (Negoc11).

Table 12

Adaptation to Circumstances

FACTOR 6	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
circuns15	.703	40	3	6	5.1	5	6	0.88	5.81	0.17	-0.7	2.66	0.1571
adaptcircun22	.671	40	2	6	5.2	5	5	0.89	5.77	0.17	-1.39	5.57	0.0001

In Table 12. Factor 6, which is called adaptation to circumstances, the interviewees mention that they almost always agree (Md=5) that leaders, in addition to mastering personal emotions, should take circumstances into account (Circuns15) that surround the situations that arise and adapt to these circumstances (Adapcircun22)

Table 13

Service Responsibility

FACTOR 7	Load Factorial	No.	Min	Max	Me	Md	Mo	Std	Z	CV	Sk.	K	OmbK2
Answer9	.812	40	0	6	4.3	4	4	1.42	3.03	0.33	-0.87	3.81	0.0240
trabserv19	.794	40	1	6	5.1	6	6	1.24	4.13	0.24	-1.51	4.91	0.0001

As shown in Table 13, which corresponds to Factor 7, leadership often influences the results of companies by taking on additional responsibility (Resp9, Me= 4.3), almost always to work with a desire to serve (Trabserv19, Me= 5.1).

Confirmatory factor analysis. Model using structural equations

Once the previous knowledge has been delimited and validated in a theoretical and statistical way to formulate concrete hypotheses about the relationship between indicators and latent dimensions his interest is focused on testing these hypotheses. The CFA subjects these assumptions to contrast statistics that, if rejected, would advise against the reliability assessment. (Batista-Fogueta et al, 2004). In this sense, it is necessary to adjust the model (Table 14). To do this, using Chi-Square indicators and degrees of freedom, it will be determined if the quotient of these data should be less than five (P<5) as a desired result to show the fit of the proposed model, called “testing the omission model” (Cea D'Ancona, 2004).

Table 14

Model Fit Summary

model	NPAR	CMIN	DF	P	CMIN/DF
default model	64	492,482	287	.000	1,716
Saturated model	351	.000	0		
Independence model	26	1186.209	325	.000	3,650

As can be seen in Table 14, Chi-Square (CMIN) 492.48 regarding the division of the Degrees of Freedom (DF) 287, sets a setting of 1.716, suggesting a ratio of approximately less than three as a reasonable principle of efficient adjustment, called "testing the default model". These values indicate that the model is consistent and with very good goodness of fit.

Figure 2

Confirmatory Model Using Structural Equations

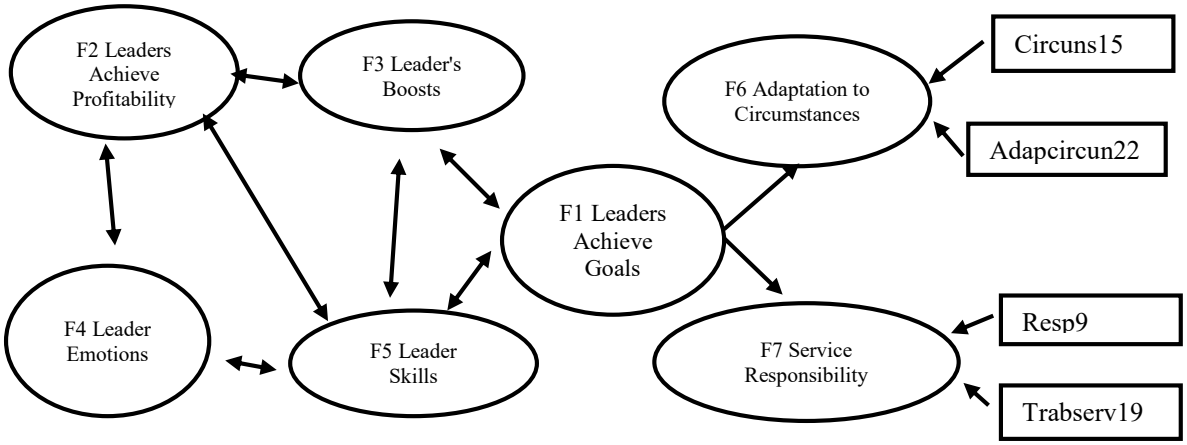


Figure 2 shows that the latent variable of Factor 2 (F2) that refers to "Leaders who Achieve Profitability" is correlated with the factors; "Leader's Incentives" (F3), also "Leader's Emotions" (F4), and "Leader's Skills" (F5) as part of the impulse that is generated to achieve that "Leaders Achieve Goals" (1) as one of the most important factors, which finally quickly affects the "adaptation to circumstances" (F6) and carries out the "Service Responsibility" (F7). This model allows us to affirm that the activities that the workers are carrying out are those that allow them to work with emotional intelligence to be taken into account under the circumstances (Circuns15) that surround the situations that arise and the leaders adapt to said circumstances (Adapcircun22), likewise, for leaders to achieve the proposed goals and results, leadership in companies often requires taking on additional responsibilities (Resp9, Me= 4.3), almost always to work with a desire to serve (Trabserv19, Me= 5.1). Therefore, Figure 2 and Table 15 corroborate what is established in the Working Hypothesis.

Table 15

Weights of Covariances and Non-Standardized Regressions

FACTOR	with	FACTOR	Estimate	HE	CR	P
F7 Service Responsibility	<---	F1 Leaders Achieve Goals	3,761	1,721	2,186	.029
F6 Adaptation to Circumstances	<---	F1 Leaders Achieve Goals	2,975	1,166	2,552	.011
F1 Leaders Achieve Goals	<-->	F3 Leader Boosts	.064	.032	2,022	.043
F1 Leaders Achieve Goals	<-->	F5 Leader Skills	.061	.026	2,347	.019
F2 Leaders Achieve Profitability	<-->	F3 Leader Boosts	.179	.084	2,125	.034
F2 Leaders Achieve Profitability	<-->	F4 Leader Emotions	.193	.096	2,023	.043
F3 Leader Boosts	<-->	F5 Leader Skills	.282	.109	2,588	.010
F4 Leader Emotions	<-->	F5 Leader Skills	.258	.110	2,354	.019
F2 Leaders Achieve Profitability	<-->	F5 Leader Skills	.201	.076	2,639	.008

Table 15 shows that all the factors related to both covariances (<-->) and correlations (<---) in the theoretical model are significant (P<0.05), so the proposed model on the use of the interaction of leadership styles in the moods of the staff through its influence on the work environment. The above allows us to explain in a simple way how; the emotional intelligence of leaders affects the work environment to maintain profitable companies.

CONCLUSIONS

The following conclusions were found:

- The leadership of the companies produces expected results and meets the established goals of the companies by having honest leaders who carry out their work with commitment, productivity, and with efficiency, and professionalism.
- Leaders obtain profitability achievements from having human qualities with others.
- A good Leader, above all, is required to anticipate situations of change, promote incentive programs for the employee and also be aware of the productive reality of the company.
- The excitement of integrating their technical experience into Teamwork allows the good leader to understand the behaviors and influence the employees for their mental integration into the organization.
- Leaders have the skills to guide, direct, and have the ability to negotiate.
- Good leaders take into account the circumstances surrounding the situations that arise and adapt to those circumstances.
- A good leader influences the results of the companies by taking additional responsibility almost always to work with a desire to serve.

Additionally, the structural model allows us to affirm that the activities that leaders and workers are carrying out are those that allow working with emotional intelligence to be taken into account under the circumstances that surround the situations that arise, and the leaders adapt to said circumstances. taking new risks, which allows for achieving the goals and proposed results.

Therefore, the research hypothesis on the existence of factors that explain: How the emotional intelligence of leaders influences the organizational and personal sphere to maintain profitable companies in the Laguna Region, was duly contrasted and corroborated by the statistical instruments applied.

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Chapter 6

Relation of the Business Philosophy with a Process of Cultural Change in Commercial Companies

Source: Scott Graham on Unsplash

Relation of the Business Philosophy with a Process of Cultural Change in Commercial Companies

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INTRODUCTION

The changes have been present all the time without stopping, and in recent years these have been increasingly pressing. This situation influences the business environment, so organizations must prepare for such changes and adapt to them. This was seen with the Coronavirus COVID-19 pandemic, which caused a series of changes in the way companies work, and in people's consumption behavior. Especially, since in world markets the competition is increasing. The importance of the study of cultural change lies in the accepted assumption that companies are constantly evolving, so it is of great importance to understand how companies change, as well as the motivations they have for those changes to take place or not. For this reason, companies that aspire to succeed and stand out in the market must adapt to the changes that are presented. Therefore, managers play a key role in the companies, because they determine the path to follow and have a clear vision of what they project their company to be, and the steps to follow to achieve it. Therefore, it is very important to examine the process of organizational culture change in companies, since this allows us to know what factors intervene in a process of cultural change, in addition to knowing the problems they face to achieve it, such as overcoming resistance to change, which is very common among the staff of organizations.

The focus of the study of Business Philosophy reveals that changes are a type of evolution that occurs in organizations; the Business Philosophy of a company helps its employees to adapt to changes because they respond more quickly to these, and in this way, such changes can be anticipated. Therefore, the principles and values that constitute the

business philosophy of companies are essential for organizations within the business environment.

At the same time, it is appropriate to highlight that our world has changed rapidly, especially since the end of the 20th century, which meant that many people were not aware of these changes. Now, it can be seen how the knowledge and skills that were previously available have become obsolete.

DEVELOPMENT

How an organizational change procedure is carried out entails a great effort, because any change process must overcome a large number of problems that make it difficult. Hence the importance of generating this type of research. Since global markets are constantly evolving, business firms must also be constantly changing. Therefore, we must understand exactly how companies change, and what causes those changes.

To implement a change strategy that forges a more efficient and competitive company, an organizational culture needs strong organizational values, which are under what the market demands. Therefore, the values of a company play a central role in organizational management, especially in companies that are undergoing a process of change.

Among the authors who analyze organizational change from the point of view of the current study of Business Philosophy, are: Groysberg et al. (2018); Schein (2010); Palm et al., (2016); Tomislav (2021); Schafer (2009), Drašković, et al., (2018), which were analyzed for this work.

The business philosophy has spread in the literature referring to organizational behavior (Schein, 2010), administration (Fu et al., 2015), and marketing (Homburg & Pflesser, 2000). There are many definitions of organizational culture (Cameron & Quinn, 2011; Hartnell et al., 2011; Homburg & Pflesser, 2000; Pettigrew, 1979; Quinn & Rohrbaugh, 1983; Schein, 2010). But the most cited definition is that of Schein (2010), who defines organizational culture as a largely invisible, but very powerful social force. This invisible force is what drives a company to specific objectives or a particular orientation (Schein, 2010). It is a combination that contains beliefs, ideology, language, rituals, myths, values, norms, and artifacts (Homburg & Pflesser, 2000; Schein, 2010); attitudes, purposes,

and habits that identify a company (Fetterman, 2010); that refine the behavior patterns of employees (Uddin et al., 2013), and give the implicit social order of a company (Groysberg et al., 2018), which includes visible symbols, communication and, above all, orientation to change. Therefore, organizational culture is defined by values and personnel behaviors that help the unique social and psychological environment and influence the internal thinking and external behaviors of the company. (Pettigrew, 1979).

On the other hand, it should be noted that there are different classifications of organizational culture, Schein (2010) classifies organizational culture at three levels: observable artifacts, values, and basic assumptions.

The competing values model of organizational culture consists of four types of organizational orientations: group culture, development culture, rational culture, and hierarchical culture. Having four types of culture: clan, adhocracy, market, and hierarchy (Cameron & Quinn, 2011). Also, Goffee & Jones (1998), indicate that organizational culture consists of two dimensions: sociability and solidarity; about which there are four main types of organizational culture: the communal culture, the fragmented culture, the network culture, and the mercenary culture.

In turn, it should be noted that there are three types of organizational culture widely used in organizational culture studies: innovative organizational culture (COI), bureaucratic organizational culture (BOC), and trust and support organizational culture (TOC) (Uzkurt et al. al., 2013).

Thus, as can be seen, organizational culture plays a fundamental role in achieving the economic objectives of a company, with an impact on the process of initiation and implementation of organizational changes. Handy's typology, which classifies culture into role culture, power culture, person or support culture, and task culture, serves to evaluate the type of organizational culture in public and private organizations. (Drašković, et al., 2018).

On the other hand, there is an association between organizational culture and the affective, cognitive, and behavioral tendency of attitudes toward organizational change. Different types of organizational cultures have varying degrees of acceptance of attitudes toward organizational change. Therefore, a certain type of organizational culture could facilitate the acceptance of change, while other types of culture would not; and since the change involves the personnel, managing them is fundamental to effecting a change, since

the change involves a variation of the normal situation (Zabid, et al., 2004). In this regard, Hughes (2011) points out that the context of change is always important and studies show that change often releases negative emotions and resistance, so the frequency of changes can be a problem (Smollan et al., 2010).

The leaders and employees of a company develop and change the company through its business philosophy, which is achieved by making an organizational change. In a company with principles and values that constitute its organizational culture, this culture must be accepted and practiced by its management, since they have a fundamental role in the process of organizational change.

Business philosophy influences having an innovative climate (Palm et al., 2016). In this regard, Tomislav (2021) analyzes the complexity of the relationship between the key determinants of a company's success, such as an ambidextrous organizational culture, innovation in the business model, and the evolution of digital businesses. He indicates that a foundation of change and innovation is the organizational culture that motivates the workforce to develop and adopt innovations. He examines the impact of ambidextrous organizational culture values on those relationships; formulating a conceptual model of the impact of exploration and exploitation on digital evolution, business model innovation, and business results. The components are required and the role of the search as a value of the business philosophy is detailed. In addition, the concept of ambidextrous organizational culture points out the cultural values associated with certain concepts. Therefore, organizational culture stimulates a diversity of organizational behaviors (Schein, 2010) and since innovation is a form of behavior, organizational culture becomes a factor that stimulates the performance of innovative actions for an organization.

On the other hand, business philosophy is a type of activity that occurs naturally in a company, and empirical evidence indicates that organizational culture has a significant influence on behaviors directed at the customer, financial performance, and the market (Homburg & Pflesser, 2000), and induces individual behaviors and collective or cooperative acts (Pettigrew, 1979). If the business philosophy is influenced by the decisions of managers, it is a way to achieve the expected organizational results. Therefore, an employee with a strong sense of regulatory responsibility continues in the company because he thinks he should.

A business philosophy centered on learning is made up of a series of values and measures that strengthen staff attitudes when they are part of learning practices. The members of a company combine the ways of learning through learning practices and organizational values, thus the company increases its capacity to respond to present and future changes. (Godé & Barbaroux, 2012).

Thus, in summary, it can be said that values are fundamental in business philosophy, although many times the values held by companies are not humanistic, which causes various companies to focus on results, instead of the ethical part. On the other hand, it is very common for companies to state that they have a certain class of values, even though they do not practice them. For this reason, companies must take good care of what their values are. Likewise, although the values of a company are indeed an essential part of it, it must be remembered that values are only one of the requirements that business firms must possess to carry out a process of change in the organization, because some solitary values are insufficient to improve the performance of an organization since other issues are required to make them more efficient and competitive, such as having a business philosophy that is open to change and principles and values that promote innovation, efficiency and a spirit of continuous improvement.

METHODOLOGICAL DESIGN

For this investigation, three stages were carried out: 1.- To begin with, a theoretical study was carried out, and as part of it, a search was carried out regarding the theoretical framework of the subject under study. 2.- Next, an empirical study was carried out; for which information emanating from this study was gathered, for this purpose a structured questionnaire was designed, with a series of closed questions, which included the response options, said questionnaire being the research instrument used. 3.- A bibliometric study on the relationship between cultural change and organizational culture. Bibliometric helps to collect statistical data from published works, guiding the researcher to reflect on the state of the art from an analytical, qualitative, and quantitative perspective, to develop transcendental research.

Unit of analysis:

As part of this project, companies with the following characteristics were studied: 1.- Being MSMEs. (1 to 250 employees). 2.- Trade sector, and 3.- Located in the ZMG (Guadalajara, Tlaquepaque, Tonalá, and Zapopan).

Sample:

In this investigation, a non-probabilistic sampling was used, and the questionnaire was applied to 78 employees who work in one of those 78 commercial MSMEs, and they should have participated in the process of organizational culture change. Additionally, it should be noted that, according to the SIEM, in Mexico, 69% of the organizations are trade companies, 7% are from the industrial sector, 21% are made up of service companies and only 1% are agricultural or mining organizations.

Operationalization of Variables:

For this research, the variables were operationalized through Likert Scale questions. The Likert Scale uses statements that reflect an attitude, for or against, concerning each question. For this work, the people interviewed were asked to indicate their degree of agreement or disagreement, with each statement, to determine how favorable or unfavorable their opinion is about the topics analyzed.

Problem statement:

This research work aims to determine what are the effects and factors of the Business Philosophy, which influence a process of Organizational Culture Change in commercial companies, of the ZMG, and whether they favor it or hinder it.

Therefore, for this project, the research questions that were formulated were:

What are the factors related to the Business Philosophy that motivated a change of organizational Culture in commercial companies of the ZMG? And What are the effects of the Business Philosophy of organizations in the commercial sector of the ZMG in a process of organizational culture change?

Research Objectives

The objective of this research work is to determine which factors of Business Philosophy influenced a process of Organizational Culture Change in companies in the commercial sector of the ZMG. Another objective was to determine what effects the Business Philosophy has in a process of Organizational Culture Change in companies in the commercial sector of the ZMG.

Hypothesis:

The hypotheses proposed for this research project are:
H1: The Business Philosophy favored the consummation of a process of organizational culture change in commercial companies of the ZMG
H2: The high turnover of personnel is a factor that hinders the implementation of a Change of business philosophy in commercial firms of the ZMG.
H3: The measurement of the results of the change of organizational culture, strengthens the essence and the business philosophy in commercial organizations of the ZMG.

Collection and processing of information

For this work, a structured questionnaire was used as a research instrument, which was formulated based on the information obtained, with which, it was tried to know the factors of Business Philosophy, which influenced a process of organizational culture change in companies of the trade sector of the ZMG. Therefore, a questionnaire was formulated to detect these factors. After obtaining the information, analysis, and classification of the results were carried out.

To establish the reliability and consistency of the research instrument used, Cronbach's Alpha was obtained; and the KMO Sampling Adequacy Measure and the Bartlett Test were taken to verify that the variables were correlated and that it was feasible to carry out a factorial analysis.

As part of the empirical study of this research that aims to establish how Business Philosophy influences a change in organizational culture, the degree of significance of the ANOVA (analysis of variance) was obtained, coming from relating the variables belonging to the Business Philosophy, with the effect they have on a process of organizational culture change, as well as some factors that favor or hinder the realization of a process of organizational culture change.

RESULTS OF THE INVESTIGATION AND DISCUSSION

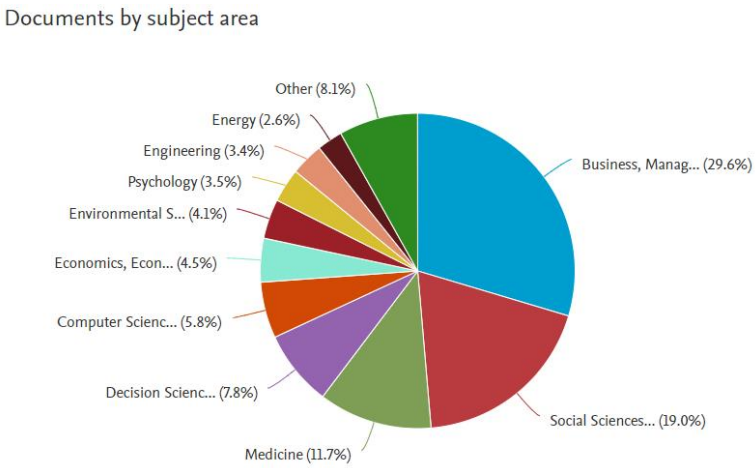
In this research project, business philosophy was analyzed as a current study that examines the process of organizational change.

The Scopus database on March 16, 2022, has a total of 672 scientific documents (599 articles, 43 reviews, 26 conference papers, 2 book chapters, and 2 books) that have the concepts of the topics examined, either in the title, the abstract or as a key term. The Scopus academic repository allows downloading of the bibliographic records of the patterns studied in different formats, which makes it possible to carry out an analysis on various platforms. To analyze the information obtained for this research, the VOSviewer software was used, which allows viewing the co-occurrence networks of the information obtained from the records of the bibliographic sources. (van Eck & Waltman, 2010).

Likewise, the Research Categories considered in the Scopus database were also inspected, where the different publications found were registered. Figure 1 shows the information obtained from the Scopus academic repository, with the Business, Management, and Accounting area being the one with the most articles, followed by Social Sciences, then Medicine, after Decision Sciences, right away its Computer Science, and later Economics, Econometrics and Finance, as the most important.

Figure 1

Publications by disciplinary area of the Scopus database.



On the other hand, continuing with the results achieved; it should be noted that to carry out this study, the 672 documents found in the VOSviewer software were processed, the said program generated the maps based on such bibliographic data found, and then the criteria for creating said maps were determined.

Regarding the study of the relationship between organizational change and the organizational values that make up the business philosophy, figure 2 shows the countries that have excelled in the works that address organizational culture and values: the United Kingdom, the United States, Australia, and the Netherlands are the countries that stand out the most.

Figure 2

Density map by countries

Regarding the applied research instrument, some questions that analyze the organizational change from the perspective of business philosophy were considered. This research was carried out through personal surveys, and they were applied to the personnel of the companies that were part of their organizational change process. They were provided with the questionnaire prepared for this study, which was used to analyze the hypotheses. Therefore, for this project, certain questions concerning the current study of business philosophy were taken into account. In addition, Cronbach's Alpha, Bartlett's Test, and KMO were obtained:

Table 1

Cronbach's alpha of the business philosophy variables

Cronbach's Alpha	Number of Elements
.810	16

By the statistical reliability result derived from this study, Cronbach's Alpha is highly consistent, since it is close to the number 1, while the questionnaire variables were consistently administered, which means that the trends and General correlations can be explained in depth through multivariate analysis, for this, the level of adjustment between groups must be understood using a KMO factor analysis and Bartlett's test.

Table 2

KMO and Bartlett Test- Organizational Change and Organizational Culture

Kaiser-Meyer-Olkin measure of sample adequacy		.706
Bartlett’s Sphericity Test	Approximate Chi-Square	329.051
	gl	120
	Sig.	.000

Yes. Sig. (p-value) <0.005 is accepted H0 (null hypothesis) > being able to use factor analysis.

Yes. Sig. (p-value) > 0.005 is rejected H0 > unable to use factor analysis.

The results reveal that the significance level obtained was zero, which is why it is representative, since the closer it is to zero, the more satisfactory the test is.

Table 3

Communalities

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Teamwork Intensity	0.840					
Team Learning Intensity		0.789				
Positive attitude of Management		0.756				
Feedback		0.732				
Frequency of Team Learning		0.712				
Frequency of Creating planned and controlled crises and conflicts			0.698			
Frequency of Teamwork			0.683			
The organization encourages employees to respect the values in practice			0.676			
Intensity of Creating planned and controlled crises and conflicts			0.671			
The organization has values that strengthen its identity			0.656			
Staff reaction to the change was favorable			0.612			
This organization shows a sincere commitment to needs and development when planning and implementing organizational changes				0.587		
When problems arise, they are discussed to seek to solve them				0.560		
Employee performance was recognized and rewarded				0.544		
Actions are carried out to develop in the staff an attitude of openness to change				0.539		
Competitively, the company is performing better than before the change				0.533		

The variable that turned out to be more significant is the Intensity of Teamwork, followed by the Intensity of Team Learning, which reveals that work teams contribute significantly to an organizational change procedure so that it is carried out through the perspective of business philosophy. The Positive Attitude of Management and its Feedback, on the other hand, are also important variables to business philosophy since employees and Management must have the same orientation in a process of change.

The people surveyed were asked if they thought that the company for which they work has an organizational culture aimed at developing a business philosophy that seeks to adapt to the evolving world in which we find ourselves; to establish if this was fundamental for the company to carry out the organizational change; this taking into account that thanks to the changes that have taken place in the world, and business, they have caused the development of new ways for a company to work, as a result of the increasing importance it has for corporations that have an innovative business philosophy and openness to change, as this encourages management to make better decisions.

In turn, the people surveyed were also asked if the business philosophy was a factor that influenced the determination to carry out a process of organizational change, and in what way it contributed to making said change. Because, according to the vision of the current study of business philosophy, organizations must have a series of principles and organizational values that allow a better execution of a process of organizational change.

As part of the instrument used in this project, a series of hypotheses and research questions were taken into account that analyzes organizational change from the perspective of the business philosophy study current, and they are:

H1: The Business Philosophy favored the consummation of a process of organizational culture change in commercial companies of the ZMG.

Table 4

Changing an Organizational Culture can be a Slow Process

ANOVA						
		Sum of squares	**gl**	**Mean quadratic**	**F**	**Sig.**
Importance of Strategic Planning in an Organization	Between groups	56.389	3	18.796	5.249	.003
	Within groups	200.544	56	3.581		
	Total	256.933	59			
Full-time specialist administrators were assigned to implement major changes	Between groups	14.957	3	4.986	5.763	.002
	Within groups	48.443	56	.865		
	Total	63.400	59			
Little mobility in management	Between groups	11.758	3	3.919	5.917	.001
	Within groups	37.092	56	.662		
	Total	48.850	59			
The company was managed based on quantifiable figures	Between groups	16.430	3	5.477	6.231	.001
	Within groups	49.220	56	.879		
	Total	65.650	59			
Adaptation	Between groups	7.427	3	2.476	4.796	.005
	Within groups	28.906	56	.516		
	Total	36.333	59			

According to the results obtained, it was found that there is a relationship between changing an organizational culture with The company being managed based on quantifiable figures, Little mobility in management, Full-time specialist administrators assigned to implement major changes, the Importance that has Strategic Planning in an organization, and the Adaptation. This reveals that these factors influence the implementation of a change in organizational culture. Therefore, H1: The Business Philosophy favored the consummation of a process of organizational culture change in commercial companies of the ZMG, is accepted. (See Table 4).

The study of business philosophy indicates that strategic planning has an extremely important role in directing change in organizational culture. (Wiedman & Martinez, 2017). Therefore, certain business characteristics such as the attitude of managers to change, business orientation to the market and learning, size, technical knowledge resources, administrative intensity, specialization, organizational culture, and business strategy, are factors that promote the adoption of the innovation in organizations (Hult et al., 2004).

For his part, Pool (2000), says that business philosophy allows a company to face the ever-changing problems of adaptation to the external context and the internal composition of resources, employees, and company policies to facilitate external adaptation. For this reason,

it is expected that some types of business philosophies favor the process of cultural change, although other types of philosophies or organizational cultures do not. One problem companies have is determining what type of business philosophy or organizational culture will foster organizational change. Keskin & Balak (2020), state the importance of organizations quickly adapting to the environment to face such challenges. Since the future will belong to organizations that adjust their skills to a constantly changing market and increased competition. (Bratianu et al., 2006).

Management support is the degree to which employees believe managers are committed to, and drive the change. Therefore, organizational management requires an orientation that helps to manage resources such as the available information, the personnel, the knowledge base, as well as creativity. A managerial implication is that any change that is made must take into account the type of business philosophy. Therefore, management may need to first understand the type of business philosophy held in the organization and then adopt one or more approaches to make organizational changes (Zabid, et al., 2004). Therefore, one of the great challenges for companies seeking to develop a sustainable environment is the use of trust and interaction within the company. This problem can be solved through the organization's knowledge base, and the self-regulation skills and mechanisms provided by its business philosophy (Vveinhardt & Minkute-Henrickson, 2005). The importance of change for any company is essential for its growth, and it is the responsibility of the company leaders to explain why it is needed and how the change of organizational culture will be carried out. Company managers must always be available and seek ways to communicate the business philosophy to achieve successful organizational change, hence the importance of not changing managers. (Saunders, 2018).

On the other hand, the ability to make good decisions and quickly adapt to changing situations is one of the great competitive advantages for companies in the 21st century. Organizations must have principles and organizational values rooted in their business philosophy that serve to improve their decision-making and obtain better results. (Matheson and Matheson, 2001). It is also essential that companies know how to adapt to situations, and can influence and shape their environment, restructure, and achieve sustainability. (Schwaninger, 2019).

The answers of the interviewees indicate that the business philosophy is a fundamental factor that must be considered when you want to make an organizational change, for this it is necessary that the organizations have a business philosophy with organizational principles and values that promote the proper functioning of the company and that there is an opening to carry out a process of cultural change in the company itself.

H2: The high turnover of personnel is a factor that hinders the implementation of a Change of business philosophy in commercial firms of the ZMG.

Table 5

High staff turnover before the change

ANOVA

		Sum of squares	gl	Mean quadratic	F	Sig.
Conflicts	Between groups	10.441	3	3.480	5.941	.001
	Within groups	32.809	56	.586		
	Total	43.250	59			
Resistance to change was the main obstacle that had to be resolved to achieve change	Between groups	17.398	3	5.799	6.135	.001
	Within groups	52.935	56	.945		
	Total	70.333	59			
Fear of the unknown remains the biggest cause of resistance to change.	Between groups	15.896	3	5.299	6.887	.000
	Within groups	43.087	56	.769		
	Total	58.983	59			
Ignorance, in which the staff did not know what to do and how to do it	Between groups	10.646	3	3.549	5.469	.002
	Within groups	36.337	56	.649		
	Total	46.983	59			
Lack of involvement and commitment of management	Between groups	11.501	3	3.834	9.294	.000
	Within groups	23.099	56	.412		
	Total	34.600	59			
Uncertainty	Between groups	10.646	3	3.549	6.006	.001
	Within groups	33.087	56	.591		
	Total	43.733	59			

According to the results achieved, a relationship was discovered between the High Personnel Turnover before the Change: Conflicts, Resistance to change was the main obstacle that had to be resolved to achieve the change, and Fear of the unknown continues to be the greatest cause of resistance to change, Ignorance, in which the staff did not know what to do and how to do it, Lack of involvement and commitment of management, Uncertainty. This indicates that these factors hinder the implementation of a change in organizational

culture. Therefore, H2: High staff turnover is a factor that hinders the implementation of a Change of business philosophy in commercial firms of the ZMG, is accepted. (See Table 5). According to Hult et al., (2004), the attitude of managers to change makes the company adopt innovation as a priority, so the lack of involvement of managers would be a serious problem in a process of organizational change.

For Firth (2000), the unpredictability of the environment and uncertainty are part of organizational change, which requires such companies to assimilate how they can learn. To safeguard their credibility, managers must be involved and take risks, and take advantage of opportunities for change. (Hirschhorn, 1983). On the other hand, Kim et al., (2013), express that the appreciation of an environment of uncertainty by the staff arises from the change in organizational culture.

Resistance to change refers to unfavorable human forces that impact the organizational change process (Dunican & Keaster, 2015). While et al., (2015), say that the observation of the practice of emerging values, reveals how change agents use organizational values strategically to be able to change a company that is very resistant to change. For his part, McMurry (1997) indicates that people do not resist the change itself, but rather the uncertainty that changes cause, because uncertainty causes fear of the unknown, so fear must be reduced, to reduce uncertainty and thus decrease resistance to change.

Management involvement is the degree to which workers believe that the company's management is committed to the change and support it. In turn, business management requires an alignment that allows managing resources such as the information that is available and the knowledge base, since ignorance and the lack of involvement of management hinder the process of organizational change.

The results indicate the importance of maintaining the base of the personnel that makes up a company, since when there is a high turnover of personnel, this negatively influences the performance of a company, being an obstacle in the implementation of a change of organizational culture.

H3: The measurement of the results of the change of organizational culture, strengthens the essence and the business philosophy in commercial organizations of the ZMG.

Table 6

A Measurement of the Results of the Organizational Culture Change is made.

ANOVA						
		Sum of squares	**gl**	**Mean quadratic**	**F**	**Sig.**
The organization has values that strengthen its identity	Between groups	7.462	2	3.731	8.175	.001
	Within groups	26.925	59	.456		
	Total	34.387	61			
Shared vision	Between groups	7.698	2	3.849	6.436	.003
	Within groups	35.285	59	.598		
	Total	42.984	61			
Accept calculated risks	Between groups	7.324	2	3.662	6.675	.002
	Within groups	32.369	59	.549		
	Total	39.694	61			
Information and analysis of the change process are documented	Between groups	10.910	2	5.455	12.529	.000
	Within groups	25.687	59	.435		
	Total	36.597	61			
The organization is more aware of its knowledge base	Between groups	4.277	2	2.138	9.281	.000
	Within groups	13.594	59	.230		
	Total	17.871	61			

According to the results emanating from this investigation, it was discovered that there is a relationship between A Measurement of the Results of the Organizational Culture Change made, with The information and analysis of the change process being documented, the organization is more aware of its knowledge base. The organization has values that strengthen its identity, Accepting calculated risks and Shared Vision. This demonstrates that the Measurement of the Results of the Organizational Culture Change helps the consummation of an organizational change. Therefore, the management of the organization must be fully involved in the process of organizational culture change, and promote a work environment that supports the process of change in organizations. Therefore, the H3: The measurement of the results of the change of organizational culture, strengthens the essence and the business philosophy in commercial organizations of the ZMG., is accepted. (See Table 6).

It is transcendental that companies have organizational values such as support, cohesion, trust, cooperation, and belonging since they help teamwork, and thus open communication is obtained, having participation and commitment on the part of the workers, (Cameron & Quinn, 2011); which benefits the execution of a change of organizational culture.

Hartnell et al., (2011) allude that companies must have behaviors associated with risk-taking and creativity. Being the market culture a competitive philosophy, in which communication, competition, and performance, become dominant values, for which behaviors associated with the determination of objectives, planning, focus on tasks, and competitiveness, are expected. Therefore, risk management focuses on managing risks and causes adequate adaptation mechanisms to them, calculating how to deal with said risks (Argyris, 2010).

The business philosophy influences consumer-oriented behaviors, financial and market performance (Homburg & Pflesser, 2000), and an innovative climate (Palm et al., 2016), making a greater contribution to the management of the knowledge base and organizational effectiveness than the strategies or organizational structures (Zeng et al., 2010). Markets are changing rapidly these days. Technological changes, such as electronic business and computerization, have caused a great leap in the communication of data, information, and knowledge bases, as well as in work processes and the way of negotiating. The knowledge base flows quickly in companies that have a more permeable business philosophy, and the flow of information that constitutes their knowledge base is improved by managing competitiveness and improvement standards.

On the other hand, Schafer (2009) affirms that an organization must have certain qualities. They must have a clear strategic vision, a business philosophy that respects the way of thinking of each individual, and incentive programs that strengthen the vision and culture of the company.

Market demands are increasing, which, in turn, implies that companies have to be increasingly efficient in their processes and be more competitive, this requires that these companies are willing to accept the changes that occur in the organization and the business world.

CONCLUSIONS:

This work analyzed the relationship between cultural change and business philosophy, carrying out a theoretical, empirical, and bibliometric study. Thus, as part of the bibliometric analysis, the data was obtained from the Scopus database, analyzing the period between 1990 and 2022. The bibliometric study helped to learn more about research trends regarding this topic, as well as how it is analyzed from different points of view.

On the other hand, it should be noted that the continuous changes that occur in the business world demand changes in companies, innovative organizational procedures, the use of new technologies, promotion of new goods and services that better satisfy the desires and needs of buyers. Therefore, it is required that companies have a business philosophy that is shared by its members, and these members, in turn, must have a constant learning ability. Successful companies cannot remain immobile, since if they did so, their competitors would surpass them. For this reason, the most outstanding organizations do not wait to react to the changes that occur in the markets but rather anticipate them and try to generate them to safeguard their leadership and force the competition, so that they are the ones who must react and adjust to such changes. That is why, although implementing a change in organizational culture can be onerous, the reality is that when there is a business philosophy shared by the members of the company, this helps the change to develop properly, bringing as a consequence that the benefits are greater than their costs, because the workers have a common goal, and the processes become more efficient, and favor in most cases to reduce costs, and that the investment made in this system is rewarded with the savings derived from said cost reduction, and making the organization more competitive.

On the other hand, the results of this investigation allow us to conclude that the hypotheses raised were accepted:

H1: The Business Philosophy favored the consummation of a process of organizational culture change in commercial companies of the ZMG

H2: The high turnover of personnel is a factor that hinders the implementation of a Change of business philosophy in commercial firms of the ZMG.

H3: The measurement of the results of the change of organizational culture, strengthens the essence and the business philosophy in commercial organizations of the ZMG.

In this work that studies the relationship between business philosophy with a process of cultural change in organizations, it was discovered that business philosophy requires a series of principles and organizational values that develop that business philosophy, which should promote an attitude of openness to change among the organization's employees and contributes to achieving greater effectiveness, where managers get involved in the process of cultural change, which in turn helps improve the decision-making process. Additionally, it should be noted that an uncertain environment requires companies to adapt to such changes since this will allow for a change in organizational culture.

Additionally, it was discovered factors that favor the change of organizational culture from the perspective of Business Philosophy: Adaptation, Little mobility in management, Full-time specialist administrators assigned to implement major changes, the company was managed based on figures quantifiable and Strategic Planning in an organization, which were transcendental factors to achieve change. Thus, the current study of Business Philosophy indicates that an organization changes when the principles and values held by a company change and its employees assimilate them.

Business Philosophy is a factor that greatly helps in a process of cultural change. This is because their organizational culture must motivate companies to have a series of principles and values that make up a business philosophy that promotes the development of their employees and the company itself, with a spirit of openness to change. Companies work better when they have an entrepreneurial Business Philosophy, which seeks continuous development and improves the performance of the company. Likewise, the Business Philosophy is a very useful tool, through which companies can improve their processes, give optimal service, and have a better presence in the markets.

There is no way to anticipate what will happen in the future, but we can be prepared for what the future brings. Proper preparation by the companies will help them to face these challenges that the future entails. All types of businesses must prepare to adapt to these changes. Carrying out a change in organizational culture is a survival mechanism that companies use to remain present in the markets. For future research, it is proposed to carry

out case studies in companies that are going through a process of organizational culture change at that time. It is also suggested to carry out investigations similar to this one, in companies of other lines such as the service sector, or the industrial sector, it would also be good to do this type of investigation in companies at a national level.

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Chapter 7

Generational influence on organizational culture and organizational citizenship behaviors

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Generational influence on organizational culture and organizational citizenship behaviors

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INTRODUCTION

A generation is defined as an identifiable group that shares a year of birth, age, location, and important events lived (Kupperschmidt, 2000). Some researches support that the values of a generation tend to be influenced by historical life and social experiences, key components shared among the time of birth and upbringing (Gursoy et al, 2013:41).

To Twenge et al., (2010) each generation is determined according to its work values, which are the result that employees seek and develop in the workplace (p. 1221). Work values shape the perception of the workers regarding their job preferences, applying a direct influence over the attitude and behavior of the worker. Roe & Ester (1999), declare that values are perceived as a motivational source of individual proactivity. These values tend to define guidelines and shared goals, their cause, and direct the collective proactivity (Quixe, 2018).

On the other hand, organizational culture is composed of a set of assumptions that are identified and developed by a group to face conflicts that involve internal and external adaptation within an organization, likewise, it is established as a proper attitude because it allows, discovers, and generates knowledge in the workplace (Schein, 2010).

Additionally, it is believed that it is capable of increasing or improving the intellectual capital of a company or industry, as well as it can guide towards corporate success as organizational performance is potentially influenced by intellectual capital and vice versa. It is favorable for companies to have both, good performance and great intellectual capital. It is a natural behavior that people assume when finding similar objectives and reasons, ethics being a great determinant for said culture, since this is the one that deals with values.

To understand and know the evolution of different generations in the workplace, the following study it is aimed to analyze the level of organizational culture fromfrom different organizational culture traits between the organizational citizenship behavior in the different generations that are part of organizations, additionally within the development of this analysis is to identify which generation is the one that, in the future, will have a greater impact on the formation of the generation.

Based on the previous idea, an important matter is to comprehend that each generation has its own behavior. To recognize what they are looking for within an organization, so these organizations must manage the influence in future generations.

THEORETICAL FRAMEWORK

The economic context of transnational corporations in Mexico

It has become one of the world's major industrial oases, one of the most advanced laboratories for free trade and deregulation. Arguing the need to attract investment at all costs to generate "development" and jobs within trade agreements such as the North American Free Trade Agreement (NAFTA) or the European Union-Mexico Agreement (FTA EU-MX) deepens this. and complicated the process of transfer of power. This is why a system has been put in place where the laws allow transnational companies (TNCs) to self-regulate on environmental, social, and labor issues.

The study of multinational corporations deals with the historical conditions of the process of capitalist accumulation. As the main agents of the internationalization of capital, they are determined quantitatively and qualitatively in terms of the organizational structure and dynamics of foreign investment flows. The definition of a multinational enterprise

derives essentially from two theoretical approaches: neoclassicism, which holds that markets regulate the free flow of factors of production through free competition, enabling general economic growth; and orthodox critics who question the realization of traditional theoretical assumptions and evaluate the location effects of transnational capital in the host country (Dicken,1992).

Organizational Culture

Culture is, from an anthropological/functionalist perspective, "the instrument required for the satisfaction of needs/values, the organization is understood as a basic principle for the achievement of objectives" (Garmendia,1988:8). However, for Rodriguez (2008), the concept of enterprise is defined as: "A noun derived from the verb to undertake, synonymous with to undertake, to begin some action of importance for the agent subject, an action that is significant for the person" (2008:111).

The organizational culture tends to explain the social behavior of the organizations, so that it projects the values, practices, attitudes, and feelings of the collaborators (Orellana, 2003). In addition, it is based on various beliefs and responsibilities that are visible in structures and practices. Kaarst et al., (2004), point out that the culture in turn has strategic resources, highlighting the code of ethics, in the company studied, this is carried out since its code of conduct is distinguished by the loyalty of its employees, managers and administrative staff, have a policy of business conduct, which is aimed at avoiding bribery and mitigating corruption risks.

Bratianu et al., (2011), it is established that culture interacts in an integral way within institutions, this because it makes the individual have the ability to develop his intelligence in conjunction with the values that seek excellence, to form a culture that is solid that motivates and excels in the ability to transcend.

The culture acquires operations at all levels and processes, so that in this way it can help to understand organizational life and explain performance. From the development of this research, the authors indicate that the values that are most developed within the companies dedicated to the packaging of (Alvarado & Monroy, 2013). In this way this authors analyzed of those surveyed consider that the directives encourage some form of

participation, a more frequent opinion among non-shareholders, which may be due to the greater expectation of shareholder participation.

The model of organizational culture is proposed by Fey & Denison (2003), highlighting as main features:

- Adaptability Trait: It refers to the description of the requirements that arise in the organizational environment, and to be able to form an action plan.
- Mission Trait: It indicates the understanding in terms of the direction and organization of certain actions, within the company.
- Participation Trait: It involves the structuring, in terms of staff capabilities, focused on the aspect of responsibility.
- Consistence Trait: It defines the main values that allow you to form a solid culture.

Organizational culture is considered as a set of values, beliefs, thoughts, and norms that, if shared by the members of a group, provides guidelines for behaving (Mobley et al., 2005). It is developed as: "Set of values and norms shared by the members of the organization, which controls the interactions between these same members, it is shaped by the internal people, by the organization's ethics and labor rights" (Gareth, 2013:9).

Robbins & Judge (2009), develop this concept as "System of meaning shared by members, which distinguishes an organization from others" (2009:551). Organizational culture is an element that is capable of improving and increasing the intellectual capital of a company or industry, which allows reaching corporate success (Asiaei & Jusoh, 2014). Therefore et al., (2011), indicate that one of the fundamental objectives of this concept is to empower their labor community, facilitating commitment, participation and loyalty. Carreón et al., (2017). They establish that organizational culture has a strong link with the collaborative climate, and activities involving the influence of contexts thus perceiving their meaningful jobs.

Generational diversity

Nowadays the concept of "generation" is established from a classification of the typical characteristics of each of them. While Kupperschmidt (2000), defines it as an "identifiable

group that shares birth years and major life events that occurred at critical stages of their lives" in the study by Shragay & Tziner (2013:143).

The generations throughout history are described below, and are the focus of this study are:

Generation X: The ages of generation X range to 35-45, Prensky (2001), points out that this generation lived throughout various events that in turn affected them psychologically and emotionally. They tend to be self-sufficient and practical, in addition to questioning everything that could affect their lives (Fishman, 2015). Likewise, Birkman (2016), points out that generation X:

- Choose to develop independently
- Are dedicated to their work and the people they work with.
- Are skeptical, risk takers and want fun at work.

Millennials: Generation "Y" is made up of this type of people who want everything at once. They are not willing to put up with uninteresting and routine work, they don't want to procrastinate, they are idealistic, impatient and well prepared academically. Many of them have had the opportunity to travel the world at a young age, to study at the best universities and to work in multinational and foreign companies (RT, 2015).

However, it is intended that this generation, bring as a result, "expect employers to accommodate their "consumer" expectations in this regard. They do not necessarily see that they should take more out, but that the employer should give more to their employees." (Dogan et., al 2010:41).

This population group stands out thanks to the constant search for jobs, which generate a challenge for them and thus can offer an opportunity to grow, involving their skills, with a greater degree of responsibility and participation in terms of decision making.

Generation Z: Born during 1995- 2015 according to Prensky, it is defined as “A new generation made up of young people that were born in a socio-digital environment. They have established “networks” as a social and personal space for their activity, their way of acting and interacting with the world and other people in the study by Garcia y Rosado (2012:16).

For his part, Tapscott (1999) refers to this population with the term net generation, with which he calls "the first generation that grows up surrounded by digital technology, and

for whose members this does not seem to constitute any threat but a completely natural environment to their daily experience" (Cited by Cabra & Marciales, 2009:324). Likewise, for these authors the most significant changes of these new generations are defined as:

- Oppositions of a cognitive nature that are expressed at the time of being able to communicate and learn knowledge.
- Competitiveness in the digital aspect
- Knowledge based on experience
- The sense of interactivity and collaboration

For Garcia & Rosado (2012), digital natives their main characteristic is undoubtedly their "technophile" They feel attraction for everything related to new technologies. With ICTs they satisfy their needs for entertainment, fun, communication, information and, perhaps, also training" (p.2).

Generation Alpha: Born during 2010, it is a relatively new generation that is characterized by the use of technology in an enhanced way (Tootell & Freeman 2014).

Organizational Citizenship Behavior

The organizational citizenship behavior (OCB) is defined by Organ (1988), as the conduct of demonstrations that are marked as being individual and discretionary. These are not recognized by a formal system of rewards. The OCB also by Smith et al., (1983), promotes the right organizational function, and are also referred to as the actions that are not formally described by any regulations, therefore they are directly compensated by the collaborator’s operational development. The dimensions are described below.

- Helping Behavior defines it as a voluntary collaboration action whose main purpose is to meet the work related problems.
- Sportsmanship Behavior: is the way to express the will to deal with inevitable problems presented at work.
- Loyalty Behavior: are the actions that employees make to sustain, care and reinforce the organization.
- According to Podsakoff et al., (2000), Compliance behavior is the fulfillment of obligations that employees must do for the business at all moments.

- Initiative behavior are the volunteer actions in which the employee caters ideas, imagination and creativity towards the business, these also promote the business' good image (George & Jones, 1997, in Organ, Podsakoff y Mackenzie, 2006).
- Civic Virtue behavior: It's determined as the acknowledgment that the employee receives when becoming a part of the business, this promotes the employee's commitment to further accept the obligations and duties of the business.
- Self-development behavior: Is a conscious organizational behavior in which the employee seeks to always increase their capabilities, skills and qualifications that also contribute to the business 'benefits.

In this way the author Omar (2012) manages that the result of organizational citizenship behaviors, are projected in results where employees with higher levels of productivity, as well as sense of responsibility, thus giving way to the power to achieve their objectives. The benefits of CCO for employees, are reflected in a more cooperative work environment, characterized by high levels of social exchanges.

On the other hand, organizational citizenship behavior (OCB) is "that individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system and that promotes the effective functioning of the organization" (Organ, 1988, cited by Rodriguez et al., 2014:963).

RESEARCH METHOD

This study is non-experimental, due to the fact that the variables are not manipulated. It has a descriptive and correlational methodology with the goal to identify the degree of incidence with the organizational citizenship behavior as the dependent variable across time. This is a longitudinal study because all data was recollected from 2015 to 2022.

The design used in this application instrument was made by Terán Cázares et al., (2018), in cooperation with other authors. This application instrument has a total of 73 items that corresponds to the 39 independent variable (OCB), and the 39 items corresponds to dependent variable organizational culture which has a Likert scale numbered from 1-5 to indicate the range of agreement (Strongly agree- Strongly disagree). This instrument was applied to a 1219 of suppliers that make up the value chain for a steel industry business. This

business is located in Monterrey The employees are trained in a number of subjects related to human capital innovation strategies and have the faculty to replace and exploit materials from the steel industry business that can be transformed into so they can later be sold. Table 1 shows the correspondence of age and generation to which they belong.

Table 1

Age distribution

No.	Generation	Age
3	Generation X	40 a 50
2	Millennials o Y	30 a 40
1	Generation Z	Less of 30

RESULTS AND DISCUSSION

In order to respond to the main objective of the study, which consists of identifying and analyzing to what extent the features of organizational culture are diverse in the different generations that are part of the organizations, for this it is that it mainly presents those of each of the items of the variables, so that from the function sum product of Excel because of this was that an average was made for each variable, to later work with the linear regression equation, to be able to predict future behaviors, where values such as:

- Durbin Watson: it is used to perform autocorrelation tests on a set of established data, in other words, it performs an analysis on the closest and furthest data, to predict other established values.
- Anova, which is the statistical formula that compares the variances between the average or means of different groups to determine the difference.
- R, value which is shown without units between -1 to 1 where if the approximation is towards zero, the weaker will be its linear relationship.
- R- Squared, it is the value that helps us test a hypothesis or predict future results.
- Correlation, it is a measure that identifies and expresses to what extent two variables, whether random or bivariate, are linearly related, and
- Beta, is the value that represents a set of probability distributions with support in an interval.

The table 2 presents Cronbach's Alpha coefficients for each variable.

Table 2

Cronbach's Alpha Coefficients

Variables	**Generations**	**# Items**	**Alfa de Cronbach**		
			3	**2**	**1**
Independent Variable Organizational culture	X1: Participation trait	9	.912	.890	.904
	X2: Consistence trait	7	.907	.909	.898
	X3: Adaptability trait	8	.879	.870	.872
	X4: Mission trait	8	.929	.922	.928
Independent Variable CCO	Helping Behavior	4	.857	.856	.840
	Sportsmanship Behavior	4	.865	.821	.814
	Loyalty Behavior	3	.616	.476	.533
	Compliance behavior	5	.794	.781	.775
	Initiative behavior	5	.899	.882	.885
	Civic Virtue behavior	3	.793	.788	.744
	Self-development behavior	5	.738	.703	.771

The following table identifies the Cronbach's Alpha Alphas for the variables under study, where an alpha value higher than 0.7 was found in all the generations, except for the loyalty variable, which shows indexes below 0.7, so it will not be considered for the purposes of this analysis. Next, each of the independent variables is presented, with the purpose of presenting the models that the statistic yields, in order to formulate the most adequate model, based on the dependent variables.

Table 3

Correlation between organizational culture traits and helping behavior

Helping Behavior				
Generations		**3**	**2**	**1**
Alpha		.857	.856	.904
R		.672	.588	.656
R. Square		.452	.340	.431
Durbin–Watson		1.527	2.079	1.861
Anova		.001	.001	.001
Constant		1.358	1.613	1.553
PARTICIPATION TRAIT	B	**.261**	**.283**	**.303**
	Sig.	**.001**	**.001**	**.001**
CONSISTENCE TRAIT	B	**.283**	.065	**.225**
	Sig.	**.001**	.365	**.001**
ADAPTABILITY TRAIT	B	.070	-.001	.054
	Sig.	.268	.986	.162
MISSION TRAIT	B	.112	**.292**	**.119**
	Sig.	.012	.062	.023

Table 3 shows the results corresponding to helping behavior, where the culture of participation trait has the highest incidence in 3 generations; however, the consistency variable has a significant association only 2 generations, which is favorable for the development of the study.

Table 4

Correlation between organizational culture traits and Sportsmanship behavior

Sportsmanship Behavior				
Generations		**3**	**2**	**1**
Alpha		.865	.821	.814
R		.416	.330	.327
R. Square		.173	.109	.107
Durbin–Watson		1.8	1.897	1.934
Anova		.001	.001	.001
Constant		5.007	4.777	4.575
PARTICIPATION TRAIT	B	-.156	-.201	-.101
	Sig.	.090	.015	.047
CONSISTENCE TRAIT	B	-.381	-.172	-.209
	Sig.	.001	.039	.001
ADAPTABILITY TRAIT	B	**.251**	.068	**.201**
	Sig.	**.001**	.365	**.001**
MISSION TRAIT	B	-.185	-.036	-.204
	Sig.	.293	.605	.001

In the table 5 the sportsmanship behavior indicates negative results and also their higher significances, only have the relationship between adaptability trait this at a level of 25- 20% that is considering a future line of investigation because sheds negative betas.

Table 5

Correlation between organizational culture traits and Loyalty behavior

Loyalty Behavior				
Generations		**3**	**2**	**1**
Alpha		.616	.476	.533
R		.535	.466	.488
R. Square		.286	.217	.238
Durbin–Watson		2.117	2.056	2.070
Anova		.001	.001	.001
Constant		1.774	1.989	1.799
PARTICIPATION TRAIT	B	**.228**	.104	**.173**
	Sig.	**.008**	.178	**.001**
CONSISTENCE TRAIT	B	.194	**.221**	.036
	Sig.	.027	**.005**	.463
ADAPTABILITY TRAIT	B	.104	.049	**.187**
	Sig.	.149	.485	**.001**
MISSION TRAIT	B	.054	.138	**.130**
	Sig.	.472	.032	**.004**

Table 6

Correlation between organizational culture traits and Initiative behavior

Initiative behavior				
Generations		**3**	**2**	**1**
Alpha		.899	.882	.885
R		.735	.672	.762
R. Square		.540	.451	.527
Durbin–Watson		2.056	1.895	1.968
Anova		.001	.001	.001
Constant		.737	0.195	.0849
PARTICIPATION TRAIT	B	**.358**	**.297**	**.361**
	Sig	**.001**	**.001**	**.001**
CONSISTENCE TRAIT	B	**.226**	.028	**.222**
	Sig.	**.001**	.667	**.001**
ADAPTABILITY TRAIT	B	**.225**	.142	**.182**
	Sig.	**.001**	.016	**.001**
MISSION TRAIT	B	-.017	**.272**	.008
	Sig.	.780	**.001**	.827

This variable has a higher association between the 3 generations of the study but, especially in the generation 1- where 3 of 4 traits, shows relationship in level 13- 18% with significance less 0.005

In this behavior analyze the presence of the Participation, Consistency and Adaptability trait is observed in generations 3 and 1 with a score above .30, while generation 4 shows presence in the Adaptability and Mission trait.

Table 7

Correlation between organizational culture traits and Compliance behavior

Compliance behavior				
Generations		**3**	**2**	**1**
Alpha		.794	.781	.775
R		.601	.552	.664
R. Square		.361	.304	.441
Durbin–Watson		1.942	2.044	1.941
Anova		.001	.001	.001
Constant		1.711	1.863	1.654
PARTICIPATION TRAIT	B	**.283**	**.272**	**.302**
	Sig	**.001**	**.001**	**.001**
CONSISTENCE TRAIT	B	.211	**.268**	**.384**
	Sig.	.011	**.001**	**.001**
ADAPTABILITY TRAIT	B	**.308**	-.167	-.085
	Sig.	**.001**	.312	.026
MISSION TRAIT	B	-.179	.113	.087
	Sig.	.012	.062	.023

This variable shows the presence of the Participation and Consistency trait in our two most recent generations (Millennials and Z), as well as participation is linked to generation 3, together with the Adaptability trait, while for generation 2 there is a link between the Consistency and Adaptability traits.

Table 8

Correlation between organizational culture traits and Civic Virtue behavior behavior

Civic Virtue behavior				
Generations		**3**	**2**	**1**
Alpha		.793	.778	.744
R		.681	.601	.691
R. Square		.463	.361	.477
Durbin–Watson		2.067	1.973	1.936
Anova		.001	.001	.001
Constant		0.669	1.100	0.806
PARTICIPATION TRAIT	B	**.392**	**.293**	**.313**
	Sig	**.001**	**.001**	**.001**
CONSISTENCE TRAIT	B	**.299**	.165	**.238**
	Sig.	**.001**	.020	**.001**
ADAPTABILITY TRAIT	B	.069	.032	**.140**
	Sig.	.269	.612	**.001**
MISSION TRAIT	B	-0.45	**.165**	.047
	Sig.	.486	**.005**	.206

In the case of the civic virtue variable, it is observed that it interferes with the three study variables, but nevertheless, within the participation trait, there is a 29-39% relationship in the three generations that are currently working.

Table 9

Correlation between organizational culture traits and Self-development behavior

Self-development behavior				
Generations		**3**	**2**	**1**
Alpha		.738	.703	.771
R		.738	.667	.740
R. Square		.545	.444	.547
Durbin–Watson		1.882	1.801	1.922
Anova		.001	.001	.001
Constant		1.034	1.202	0.877
PARTICIPATION TRAIT	B	**.317**	**.499**	**.366**
	Sig	**.001**	**.001**	**.001**
CONSISTENCE TRAIT	B	**.279**	-.108	**.133**
	Sig.	**.001**	.101	**.001**
ADAPTABILITY TRAIT	B	.088	.097	**.172**
	Sig.	.124	.105	**.001**
MISSION TRAIT	B	.114	**.221**	**.124**
	Sig.	.057	**.001**	**.001**

The self-development variable has the highest beta in this study for the generation and with 49.9%, where it is observed that it has incidence in the three main generations.

CONCLUSIONS

With the development of this study we answer the central question: What are the features of organizational culture that influence organizational citizenship behaviors in generations X Millenial and Z? With the results obtained from the application of the instrument and developing the statistical analysis, it is understood that participation has an influence on the development of prosocial actions behavior, due to the fact that it is related to decision making within the institution, where fundamentally the person seeks to share information that is disseminated to improve the staff, however teamwork allows staff to develop new skills and thus make their organization a recognized company thanks to its quality.

Another of the traits belongs to consistency which generates a connection with communication when setting guidelines and rules to direct the behavior of employees, forming solutions if unforeseen events arise. On the other hand, adaptability is clearly established in the communication in the work environment that allows for new and innovative ideas to be able to carry out the work efficiently within the staff, as well as the mission that indicates how to carry out a correct coordination from the opportunities, goals, and objectives already established.

However, when carrying out the study, the issues that arise are the following:

- The implementation of communicative processes guarantees the fulfillment of the goals and objectives proposed within the institution.
- Putting into practice the features of the organizational culture allow to understand how the staff of the educational institution interacts.

Likewise, the theoretically proposed is fulfilled because the participation within the institution is achieved thanks to the fact that the collaborator has the best information for the decision making of each one of the participants, as well as establishing trust in the control between departments and the coordination to do a better job.

Similarly, it was developed throughout the study that the institution takes into account the ideas and opinions of the staff for the continuous improvement of the CENDI, however,

communicating among colleagues is characterized by being flexible and open where the information received is correct and this makes the decisions that are made always benefit all staff so that the institution can grow

They are also influenced in large companies because business performance has been linked to organizational culture, satisfaction, and commitment. This is because carrying out the behaviors allows to reduce the tension of the collaborators, which are reflected in the few conflicts of roles and the work overload.

The findings of the research will allow us to know in the first instance, the similarity in terms of organizational culture from the different perceptions of the different suppliers and collaborators of the value chain, followed by the study on checking how the organizational culture that develops in the work area has a relationship with the behaviors of organizational citizenship.

This research contributes to generate empirical knowledge so that in this way it can be known, from the adaptation process, that employees improve their behaviors in their work environment, in order to become part of an efficient staff that at the same time contributes to the increase of productivity in there.

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Chapter 8

Brand Matters? Millennials and purchase decision of craft beer

Source: Jon Parry on Unsplash

Brand Matters? Millennials and purchase decision of craft beer

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INTRODUCTION

In Mexico, the beer industry arrived in 1918 with 36 regional breweries that merged in 1927 to become the largest company in the country: Grupo Modelo. At the end of the last century, the birth of craft beers with companies such as Cosaco & Casta gave rise to the arrival of this product in the country. By the beginning of the 21st century, the large craft breweries of the current era arrived, made up of several brands such as Mexicali, Tijuana, Minerva, and Tempus, which formed the first wave of craft breweries in Mexico (Sánchez et al., 2018).

Today, local beer brands will face new challenges to position their brands, maintain them as they have achieved so far, and make them grow further. Of the total expenditure for consumption of goods and services for brewing, 20.7 percent goes to advertising and communication services, which gives a great disadvantage, in terms of advertising and positioning strategies to small local brewing companies (González, 2017). Choosing a craft beer is not a simple matter, the market is full of competitors and the lack of consumer knowledge becomes a disadvantage for brands. Having access to consumer preferences is a key point to develop a brand, where the added values are increasingly important for the customer to decide at the time of purchase.

Craft beer is that produced in small breweries, using traditional methods and ingredients to produce and market locally (Hieronymus, 2010), according to ACERMEX (Mexican Association of Craft Brewers, as in Spanish), its annual production should not

exceed 1% of the national beer market. In 2011, the craft beer industry began to show sustained growth, leading Mexico to be the country's leading exporter worldwide of craft beer, but despite the growth it has had in recent years, it cannot be compared to that of industrial beer production produced each year in Mexico (Calvillo, 2017).

It is important to mention that craft breweries have as their main characteristic to take care of the quality of the raw materials with which their products are prepared, for this reason, it uses traditional processes to brew a beer, experimenting with different styles, techniques, and ingredients that come to produce unique styles in the market, regardless of the size of the brewery or the volume of production of the same (Maltosaa, 2020). However, the United States Brewing Association (2010) determined that a small craft brewery produces between 2 and 6 million barrels per year. In Mexico, a microbrewery is a brewery that usually produces approximately 15,000 barrels of beer, of which 75% must be sold externally. It could be said that craft beers do not depend on their sales classification, but on how their production is carried out and whether it follows the quality standards established by the corresponding agencies (Mattosaa, 2020).

Craft beer is the second most consumed beverage in Mexico, surpassed only by industrial beer, with consumers drinking it because of its taste (Calvillo, 2017). When buying a craft beer, there are several factors that beer experts consider to choose the best one, such as flavor, bitterness, ingredients, alcohol percentage, and aroma, among others. What beer buyers enjoy is being able to live the full experience of consuming a craft beer, but how much impact does the brand of the craft beer have on their purchase decision? Do people who consume craft beer, either for the first time or constantly, make their choice based on the brand? Or do they take into account other factors such as ingredients, aroma, and taste? The main strategy of the different brands of craft beers according to the Deloitte study (Calvillo, 2017) is based on linking the product to the Gourmet market, which commits the manufacturer to quality and innovation in the preparation of the product so that consumption continues to increase, involving the consumer in the manufacturing process to thus make him/her belong to the brand.

The success of craft beers is based on the momentum it has had from the homebrew movement and continues to grow despite the great competition from industrial beer, which usually has more promotional, production, and distribution budget (Murray & O'Neill 2012

Mentioned by Robin et al., 2017). An advantage of the large beer markets is the access to inputs with better costs, due to the large allies and the participation of large industrial beer brands such as AB-Inbev, which cover a large part of the consumers and added to their multiple imports of industrial beers from various parts of the world, have been causing the slight decrease of craft brands (Zamora, 2014).

The high degree of presence in the market of large and global brewing companies such as AB - Inbev, Miller and Coors, have achieved an increase in the monetary value of their brand and thus improved their production efficiency and final prices. This presence is attributed to advertising investments in the 1950s and 1970s, which at that time became common practice in national breweries (Apex Publishers, mentioned by Zamora, 2014). In Mexico, for example, in 1943 Modelo beer was one of the brands that took advantage of the advertising boom to start with its advertising development by adding slogans such as ``And twenty million Mexicans cannot be wrong" and with this began its expansion throughout different states of the country (Grupo Modelo, 2021), thanks to this it was possible to identify changes in consumer habits and formulate strategies focused on quality-price, to cover larger markets, mainly the youth market (Zamora, 2014).

Thanks to the progress and growth of these two corporations, it has facilitated the access of inputs to local craft beer markets, but also, this growth has allowed them to acquire local brands which expands their brand portfolio and their penetration in the national and international markets (Vázquez, 2018). Currently, small producers depend on the demand of large companies and intermediaries to be able to obtain the necessary inputs to make their products. These activities, added to exclusivity contracts, detract from the competitiveness of these large industries, making it necessary for them to produce specialized products at higher prices than industrial premium products (Cázares et al., 2018). Even so, the growth of craft breweries has remained constant. In the metropolitan area of Guadalajara, as of 2017, 126 brands of craft beers had been registered, which are sold at different points of sale in the state (Larios, 2017). Therefore, with this study, we seek to solve the unknown about what the influence that the brand value has on the purchase decision of craft beer in the population of a certain lifestyle in the ZMG, to show what strategies are necessary for the positioning of this in the market.

CONCEPTUAL FRAMEWORK

The Millennial market

Regarding the subjects of study, the segmentation went beyond the geographical, taking as the subject of study the millennial generation, millennium generation, or generation Y, i.e. the population born between 1980 and 2000 (Brewers Association, 2015). Their selection was not only based on their demographic characteristics, psychographics, behavioral characteristics, and the types of consumers of craft beers which this study focused on will also be selected. People belonging to the millennial generation, are currently in the labor market and currently represent an important part of the consumers in the market and tend to be the kind of consumers who go in search of unique experiences and consume based on that, preferring to spend their savings or salaries in this type of products or services than something long term such as a house (Nielsen, 2015). According to Dougherty (nd), the millennial generation is a consumer of craft beer, but they are not, for the most part, loyal to a specific brand, i.e. they prefer to consume a craft beer over an industrial one, but they will not make it clear which brand they will prefer.

The millennials of the world aspire for the future to have a successful and satisfying career, most commonly focused on information technology, which allows them to stay fit and healthy, and they are not very loyal to their workplaces, which results in them being twice as likely to leave as generation X (Nielsen Global, 2015). Their goal is to live in modern and urban neighborhoods and 20% wish to have a house, a marriage, and children in the future, their preferred activities focus on television, connecting with friends and/or family, music, reading, and travel. Their main source of information is based on social networks, internet search engines, and also television. In terms of food shopping, they are prone to eat out at least once a week, take into account the benefits of food and beverage places for the decision, and are willing to pay premium prices for premium products. We are talking about a highly connected generation, thanks to new technologies, being the first global citizens with social and environmental awareness, not seen since the 60s (Dos Santos et al., 2015).

On the other hand, Howe & Strauss (2003, mentioned by Simões & Gouveia, 2008), found seven exclusive traits of the Millennial generation that do not belong to any other generation:

1- Special: Concern about issues of importance and discussion of issues related to young people, where the press emphasizes the problems of today's youth.

2- Protected: They are the first generation with the "baby on board" and baby seat messages.

3- Confident: They have the idea that they will be much better than their parents when they reach their age.

4- Oriented by group behaviors and activities: Oriented to group behaviors or carrying out and performing group activities.

5- Conventional: They take into account the values and traditions instilled in them by their parents.

6- Pressured: they live with diverse daily activities, from work to practicing sports, and make time for their personal and recreational activities, so they lead a life determined by schedules.

7- Focused: from an early age they think about their future, both their career and salary.

Carpenter et al., (n.d.) conducted a study in the state of Oregon in the U.S.A. where they manage four profiles of beer consumers and the lifestyles of each one, being their profiles:

Enthusiasts: This type of consumer appreciates the brewing process and strives to obtain more information about that process. In addition, they are interested in experiencing a variety of craft beer styles. They place great importance on their appearance, how others see them, and how they would like to be seen by others. They appreciate craft beer knowledge both for mental enrichment and to satisfy their thirst.

Explorers: Unlike enthusiasts, explorers do not seek vast knowledge about craft beer but are willing to try new flavors and styles, so they seek to explore them in craft brew pubs. Like enthusiasts, they also care about how they look to others and how others see them, and at the same time derive pleasure from the social aspects of craft beer consumption.

Loyalists: Unlike the other two types of consumers, loyalists are loyal to a single brand and/or style, they are not interested in exploring different flavors, attributes, quality, or benefits of the unknown, and when it comes to consumption, location, seasonality or

coexistence affect their decision making. This segment is more concerned with how they see themselves than how others see them.

The fourth profile (*the novice*) does not have a deep description or lifestyle. The study also showed that regardless of the type of consumer to which a person may belong (explored, enthusiastic or loyal), the profile of consumers coincides with that of the "millennial hipster", since they are people who like to adopt active and healthy lifestyles such as biking, hiking, and camping, with a lifestyle more focused on the outdoors (Carpenter et al, n.d.). Similarly, they choose to go to more local places such as markets and national parks, have preferences for indie-pop music, and value independent thinking, creativity, intelligence, and art, likewise, being part of the millennial generation, craft beer drinkers are hardworking, aspirational and have a vision of success (Carpenter et al, n.d.).

In Mexico the consumption of craft beer is on the rise, more and more people tend to opt for this product as a substitute for industrial beer. This has led to the creation of a segment that is more informed about the product and its consumption, and as a consequence, companies have to offer more differentiated products than their competitors (Clemons et al., 2006).

For Cassini et al. (2009), functional, social, emotional, and price factors are determinants in the consumption of tasting products such as craft beer, and also establish that people who have already consumed a gourmet product, such as table wine or craft beer, and its taste matches their food, are more likely to choose it. According to Aquilani et al. (2015), craft beer is chosen according to taste preferences compared to commercial beers, since it is perceived as higher quality than industrial beer, due to the raw materials used for its production. For their part, Barbery et al. (2018) mention that the motive for beer consumption is divided into two sectors: experiential, which has the objective of multisensory consumption and where craft beer enters; and refreshment, whose objective is to quench thirst, which makes the consumer of this type opt for craft beer. They highlight factors that influence the purchase of a beer, which are: taste, temperature, brand, ingredients, and price.

Araya et al. (2016) show how the millennial population (known for being the largest and most influential generation so far), buys a craft beer for its high alcohol content, which in turn is related to its taste, since the manufacturers of this product claim that the alcohol content is a great differentiator of flavor. Fernandez et al. (2017) identify possible variables

that the millennial generation takes into account when choosing to purchase a craft beer, where they obtain as a result that this generation seeks, for instance, a known brand when making their purchase choice, followed by the type of packaging, whether can or bottle, and finally the right price of the product. It was also highlighted that culinary tourism currently has the most active consumption of this type of artisanal products, taking into account that they are in a mostly male market, between 21 and 31, mainly employed in the private sector (Murray & Kline 2015).

Brakus et al. (2009) mentioned that there are two types of experiences that the consumer has with the product, direct and indirect, where it is considered that the indirect form is the one that refers to the physical interaction with the product and this is reflected in the purchase experience when the consumer interacts with the physical environment of the brand. Likewise, Fernández & Delgado (2011) mention that the use of the brand as a differentiation strategy takes an important role in the purchase experience, this shows us that people take into account different aspects that encompass the brand and that are determinants in their decision making.

Augusto & Torres (2017) find that brand recognition is the key to being able to have a loyal relationship with the customer, since, by obtaining it, it is easier to create trust, satisfaction, and value for the customer. Likewise, the positive effects of perceived quality and brand recognition on brand equity are measured by consumer loyalty to the brand, meaning that consumer loyalty to a certain brand is proportional to brand recognition and brand equity. Therefore, it could be deduced that consumers take brand equity into account when making a purchase decision.

Calvillo (2017), mentions that currently the consumption of craft beer is linked to the change in consumption culture in the Mexican population. Murray & Kline (2015), put on the table the factors that influence brand loyalty of breweries and their craft beers, where through surveys they evaluated brand loyalty concepts such as access to the point of sale, consumption, environment, proximity to the community, satisfaction and the desire to consume unique products, the latter three being the most tied to brand loyalty. Finally, it is also highlighted that culinary tourism is currently the most active in the consumption of this type of handcrafted products, taking into account that they are found in a male majority market, between 21 and 31 years of age, mainly employed in the private sector.

Brand Equity

The brand has the main function of identifying the manufacturer of a product, but for consumers, a brand is a promise, a means by which they set expectations and reduce risks. Gunawardane (2015) states that there is a positive relationship between the variables of perceived quality and brand awareness, to purchase products, which leads us to intuit that brand equity is important for consumers to decide the products they will buy.

For Keller (1993), brand equity, known in Spanish as brand equity, is a value-added to products and services that are added by consumers, such values can be reflected in how consumers think, feel, and act concerning the brand. Similarly, Aaker (1992) mentions that brand equity is everything surrounding the company that provides information to the consumer about the possible performance, image, or quality of a product. On the other hand, for Kamakura & Russell (1991), customer-based brand equity has been defined as a differentiation of brand awareness and consumer response to brand marketing.

Therefore, it could be said that for consumer's brand equity represents being familiar with the brand and having favorable, strong, and unique associations with it. Keller (1993), states that such positive evaluations made by consumers are a favorable response to the marketing efforts made by the company. Currently, the American Marketing Association (AMA 2013), looking at it from the consumer's point of view, defines it as the attitudes of such consumers, acquired by the positive attributes that the brand has and the favorable consequences of the use of brands.

THEORETICAL FRAMEWORK

Today, there are different Brand Equity models, which are useful to measure the value of a brand depending on the brand approach based on different methods: a method based on cost, a method based on the market value of the company, a financial method and method based on the consumer (Forero & Duque, 2014). In turn, these consumer-based models are divided by their function, such as brand building; brand building and measurement; brand measurement; and their approach, either theoretical or pragmatic. For this research, consumer-based models were sought and analyzed, taking into account only those of brand

measurement with a theoretical approach, since they are usually the methods related to the purchase decision of a brand or, in this case, beer style (Table 1).

Table 1

Brand Equity Brand Measurement Models

Model	Author	Year
Conjoint analysis model	Green and Srinivasan	1978
Logit model	Kamakura y Russell	1993
Simulator model of conjoint selection	Green and Krieger	1995
Price march model	Swait	1993
Aaker model	Aaker	1991
Survey analysis model	Srinivasan y park	1994
Brand loyalty model	Dick y Basu	1994
Concession joint analysis model	François y MacLachlan	1995
Brand Equity Ten model	Aaker	1996

Note: Based on Forero & Duque (2014).

Table 2 shows the variables that all of the above models have in common:

Table 2

Variables per consumer-based brand equity model

Model	Variables
Conjoint analysis model	Perceived value/product attributes/market share
Logit model	Brand loyalty
Simulator model of conjoint selection	Perceived value/product attributes/market share
Price march model	Loyalty/ perceived quality/ price
Aaker model	Loyalty/perceived quality/brand association/brand awareness
Survey analysis model	Brand association
Brand loyalty model	Brand loyalty
Concession joint analysis model	Brand and price association

Model	Variables
Brand Equity Ten Model	Loyalty / perceived quality/brand association and differentiation/awareness measures/market behavior

Analyzing the different methods based on consumer behavior, Aaker's (1996) Brand Equity Ten model was identified as the model that includes the greatest number of variables associated with consumer behavior, which in turn is related to the brand and the product. This model collects more completely and measurably the variables identified for a complete brand measurement study, helping to build the profile of the ideal consumer for the craft beer product. This model (Table 3) values the elements that give added value to the product or brand, which motivates them to pay a higher price for a product and this in turn generates loyalty to a specific brand (Garolera, 1997).

Table 3

Aeker´s Brand Equity Ten Model

Loyalty measures
Premium price
Satisfaction/ Loyalty
Perceived quality/leadership measures
Perceived quality
Leadership
Association and differentiation measures
Perceived value
Brand personality
Organizational association
Awareness measures
Brand awareness
Market behavior measures
Market share
Price and distribution indices

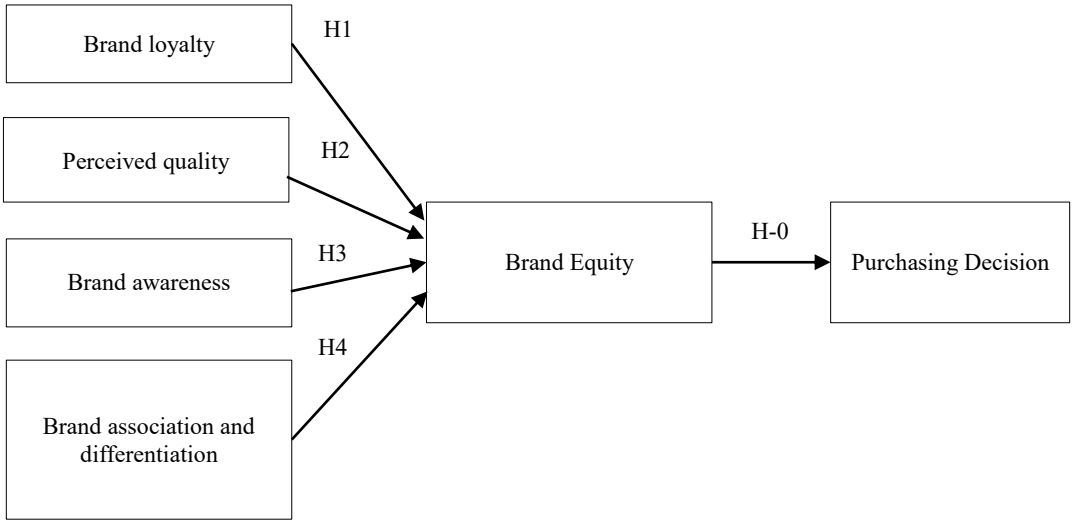
Note: based on Aeker´s Brand Equity Ten Model (Aaker 1996)

Based on the literature reviewed, the following hypothesis is proposed and has the following construct for the model proposed (Figure 1):

H0: Brand Equity positively influences the purchase decision of craft beer.
H1: Consumer brand loyalty positively influences the decision to purchase a craft beer.
H2: The perceived quality by consumers of a craft beer positively influences the decision to purchase it.
H3: Brand awareness of a craft beer positively influences the purchase decision.
H4: Brand association and differentiation positively influence the decision to purchase a craft beer.

Figure 1

Millennials' Purchasing Decision Model



METHODOLOGY

Employing a quantitative analysis using primary data sources and with a non-experimental and transversal design focusing on a specific population Hernández-Sampieri et al. (1998), it was possible to obtain a descriptive correlational level of knowledge, whose numerical results will be tested through statistical analysis. For this purpose, the following variables were studied: purchase decision and brand equity, using correlations, which allows knowing the

relationship that exists between two or more variables in a specific context; finally, the cross-sectional aspect indicates that it will be a one-time study (Hernández-Siamperi, 1998). The multivariate technique of multiple regression type was also used to measure the relationship of a single dependent variable with one or more independent variables to predict changes in the dependent variable by obtaining responses from the independent variable(s) (Hair et al.,1999).

As an instrument for data collection, a structured direct survey with fixed alternative questions was applied, to capture the necessary information in the form of specific questions that respondents could answer (Malhotra, 2008). These surveys were carried out by digital and/or printed means and analyzed with the SPSS program. The instrument design is based on a questionnaire previously conducted and validated by Washburn & Plank (2002) with six variables: perceived quality, brand awareness, brand association, loyalty, brand value, and purchase decision, the latter based on the questionnaire conducted by Adam & Akber (2016).

No population defines the exact number of people who meet the lifestyle characteristics of craft beer consumers in the GMA (Guadalajara Metropolitan Area, which includes the cities of Zapopan, Guadalajara, San Pedro Tlaquepaque, and Tonala), so it was not possible to perform a statistical calculation as some authors, such as Hernández Sampieri et al. (1998) establish. We are talking about non-probabilistic convenience sampling since it allows us to select those accessible cases that accept to be included. This is based on the convenient accessibility and proximity of the subjects for the research (Otzen & Manterola, 2017). Therefore, with a size of at least 200 people, it is a reasonable amount to obtain a good result in the research. Such amount was achieved to exceed 47% more participants (294) despite the pandemic conditions in which this study was conducted in the GMA using digital means to conduct this survey.

RESULTS

In terms of age, this study is based on the millennial population living in the GMA, so surveys were conducted to people with an age range of 18 to 40 years and we can find that people between 26 and 30 years are those who usually consume these drinks, representing 40% of the sample, followed by people who are located in ages between 21 and 25 years and 31 and

35 years. Regarding the schooling of the respondents, it was identified that people with a bachelor's degree are the largest consumers of craft beers with 70% frequency, followed by people with a specific postgraduate study of Master's degree with 18% frequency, people with a bachelor's degree with a frequency of 11% and finally with a frequency of less than 1%, people who have completed high school and a doctorate. It was also found that craft beer is not a product that is consumed by people with basic primary education.

Brand loyalty

In Table 4 we can observe that knowledge about craft beers and the brand value given to them by the consumer positively influence loyalty, recommendation, price increase, selecting it as the first option at the time of purchase and on future occasions, which tells us that when a person is loyal to a brand and in this case to craft beers in general, their purchase decision will be guided by the type of product, the recommendations offered or received about the product and the variation in its price.

Table 4

Correlation between items of the purchase decision variable and brand loyalty items

		I consider myself loyal to craft beers	I would recommend the consumption of craft beers to my friends and acquaintances	I would buy craft beers even if their price increases	When I buy beers, craft beers would be my first choice	If in the future I want to buy a beer, craft beers would be my first choice
I consider that my purchase decision depends on how others think of me based on the type of beer I consume	Pearson Correlación	.144*	.119*	.139*	0,096	.175**
	Sig.(2-tailed)	**0,013**	**0,041**	**0,017**	**0,100**	**0,003**
	Sum of Squares and Cross-products	74,102	50,898	67,204	49,898	90,408
	Covariance	0,253	0,174	0,229	0,170	0,309
	N	294	294	294	294	294
I consider that my knowledge of craft beers guides my purchase decision	Pearson Correlation	.583**	.555**	.556**	.528**	.551**
	Sig.(2-tailed)	**0,000**	**0,000**	**0,000**	**0,000**	**0,000**
	Sum of Squares and Cross-products	302,871	239,463	272,075	277,463	287,150
I believe that the value I place on craft beers (brand value) affects my	Pearson Correlation	.351**	.337**	.396**	.320**	.333**
	Sig.(2-tailed)	**0,000**	**0,000**	**0,000**	**0,000**	**0,000**
	Sum of Squares and Cross-products	185,850	148,483	198,034	171,483	177,068

**. Correlation significance at level 0,01 (two dimensions)

We can add that people who have ever consumed craft beer tend to incline their purchase decision toward this product simply because they know it and have consumed it before. However, it can be noted that there is a question that does not generate a relationship between one question and another, so considering that a person's purchase decision depends on what others think about him or she has no relationship with loyalty in terms of selecting craft beer as the first choice. However, the opinion of others about the consumer has a positive relationship when it comes to loyalty and recommendation towards the product, price increase, and selection of beers in the future.

Despite the negative relationship between two questions of the perceived quality variable and one of the purchase decision variable, we can observe a high significance between the two variables, creating a positive relationship between them (table 5).

Table 5

Correlation between the purchase decision variable and brand loyalty.

Correlations		
		Purchase Decision
Brand Loyalty	Pearson Correlation	.532**
	Sig. (2-tailed)	0.000
	Sum of Squares and Cross-products	2592.449
	Covariance	8.848
	N	294

**. Correlation significance at level 0,01 (two dimensions)

Perceived Quality

Table 6 shows the correlation between the same dependent variable, purchase decision with perceived quality, where we can identify the variables that have significance, being that the knowledge of the product and the value that the consumer gives it, have a positive relationship on the confidence in the quality of the product, and the excellence of its characteristics.

Even so, it was found that the thought of others about the type of beer that the consumer chooses does not have a positive relevance with the quality confidence about the product. Despite the negative relationship that exists between two questions of the perceived

quality variable against one of the purchase decision variables, we can find that there is a high significance between the two variables creating a positive relationship between the two.

Table 6.

Correlation between items of the purchase decision variable and items of perceived quality.

		I trust in the quality of craft beers	I consider that craft beers could be of very good quality.	I consider craft beers to have excellent characteristics.
I consider that my purchase decision depends on how others think of me based on the type of beer I consume	Pearson Correlation	0.111	0.054	.141*
	Sig.(2-tailed)	**0.058**	**0.356**	**0.015**
	Sum of Squares and Cross-products	35020	13.735	40.857
	Covariance	0.120	0.047	0.139
	N	294	294	294
I consider that my knowledge of craft beers guides my purchase decision	Pearson Correlation	.267**	.373**	.477**
	Sig.(2-tailed)	0,000	0,000	0,000
	Sum of Squares and Cross-products	85,374	95,803	139,381
I believe that the value I place on craft beers (brand value) affects my purchase decision	Pearson Correlation	.196**	.147*	.288**
	Sig.(2-tailed)	**0.000**	**0.000**	**0.000**
	Sum of Squares and Cross-products	64. 170	38,456	85,810
	Covariance	0,219	0,131	0,293

**. Correlation significance at level 0,01 (two dimensions)

*. Correlation significance at level 0,05 (two dimensions)

Similarly, as shown in Table 7, the relationship between the purchase decision variable and the brand knowledge variable has a high significance, with a value of 0.000 the relationship between them, therefore the consumers' decision is based on how much knowledge they believe they have about the product.

Table 7.

Correlation between the purchase decision variable and perceived quality.

Correlations		
		Purchase Decision
Perceived Quality	Pearson Correlation	.373**
	Sig. (2-tailed)	0.000
	Sum of Squares and Cross-products	598.605
	Covariance	2.043
	N	294

**. Correlation significance at level 0,01 (two dimensions)

Brand awareness

The value they place on the brand and the knowledge of product characteristics, along with the familiarity and recognition they have about craft beers positively affect their purchase decision. While the thought that others have about the consumers of craft beers about the knowledge of characteristics, familiarity, and recognition of this product, has no relationship with the purchase decision of consumers (Table 8).

Table 8

Correlation between items of the purchase decision variable and brand awareness.

		Several characteristics of craft beers come quickly to mind when mentioned.	I'm familiar with craft beers	I can recognize a craft beer over one that isn't.
I consider that my purchase decision depends on how others think of me based on the type of beer I consume	Pearson Correlación	0.083	0.027	0.056
	Sig.(2-tailed)	0,154	0 .648	0,336
	Sum of Squares and Cross-products	35,133	11,408	22,500
	Covariance	0.120	0.039	0.077
	N	294	294	294
I consider that my knowledge of craft beers guides my purchase decision	Pearson Correlation	.557**	.598**	.315**
	Sig.(2-tailed)	0,000	0,000	0,000
	Sum of Squares and Cross-products	237,432	255 .816	127,167
I believe that the value I place on craft beers (brand value) affects my purchase decision	Pearson Correlation	.273**	.302**	.157**
	Sig.(2-tailed)	0,000	0,000	0,000
	Sum of Squares and Cross-products	118,605	132,735	64,667
	Covariance	0,405	0,453	0,221
	N	294	294	294

**. Correlation significance at level 0,01 (two dimensions)

Therefore, only the opinion of others about the type of beer consumed by the respondents has no significance whatsoever on the brand awareness they have about the product. The relationship between the purchase decision variable and the brand awareness variable has a high significance, with a value of 0.000 relationship between them, so the consumers' decision is based on how much knowledge they believe they have about the product.

Similarly, as shown in Table 9, the relationship between the purchase decision variable and the brand awareness variable has a high significance, with a value of 0.000 the relationship between them, therefore the consumers' decision is based on how much knowledge they believe they have about the product.

Table 9

Correlation between purchase decision variable and Brand Awareness.

Correlations		
		Purchase Decision
Brand Awareness	Pearson Correlation	.433**
	Sig. (2-tailed)	0.000
	Sum of Squares and Cross-products	1007.463
	Covariance	3.438
	N	294

**. Correlation significance at level 0,01 (two dimensions)

Brand association and differentiation

In Table 10, the relationship of the purchase decision variable now with the variables brand association and differentiation, it results again that the purchase decision has a significance with the values of brand association and differentiation when the knowledge of the product and the value given to the product at the time of making the purchase decision is affected. Respect and admiration for people who consume craft beers, the brand image they present, and the trust reflected towards the product are favorable. However, as in the previous variables, the thought of others at the time of deciding to purchase does not have a positive relationship with the brand image of craft beers, so it is not relevant at the time of deciding to buy one craft beer over another, even so, this decision variable has a positive influence with respect and admiration for the consumer and the trust given to the product.

Table 10

Correlation between items of the purchase decision variable and brand association and differentiation.

		I respect and admire people who consume craft beers.	I like the brand image that craft beers have	I like and trust craft beers
I consider that my purchase decision depends on how others think of me based on the type of beer I consume	Pearson Correlation	.162**	0.091	.148*
	Sig.(2-tailed)	**0.005**	**0.118**	**0.011**
	Sum of Squares and Cross-products	75,490	30,204	56,694
	Covariance	0.258	0.103	0.193
	N	294	294	294
I consider that my knowledge of craft beers guides my purchase decision	Pearson Correlation	.348**	.158**	.428**
	Sig.(2-tailed)	**0.000**	**0.007**	**0.000**
	Sum of Squares and Cross-products	164,313	52,741	166,054
I believe that the value I place on craft beers (brand value) affects my purchase decision	Pearson Correlation	.279**	.198**	.296**
	Sig.(2-tailed)	**0.000**	**0.001**	**0.000**
	Sum of Squares and Cross-products	134,415	67,701	117,116
**. Correlation significance at level 0,01 (two dimensions)				
*. Correlation significance at level 0,05 (two dimensions)				

Despite the low significance between the two items of the variables, when correlating the two variables together, it is observed that they are positively correlated with each other, with a high significance of 0.000 (table 11).

Table 11

Correlation between purchase decision variable and brand association and differentiation.

Correlations		
		Purchase Decision
Brand association and differentiation	Pearson Correlation	.417**
	Sig. (2-tailed)	0.000
	Sum of Squares and Cross-products	864.728
	Covariance	2.951
	N	294

**. Correlation significance at level 0,01 (two dimensions)

Brand equity

Regarding the brand capital variable concerning the purchase decision variable (Table 8), it can be noted that there is a total significance between items, which means that the purchase decision is based on what others think of the consumer, their knowledge about craft beers and the value given to them, positively influence the consumption and purchase of the product if there were another product with the same characteristics, was equally good for the consumer and was the same. This means that craft beer itself has a great influence on the thinking that others have about the consumer and the type of beers consumed, the knowledge and value given to the product at the time of making or deciding on the purchase since the people surveyed agreed that this product is good just for belonging to this group and would choose it even if any other products were exactly as good or had the same characteristics in the eyes of the consumer.

Table 12.

Correlation between items of the purchase decision variable and brand equity.

		I think it makes sense to buy craft beers over any other, even if they were the same	Even if another type of beer had the same characteristics as craft beers, I would still prefer to buy craft beers.	If another kind of beer was as good as craft beers, I'd rather buy craft beers	If another type of beer is the same as craft beers, it would be smart to buy craft beers.
I consider that my purchase decision depends on how others think of me based on the type of beer I consume	Pearson Correlation	.252**	.186**	.234**	.275**
	Sig.(2-tailed)	0,000	0,001	0,000	0,000
	Sum of Squares and Cross-products	120,959	90,122	111,673	139,265
	Covariance	0.413	0.308	0.381	0.475
I consider that my knowledge of craft beers guides my purchase decision	Pearson Correlation	.446**	.441**	.385**	.288**
	Sig.(2-tailed)	0,000	0,000	0,000	0,000
	Sum of Squares and Cross-products	216,918	216,245	186,014	147,197
I believe that the value I place on craft beers (brand value) affects my purchase decision	Pearson Correlation	.344**	.364**	.325**	.227**
	Sig.(2-tailed)	0,000	0,000	0,000	0,000
	Sum of Squares and Cross-products	170,327	182,020	160,279	118,544

**. Correlation significance at level 0,01 (two dimensions)

Therefore, when correlating the two variables, brand equity, and purchase decision, we can find a high significance relationship between them of 0.000. as shown in Table 13.

Table 13.

Correlation between purchase decision variable and brand equity.

Correlations		
		Purchase Decision
Brand equity	Pearson Correlation	.493**
	Sig. (2-tailed)	0.000
	Sum of Squares and Cross-products	1859.565
	Covariance	6.347
	N	294

**. Correlation significance at level 0,01 (two dimensions)

The results not only indicate that the general independent variable, brand equity, has this positive influence on the purchase decision (Hypothesis 0), but also showed that the sub-variables belonging to this independent variable such as loyalty, perceived quality, brand awareness, and brand association and differentiation are also related one to one with the purchase decision of this product as shown below.

Regarding brand loyalty related to the purchase decision (hypothesis 1), it can be stated that price does not present an obstacle when deciding on craft beers or industrial beers, in addition to this it is usually a product that is recommended among people who have consumed it, which leads to it being considered as the first option when deciding on the purchase.

Likewise, for the perceived quality variable (hypothesis 2), trust, association with good quality and its excellent characteristics, positioned in the consumer's mind, play an important role when deciding on craft beers, showing that the characteristics with which this product is promoted are perceived and taken into account by consumers at all times.

As for the brand awareness variable (hypothesis 3), we note that it also has a positive influence on the purchase decision, since it was identified that the consumer being familiar with the product and associating characteristics to it, encourages them to opt for this type of beer over industrial beers. Similarly, the pattern is repeated with the last variable, brand association, and differentiation (hypothesis 4), which relates respect for consumers and taste

and trust in the product as important factors in deciding to buy craft beers over industrial beers or any other product that happens to have the same or similar characteristics.

CONCLUSIONS

Based on a quantitative correlational analysis, it can be concluded that brand equity has a positive influence on the decision to purchase craft beers in the millennial population of the municipalities of Zapopan, Guadalajara, San Pedro Tlaquepaque, and Tonal, belonging to the GMA. Despite the above, there was an important constant when analyzing the data collected, with a specific item of the purchase decision variable, this item specifically mentions the relationship that exists between the thoughts that others have about the type of beer chosen by the consumer when deciding on the purchase of this and variables such as loyalty, perceived quality, brand awareness and brand association and differentiation, having little or no significance when related to all or some items of these variables, as we noted above. Therefore, when analyzing the results obtained from the 294 respondents who participated in the study, we can affirm that the hypotheses presented in this project were fully accepted, since both loyalty, perceived quality, brand awareness, and brand association and differentiation, obtained a significance level of 0.01 on the purchase decision when processed by the SPSS software.

In this sense, we consider that brand equity has a highly positive influence on the purchase decision of people between 20 and 40 years of age, being those between 26 and 30 years more likely to consume craft beers, who in turn coincide with preferences inclined towards lifestyles related to genres such as rock, It would be good to consider taking this data into account when conducting market research, marketing or advertising proposals, campaigns, sponsorships or other issues related to the brand and the consumption of this product. Regarding income, it is important to emphasize that the amount of income perceived by the consumer is not of utmost importance when choosing a craft beer since they are guided more by the type of product than by the cost; this can become a point in favor of the sellers or producers of craft beers. However, even though income is not a point that is taken into account, it would be advisable to focus more on consumers with incomes over 21 years old,

since they make up the majority and are the ones that best meet the lifestyle characteristics of most consumers.

In this study, a methodology based on the correlation of questions and variables was developed and applied, based on a bibliographic review of similar cases. Although the objectives were achieved, there are still areas of opportunity that can be exploited for the benefit of the research. At this point it would be prudent to consider, for future research, contemplating the market behavior measure of Aaker's (1996) model, which was excluded from this study. With this, market share and price and distribution indexes could be included, making the correlation between brands of the same type of product, so it would be necessary to close the study and focus it on two or more brands of craft beers.

As for the profile of the respondents, as the literature says, they favor certain life characteristics and tastes, so it would be advisable to focus future studies on the profile identified in this research. Likewise, implementing other types of data analysis would be enriching to strengthen the study results, such as descriptive, diagnostic, predictive, prescriptive, or causal analysis. Finally, proposing marketing strategies based on the results obtained would be beneficial for future qualitative or quantitative research.

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Chapter 9

The nexus theory-reality: The meso level of the Esser model of systemic competitiveness. An empirical test with data from the Mexican states

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The nexus theory-reality: The meso level of the Esser model of systemic competitiveness. An empirical test with data from the Mexican states

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INTRODUCTION

This paper analyzes the Esser model of systemic competitiveness and tests it empirically. This model sees systemic competitiveness as a multifactorial phenomenon, since competitiveness is not only economic, as it has been frequently considered. On the contrary, competitiveness is determined by political, technological, educational, and social factors in general. It has also determinants of public security, international insertion, and labor components.

This paper is preceded by several studies about the competitiveness in Mexican states and cities, using various explicative variables such as public insecurity, violence, crime, corruption, and trust. The experience obtained in the development of the cited papers, especially that developed by Soria & Rivas (2019) regarding the impact of some variables that represent the objective quality of life of citizens, such as education, health, public security, and labor conditions, on competitiveness in Mexican cities, set the pattern to broaden the spectrum of variables that impact the competitiveness of the federal entities in Mexico. The systemic competitiveness model associated with Esser et al (1966), has been widely quoted and has had an impact on the development of competitiveness studies.

This model states that systemic competitiveness encompasses 4 levels: meta, macro, micro, and meso. In the present work, we seek to test empirically the meso level of the Esser model, using data from Mexican states, in variables that represent a wide spectrum of sectors such as education,

labor, technology, public safety, and international insertion, among others. This empirical test is instrumentalized through a data panel using the IMCO 2022 database, to integrate the information panel for the period 2001-2020.

To meet the stated objective, the work is integrated into 4 additional sections. In the following, the theoretical framework of competitiveness is analyzed. In the second, the objectives and hypotheses of the paper are stated, as well as their importance, to move on in the third section to the approach of the model and its empirical tests. In the fourth and final part, the conclusions of the paper are presented.

THEORETICAL FRAMEWORK OF COMPETITIVENESS

The concept of competitiveness is very elusive. Díaz points out (2010:93):

> Competitiveness presents an intrinsic difficulty in its definition: it is a concept that has become common currency and its use is widespread, therefore, it suffers from the ills that such popular concepts suffer: Its meaning ends up being diluted in the definitions and works of a myriad of authors. The same author traces the concept back to its etymological roots.

Following Piernas y Hurtado (1877), Díaz (2010:93) states:

> [...] competitiveness is the noun of the adjective competitive, which in turn is derived from the noun competition. This simple regression eliminates the difficulty since the meaning of competitiveness is understood as competition or economic competition, which is the rivalry that arises between two or more producers who want to sell items of the same class, or between several consumers who try to obtain products of the same species.

The concept of competitiveness has been adjusted to the purposes and interests of different authors. Thus, for example, Paredes et al (2013: 20), citing Gutiérrez (2005) "competitiveness is considered as the ability of a company to generate a product or service in a better way than its competitors". For Chávez and Aguilera (2013: 40):

> [...] The expression "competitiveness" is also used to compare the cost structure of the production process, mainly labor and raw materials, technology, product differentiation, and market size, among other factors, of a producer for others —internal or external— of products with the same quality.

González & López (2013: 457), citing Abdel & Romo (2004) emphasize that business competitiveness derives from the competitive advantage that a company has through its production and organization methods (reflected in price and quality of service) of the final product in a specific market. Following Garduño et al (2013: 29) it is agreed that "in general, competitiveness is a way of approaching the relative economic performance of the analysis of units in a comparative sense".

Competitiveness is a microeconomic concept in its origin, that is, applied to the business firm. However, according to Fantechi & Fratesi (2022: 2):

> The concept of competitiveness has, in recent decades, rising from being a firm-related concept to being a central element for the understanding of the economic development of countries and regions. Indeed, firm competitiveness and territorial competitiveness are closely related. Firms competing with each other in a globalized economy are not monads; rather, they are tightly rooted in the territorial context surrounding them, where their competitiveness is strongly affected, if not determined, by the local context in which they operate (Boschma, 2004). A large set of elements influencing firm competitiveness are highly territorialized and unevenly distributed in space (e.g., infrastructure, human capital, skilled workers, and quality institutions) (Dierickx & Cool, 1989; Maskell & Malmberg, 1999); even the presence of other firms (both related and nonrelated) may be important for their competitiveness (Balland, et al., 2015).

On the other hand, according to the work of Benzaquen et al (2010:71), the theory of competitiveness has evolved from two fundamental theories: classical economics represented by the model of international trade (Smith, 1776; Ricardo, 1817) and modern economic theory represented by the model of the competitive advantage of nations (Porter, 1991), also known as the "diamond of national advantage". This "diamond" is the theory behind the well-known World Economic Forum report on the competitiveness of nations which has been produced and published annually since 1979.

In addition, Porter's contribution to the study of competitiveness has been vast and has left a deep mark. While it is true that the origin of the concept of a nation's competitiveness dates back several centuries back, Porter (1991) establishes the foundations and recognizes changes in the environment and instability of generic strategies, pointing to the need for more dynamic models to conceive the competitive advantage of nations (Benzaquen et al, 2010:71).

This vision of productivity was enriched in the eighties of the last century with wide dissemination of the frameworks of competitive strategy: some techniques for analysis of the industrial and competition sectors (Porter, 2000), which proposes a model for understanding industries and competition, as well as to formulate a global strategy (Benzaquen et al, 2010:70).

These developments of Porter's work (1991, 2000), and with the incorporation of economic geography (Krugman, 1999), this approach was generalized to analyze the competitiveness of municipalities, cities, regions, federal entities, and countries. These preceded the proposal, in the '90s of the last century, of the "systemic competitiveness" approach associated with the German Development Institute (Esser et al 1996: 39-52). This model proposes four levels of competitiveness: meta, macro, meso, and micro. These authors point out that:

> [...] industrial competitiveness is the product of the complex and dynamic interaction between four economic and social levels of a national system, which are the following: the micro level, of companies, those that simultaneously seek efficiency, quality, flexibility and speed of reaction, being many of them articulated in networks of mutual collaboration; the meso level, corresponding to the State and social actors, who develop specific support policies, promote the formation of structures and articulate learning processes at the society level; the macro level, which puts pressure on companies through performance demands; and, finally, what in this article is called the meta-level, which is structured with solid basic patterns of legal, political, and economic organization, sufficient social capacity for organization and integration, and the capacity of the actors for strategic integration.

Furthermore, these authors (Esser et al 1996:50):

> At the meso level, the actors of the state administration (from the local to the national level), as well as the public and private intermediate institutions (technological, consultative, and educational entities; also chambers of commerce and other associations). Through interaction, cumulative processes emerge that enhance the capacity of all parties involved, including the meso level as a whole.

The authors (Esser et al 1996: 41) summarize stating that:

> The most competitive countries have: i) at the meta-level, basic structures of legal, political, and economic organization, social capacity for organization and integration, and capacity of the actors for strategic interaction; ii) a macro context that demands greater efficiency from companies; iii) a meso-structured level where the State and social actors develop specific support policies, foster the formation of structures and articulate learning processes at the societal level, and iv) at the micro level a large number of companies seeking simultaneously the efficiency, quality, flexibility, and speed of reaction, being many of them articulated in networks of reciprocal collaboration.

This conceptualization is reinforced by Labarca (2007: 175), who points out:

> It starts from the conceptual elements, applied to the systemic approach to competitiveness. It considers, according to Eissa and Ferro (2001), four spheres that condition and shape their performance: first, the microeconomic level (in the plant and within companies, to create competitive advantages); secondly, the mesoeconomic level (environmental efficiency, factor markets, physical and institutional infrastructure and, in general, specific policies for the creation of competitive advantages); thirdly, the macroeconomic level (fiscal, monetary, trade, exchange rate, budgetary, competition policy) and, finally, the economic or strategic target level (development-oriented political and economic structure, competitive structure of the economy, strategic visions, national development plans).

To summarize and following Rubio and Baz (2005: 70-71):

> Competitiveness is the ability of a company to successfully face its counterparts. A company is productive when it has developed the internal conditions that allow it to compete and the external ones that add the capacity to reduce costs and compete successfully. The optimization of the internal processes of the companies is the task of each entrepreneur, but the general conditions of the economy are what economists call a "public good", that is, a benefit from which a small company and a big company can benefit equally... The most competitive companies will be those that have an optimal internal structure with an environment that favors their competitive capacity.

There is a consensus among academics and practitioners that competitiveness is the product of the synergies that form the interaction of the four levels indicated and the elements that compose them. Business competitiveness depends on many factors and variables integrated into the different levels of systemic competitiveness. At the meta-level, the original proponents of this approach (Esser *et al* 1996: 46), point from sociocultural factors, through the scale of values, the basic patterns of political, legal, and economic organization, to strategic and political capacity. In the same way, business competitiveness depends on a sound macroeconomic policy in budgetary, monetary, fiscal, exchange, and commercial matters.

At the meso level, among the factors cited by these authors are a series of policies where there is a strong intervention of subnational governments (state and municipal in the case of Mexico). Among these policies, according to the same authors, the physical infrastructure, educational, technological, environmental, regional, foreign trade, and public safety policies stand out. Finally, at the firm level, competitiveness depends on a set of microeconomic variables such as management capacity, business strategies, innovation management, integration into technological cooperation networks, business logistics, and the interaction of suppliers, producers, and users, among others.

To summarize, competitiveness is the result of the interaction and synergy of many factors and variables at the four levels of systemic competitiveness. This paper seeks to empirically test the meso level of this model with data from the Mexican states. For this purpose, we need to propose the theory of territorial competitiveness.

Territorial competitiveness

Territorial competitiveness is a general framework applied to study competitiveness in municipalities, cities, regions, federal entities, and nations as a whole. In this sense, regional competitiveness, state competitiveness, urban competitiveness, and country competitiveness are varieties of territorial competitiveness. In this case, our work focuses on the Mexican federal entities.

The concept of territorial or regional competitiveness has had an interesting evolution as Sadki *et al* show:

Table 1

The evolution of the concept of territorial (regional) competitiveness

Author(s)	Definitions of regional competitiveness
Stopper, 1997	The ability of a region to attract and retain businesses with stable or increasing market shares. While maintaining a stable or rising standard of living for those who settle there.
Krugman, 1998	The ability of regions to attract capital and labor through their productivity and the returns they can provide to these factors of production.
Camagni, 2002	The power of attraction of territories and their ability to meet the needs of citizens and the needs of businesses in terms of collective well-being and efficiency.
Kitson et al, 2004	The ability of regions to attract qualified people and creative and innovative businesses, by providing high-quality cultural facilities and encouraging the development of social networks and institutional arrangements that ensure sharing and engagement, common concerning regional prosperity.
Porter, 2010	The level of production expected per individual of working age taking into account the quality of life in the region as a workplace.
Torre, 2014	The capacity of a region to create and develop economic activity and to attract and retain capital and qualified people in its territories.

Note: Adapted from Sadki, T., et al (2020),

All of the above definitions take the ability (power or capacity) of attracting and retaining capital, labor, and business and develop a level of economic activity sufficient enough to increase the quality of life, the cultural level, and the standard of living for the inhabitants of the region. These are common characteristics of all varieties of territorial competitiveness.

In terms of urban competitiveness, Lever and Turak (1999) cited in Sobrino (2005: 145) discuss:

> The concept of urban competitiveness refers to the ability of a city to insert itself into national and foreign markets, its relationship with local economic growth, and the increase in the quality of life of its residents. Another definition of urban competitiveness is the degree to which cities can produce goods and services for regional, national, and international markets, increasing, in parallel, the real income and quality of life of the population and seeking sustainable development.

Sobrino (2005: 147) emphasizes the attraction of investment by cities, pointing out that:

> [...] cities compete for investments that create jobs, for investments that contribute to local economic growth, for investments with high-income elasticity of demand, and for investments that favor production without endangering environmental conditions. The foregoing makes it possible to clarify that cities compete in some areas and companies in others, with in some cases a very fine line between the competition of both, and in others a clear overlap.

In a later work, the same author establishes a more precise definition of territorial competitiveness (Sobrino, 2010b: 151, citing the Global Urban Competitiveness Project, 2005):

> The degree to which a city, compared to other competing cities, is capable of attracting productive investments that translate into job creation and income increases, while increasing and consolidating its cultural amenities, recreational attractions, social cohesion, governance, and an environment for its resident population.

Previously, the IMCO had incorporated the element of sustainability (IMCO 2007: 41) by stating:

> Sustainability is a guarantor of the circumstances and situations that the region will offer, not only in the following months but, at least, in the medium term. This is a fundamental aspect of investment-oriented economic decision-making. In itself, the term sustainability contains much of the meaning of what competitiveness is and implies.

In the same year, Cabrero *et al* (2007: 4-5) reinforce the above argument by pointing out:

> [...] a competitive city is not one that only manages to attract investment due to its low labor costs but is one capable of creating better conditions by training the workforce more, raising productivity, and offering better urban-environmental and institutional, whether in terms of basic infrastructure and communications, as well as the quality of specialized services, technological innovations, a sustainable environment, transparent institutions, quality regulations, combating insecurity and promoting social cohesion, that is, better general conditions for economic production and the development of social life.

The same authors add that competitiveness is a set of elements in which the reduction of social inequities becomes a fundamental lever for attracting investment and opportunities (Cabrero *et al.,* 2007: 4-5).

A key issue of the competitiveness of cities is the dynamic established between the short and long term (Sobrino 2005: 149):

> […] the factors of local competitiveness are different in the short and long terms. In the first, the competitive base is determined by the local economic structure, the character and effectiveness of its institutions, and the quality and quantity of infrastructure (in other words, by its economies of urbanization and location that translate into the specialization of its economic structure). , while in the long term, competitiveness is sustained by the adoption of technological innovations and the formation of human capital, so investment in physical and human capital makes it possible to consolidate and increase local competitive advantages.

To operationally define the competitiveness of the federal entities applied in this work, we use the common arguments of the quoted authors defining competitiveness as "the ability of states to attract and retain talent and investment..., which translates into greater productivity and well-being for their inhabitants" (IMCO 2016: 87; Abdel and Romo 2005, Díaz Sánchez 2010). This investment attraction must be sustainable and compatible with the ecological and environmental balance. The achievement of territorial competitiveness is not an end in itself but is conceived as a vehicle to generate employment with decent wages, increase real income and the quality of life of the population, reduce poverty and achieve equity among the residents of the territory through inclusion and social cohesion.

Empirically, for this work, competitiveness is operationalized through the per capita investment per individual of the economically active population (EAP) and human talent that federal states attract. The last variable is represented by the percentage of people over 25 years of age who have completed a BA degree or its equivalent. Next, the objective and hypothesis state is presented.

OBJECTIVE AND HYPOTHESIS

It was previously commented that the meso level of the systemic competitiveness model by Esser *et al* (1996: 39-52), corresponds to the performance of the "State and social actors, who develop specific support policies, promote the formation of structures and articulate learning processes at the societal level". Similarly, the same authors point out that "State administration actors (from the local to the national level) move at the meso level, as well as public and private intermediate

institutions (technological, advisory and educational entities) (Esser *et al.* 1996: 50). Similarly, Labarca (2007:175) reinforces this position by pointing out that at the mesoeconomic level correspond those factors that impact the efficiency of the environment, the factor markets, the physical and institutional infrastructure and, in general, the specific policies for the creation of competitive advantages.

According to Aguilera (2005) quoted by Morales y Castellanos (2017: 121)

> [...] the meso level has been little studied at the global, regional, and national levels. Their development receives little attention because there are no adequate coordination structures between micro and macro local, regional, or national levels (Aguilera, 2005). Its importance lies in the fact that it is a means to link the actions of the public, private, and academic sectors, achieving, through participatory strategic planning, the coupling of structures and the promotion of the development and competitiveness of firms".

This is where the main contribution of this work lies since it attempts to empirically test the main arguments of the meso level of the systemic competitiveness model with information from the Mexican states for the period 2001-2020. This test could not be very precise since the statistical information that is generated in the country does not correspond precisely with the theoretical categories of the model. Another element of imprecision is that sometimes complete data series covering the period of analysis cannot be found, for example, some variables related to the perception of public safety.

CONSTRUCTION OF THE MODEL AND RESULTS

Following the IMCO tradition (IMCO 2019: 177) in this work, competitiveness is represented by two dependent variables: physical investment per member of the economically active population (EAP), which is taken as the gross fixed capital formation of the federal entities (IMCO 2019: 177). A second dependent variable (which represents another element of competitiveness) is human talent, which is measured as the percentage of people aged 25 or over with higher education or normal education, residing in the federal entity. The dependent variables of the model are presented in the following table and their expected sign. Two specifications of the model are run: in absolute numbers and logarithmic transformation, using the same variables.

Table 1

Variables used in empirical models

Name in model	Variable	Information it contains	Expected sign
investment	Investment	Pesos per economically active person	Dep. var
talent	Talent	Percentage of the population aged 25 and over, that has higher, normal, or technical education	Dep. var
homicide	Homicides	Intentional homicides per 100,000 inhabitants	-
incdelictiva	Criminal incidence	Common law crimes per thousand inhabitants	-
volresiduos	Volume of solid waste generated	Kilograms per inhabitant	-
intenerg	Energy intensity of the economy	Megawatt hours per million GDP	-
accsalud	Access to health institutions	Percentage of the economically active population that has access to health institutions	+
mujeract	Economically active women	Economically active women as a percentage of the economically active population	+
analfab	Illiteracy	Percentage of the population aged 15 and over that cannot read or write	-
scholarship	Scholarship	Average school grades passed by the population aged 15 and over	+
espvida	Life expectancy	Years	+
mortinf	Child mortality	Deaths of children under 1 year of age per thousand live births	-
inflaboral	Labor informality	Percentage of the employed economically active population that is in a condition of labor informality	-
absedsup	Absorption in higher education	Percentage	+
partlaboral	Labor participation	Employed economically active population as a percentage of the total population	+
telmovil	Mobile telephony	Percentage of total households that have a cell phone	+
acinternet	Internet Access	Percentage of total households that have Internet access	+
puntoventa	Point of sale terminals	Point of sale terminals for every 10,000 adults	+
cajautom	Automatic Teller Machines	ATMs for every 10,000 adults	+
ied	Foreign Direct Investment	Dollars per thousand GDP (3-year average)	+
expmerca	Export of goods	Percentage of GDP	+

To carry out the empirical test, educational, health, public safety, connectivity of firms and households, the labor sector, development of the financial system, development of the commercial system, and integration with the exterior variables are considered. These variables try to represent the meso level of the systemic competitiveness model, although there are limitations regarding the

compatibility of the theoretical concepts with the available statistical information, also when the statistical series coincide with the concepts, there are not necessarily sufficiently long series to form a panel data. For each sector, 1 or 2 variables are taken, which represent different aspects of it and are general enough to represent it. In the first instance, the models are presented in their specifications in absolute numbers.

The specification of the first model is as follows: investment= c + α homicide + β criminal + γ volresiduos + δ intenerg + ε accsalud+ ζ mujeract + η analphab + θ schooling + ι espvida+ κ mortinf + λ inflaboral + μ absedsup + ν partlaboral + ξ telmovil + ο acinternet + π point-of-sale + ρ cajaautom + ς ied + τ expmerca + ui.

Table 2

Model 1.- Dependent variable: investment. Absolute values. Results of different estimation methods

Variable	LSR	Data panel Random Effects	Data Panel Fixed Effects	PCSE	Expected sign
ied	-194.23511	149.03648	341.92128	-194.2351	+
expmerca	127.56182***	255.37516***	262.42607***	127.5635***	+
telmovil	-64.171481	-79.840031	-109.8867*	-64.17148**	+
acinternet	328.52559***	148.09342**	61.797727	328.5256***	+
puntoventa	61.731394**	212.95798***	226.03898***	61.73139**	+
cajautom	2584.4692***	903.91184	1840.9773*	2584.469***	+
analfab	1920.2387***	375.28603	-741.54011	1920.239***	-
escolaridad	12004.632***	5775.3372*	414.75548	12004.63***	+
absedsup	38.232054	-35.974646	-12.303626	38.23205	+
mortinf	-728.44681**	350.12318	644.68905**	-728.4468**	-
mujeract	656.46704**	-714.95588**	-496.61685	656.467**	+
inflaboral	-408.4014***	-176.94921	-543.56727***	-408.4015***	-
partlaboral	-1828.245***	380.78352	539.68663*	-1828.246***	+
homicidio	-132.769***	- 31.688894	- 16.1149	-132.7699***	-
incdelictiva	-267.563***	396.01694***	483.63978***	-267.5635***	-
volresiduos	48.170523***	62.766587*	143.20623***	48.17052***	-
intenerg	-553.6506***	-600.3639***	-580.9066***	-553.6506***	-
Constante	-2472.935	-16644.197	7596.161	-2472.935	
N =	576	576	576	576	
R2	0.8673802		0.91476151	0.8674	
Adjusted R2	0.863339		0.90699786		
*significant at 10%; **significant at 5%; significant at 1%.					

LSR: Least square regression.
PCSE: Prais-Winsten regression model (Panel Corrected Standard Errors).

Table 2 presents the estimate of investment attraction (dependent variable) by state. The specification is in absolute terms and different estimation methods are presented: Ordinary Least Squares (OLS); panel data with random effects and with fixed effects and the Prais-Winsten regression called Panel Corrected Standard Errors (PCSE). The latter is the most robust since it corrects problems of heterogeneity, contemporaneous correlation, heteroscedasticity, and autocorrelation. Due to the strengths of this last estimate, emphasis will be placed on its results. The results of the different estimations are presented in the following table:

Table 3

Model 1 results. Dependent variable: investment. Absolute values

Variable	Meaning	No. models in which it is significant*	Correct sign	Significant in PCSE**
ied	Foreign direct investment	0	2	no
expmerca	Export of goods	4	4	**Yes**
telmovil	Mobile telephony	2	0	No
acinternet	Internet access	4	4	**Yes**
puntoventa	Point of sale terminals	4	4	**Yes**
cajautom	ATMs	3	4	**Yes**
analfab	Illiteracy	2	1	**Yes**
escolaridad	Scholarship	3	3	**Yes**
absedsup	Absorption in higher education	0	2	No
mortinf	Child mortality	2	2	**Yes**
mujeract	Economically active women	3	2	**Yes**
inflaboral	Labor informality	3	4	**Yes**
partlaboral	Labor participation	2	2	No
homicidio	Homicides	2	4	**Yes**
incdelictiva	Criminal incidence	4	2	**Yes**
volresiduos	Volume of solid waste generated	4	0	No
intenerg	Energy intensity of the economy	4	4	**Yes**

*Significant and correct sign. ** any level of representativeness (10, 5, and 1%)

It is important to highlight that, in Table 3, the significant variables with the correct sign in column 5 (PCSE) are the ones that generate the best results: merchandise exports, Internet access, the existence of the largest number of points of sale, the existence of more ATMs, the existence of a lower level of illiteracy, a population with higher education, the presence of lower infant mortality, more equitable access for women to the labor market, less labor informality, a lower level of homicides, and a lower level of criminal incidence and lower energy intensity.

The second model has the same specification, changing only the dependent variable, which in this case is the human talent variable expressed in absolute terms. The results are presented in Table 4.

Table 4

Model 2.- Dependent variable: talent. Absolute values. Results of different estimation methods

Variable	OLS	Data Panel Random Effects	Data Panel Fixed Effects	PCSE	Expected sign
ied	-0.1200686 **	-0.0861005*	-0.0905132**	-0.1200686**	+
expmerca	-0.0341677***	0.0291207***	-0.0244266***	-0.0341677***	+
telmovil	-0.0717153***	-0.0251502**	-0.0187663*	-0.0171715***	+
acinternet	-0.0272171**	-0.0117139*	0.0040258	-0.0272171**	+
puntoventa	-0.0235985***	-0.0025746**	0.0060499*	-0.0235985***	+
cajautom	0.5706613***	0.218553**	0.1120187	0.5706613***	+
analfab	0.3615009***	-0.0204756	0.0584547	0.3615009***	-
escolaridad	3.999625***	1.140519***	1.346864***	3.999625***	+
absedsup	0.0457711***	0.0089008*	0.0000894	0.0457711***	+
mortinf	-0.121099**	-0.0204756***	-0.2050602***	-0.121099*	-
mujeract	-0.0135088	0.2529706***	0.2223175***	-0.0135088	+
inflaboral	-0.1504395***	-0.1619951***	-0.07364**	-0.1504395***	-
partlaboral	0.1628502***	-0.0456682	-0.0134893	0.1628502***	+
homicidio	-0.0166474**	-0.0050329	-0.0073989*	-0.0166474**	-
incdelictiva	-0.0511609***	-0.138714	-0.0046703**	-0.0511609***	-
volresiduos	0.0217236***	0.0180402***	-0.0006042	0.0217236***	-
intenerg	0.0369604*	0.0284514*	0.0360205*	0.0369604***	-
Constante	-15.831351***	10.016925**	10.160113**		
N =	576	576	576	576	
R2	0.8673802		0.91476151	0.9212	
Adjusted R2	0.863339		0.90699786		

*Significant at 10%; **significant at 5%; significant at 1%.
OLS: ordinary least squares
PCSE: Prais-Winsten regression model (Panel Corrected Standard Errors).

The results of this estimation are presented in Table 5. In this model, less promising results are obtained. The significant variables with the correct sign are found in column 5 (PCSE) marked with yes. These are the existence of more ATMs, the existence of a higher level of schooling, the presence of lower infant mortality, more equitable access for women to the labor market, less labor informality, and, conversely, greater labor participation, a lower level of homicides, and a lower level of criminal incidence and lower energy intensity. A variable that was not significant in the first model is added (the existence of a higher level of absorption of the state's higher education system).

Table 5.

Model 2 results. Dependent variable: human talent. Absolute values

variable	meaning	No. models in which it is significant*	Correct Sign	Significant in PCSE**
ied	Foreign direct investment	4	0	no
expmerca	Export of goods	4	1	no
telmovil	Mobile telephony	4	0	no
acinternet	Internet access	3	1	no
puntoventa	Point of sale terminals	4	1	no
cajautom	ATMs	3	4	**Yes**
analfab	Illiteracy	2	1	No
escolaridad	Scholarship	4	4	**Yes**
absedsup	Absorption in higher education	3	4	**Yes**
mortinf	Child mortality	4	4	**Yes**
mujeract	Economically active women	2	2	No
inflaboral	Labor informality	4	4	**Yes**
partlaboral	Labor participation	2	2	**Yes**
homicidio	Homicides	3	4	**Yes**
incdelictiva	Criminal incidence	3	4	No
volresiduos	Volume of solid waste generated	3	1	**Yes**
intenerg	Energy intensity of the economy	4	0	no

*Significant and correct sign. ** any level of representativeness (10, 5, and 1%)
Source: panel data models

A second stage in the tests is to run the same models but in the logarithmic specification. The calculation of the two models is performed by taking the natural logarithms of all the continuous variables to represent elasticities. In addition, the logarithmic transformation has various properties that make it attractive, since it reduces both the asymmetry and the heteroscedasticity of the variables (Gujarati & Porter, 2010; Aparicio & Márquez, 2005). The specification of the first logarithmic model with the logarithm of investment as the dependent variable has the following specification:

The specification of this model is as follows: lninversion= c + α lnied + β lnexpmerca + γ lntelmovil + δ lnacinternet + ε lnpuntdeventa + ζ lncajautom + η lnanalfab + θ lnescolaridad + ι lnabsedsup + κ lnmortinf + λ lnmujeract + μ lninlaboral + ν lnpartlaboral + ξ lnhomicide + ο lnincdelivery + π lnvolwaste + ρ lnintenerg + ui.

The results of different estimations of this model are presented in Table 6.

Table 6

Model 3.- Dependent variable: investment. Logarithmic specification. Results of alternative methods of estimation

Variable	OLS	Data Panel Random Effects	Data Panel Fixed Effects	PCSE	Expected sign
lnied	-0.0287289***	-0.00137897	0.00031689	-0.028728***	+
lnexpmerca	0.05501197***	0.02397945**	0.01299926	0.055119***	+
lntelmovil	0.00650955	-0.08221165**	0.0677561*	0.00650955	+
lnacinternet	0.01178873	0.0129967	-0.01378868	0.01178873	+
lnpuntoventa	0.18498277***	0.07120986**	0.03281863	0.184982***	+
lncajautom	0.25161937***	0.08172036*	0.07205711	0.251619***	+
lnanalfab	-0.01879477	-0.02744956	-0.05522527	-0.01879477	-
lnescolaridad	0.92623641***	1.8361297***	2.1418916***	0.926236***	+
lnabsedsup	-0.3173521	0.04126794	0.05185453*	-0.03173521	+
lnmortinf	-0.12317463**	-0.12058567**	-0.09752097*	-0.1231746**	-
lnmujeract	0.37093927***	-0.08299142	-0.06196385	0.370939***	+
lninflaboral	-0.5939083***	-0.58986262***	-0.55046594***	-0.593908***	-
lnpartlaboral	-0.7679896***	-0.23828204	-0.29911046*	-0.767989***	+
lnhomicidio	0.00561048	0.02141147***	0.01875201**	0.00561048	-
lnincdelictiva	-0.0376553***	0.01782153	0.02028417	-0.037655***	-
lnvolresiduos	10.1470851*	-0.20599174		-0.1470851**	-
lnintenerg	-0.3139478***	-0.47061004***	-0.48942113***	-0.313947***	-
Constante	20.117976	0.9893748	-0.94225498	20.117976*	
N =	576	576	576	576	
R2	0.9394		0.9651	0.9394	
Adjusted R2	0.9373		0.9620		

*Significant at 10%; **significant at 5%; significant at 1%.
OLS: ordinary least squares
PCSE: Prais-Winsten regression model (Panel Corrected Standard Errors).

The results of the different estimations of this model are presented in Table 7. In this case, it can be established that the attraction of investments in a federal entity is associated with variables such as merchandise exports, and the existence of point-of-sale terminals and ATMs. Similarly, states with higher levels of education, lower infant mortality, and less labor informality are more attractive for investment. A lower crime rate and lower energy intensity (greater efficiency) are also factors of competitiveness.

Table 7

Model 3 results. Dependent variable: investment. logarithmic transformation

Variable	Meaning	No. models in which it is significant*	Correct Sign	Significant in PCSE**
lnied	Foreign direct investment	2	1	no
lnexpmerca	Export of goods	3	4	**Yes**
lntelmovil	Mobile telephony	2	3	No
lnacinternet	Internet access	0	3	No
lnpuntoventa	Point of sale terminals	3	3	**Yes**
lncajautom	ATMs	3	4	**Yes**
lnanalfab	Illiteracy	0	4	No
lnescolaridad	Scholarship	4	4	**Yes**
lnabsedsup	Absorption in higher education	0	2	No
lnmortinf	Child mortality	4	4	**Yes**
lnmujeract	Economically active women	2	2	**Yes**
lninflaboral	Labor informality	4	4	**Yes**
lnpartlaboral	Labor participation	3	0	No
lnhomicidio	Homicides	2	0	No
lnincdelictiva	Criminal incidence	2	2	**Yes**
lnvolresiduos	Volume of solid waste generated	2	1	No
lnintenerg	Energy intensity of the economy	4	4	**yes**

*Significant and correct sign. ** Any level of representativeness (10, 5 and 1%)
Source: panel data models

The specification of the second logarithmic model has Intalent as the dependent variable and as independent variables the same ones used in the first model. The results of different estimation methods are presented in Table 8, and a summary of the results is presented in Table 9.

In this model that has as a dependent variable the attraction of talent by the federal entities, in its logarithmic specification, the relevant variables are the existence of a greater number of ATMs, better absorption of the higher education system in the state, lower infant mortality, a higher proportion of economically active women, lower labor informality and, correspondingly, higher labor participation. On the public safety side, the states that attract the most human talent are those with the lowest level of homicides and criminal incidence and greater energy efficiency of the economy.

Table 8

Model 4.- Dependent variable: logtalent. Logarithmic specification. Results of different estimation methods

Variable	OLS	Data Panel Random Effects	Data panel Fixed Effects	PCSE	Expected Sign
lnied	-0.01039291	-0.00137897	-0.01116713**	-0.01039291*	+
lnexpmerca	-0.02105537***	0.02397945**	-0.01109211	-0.0210553***	+
lntelmovil	-0.1770304***	-0.08221165**	-0.01338795	-0.1770304***	+
lnacinternet	-0.06998279***	0.0129967	0.00741047	-0.0699827***	+
lnpuntoventa	-0.10159324***	0.07120986**	0.0270232	-0.1015932***	+
lncajautom	0.08859747***	0.08172036*	0.02732731	0.08859747***	+
lnanalfab	0.0395472*	-0.02744956	0.04454661*	0.0395472**	-
lnescolaridad	1.556709***	1.8361597***	-0.38047636*	1.5556709***	+
lnabsedsup	0.13215519***	0.04126794	-0.0273075	0.13215519***	+
lnmortinf	-0.14202187***	-0.12058567**	-0.15093822***	-0.1420218***	-
lnmujeract	0.14336559*	-0.08299142	0.39964396***	0.143365385	+
lninflaboral	-0.33502947***	-0.5898626***	0.22202768*	-0.3350294***	-
lnpartlaboral	0.35677682***	-0.23828204	-0.00556324	0.35677682***	+
lnhomicidio	-0.02990573***	0.02141147***	-0.01537066***	-0.0299057***	-
lnincdelictiva	-0.0220411**	0.01782153	0.00274852	-0.0220411***	-
lnvolresiduos	0.28228677***	-0.20599174	0.04999977	0.28228677***	-
lnintenerg	-0.01881052	-0.4706100***	0.04797986*	-0.01881052	-
Constante	5.817124	0.98939748	4.7327869*	5.817124*	
N =	576	576	576	576	
R2	0.9091		0.7337	0.9092	
Adjusted R2	0.9061		0.7083		

*Significant at 10%; **significant at 5%; significant at 1%.

OLS: ordinary least squares

PCSE: Prais-Winsten regression model called Panel Corrected Standard Errors, which corrects for problems of heterogeneity, contemporaneous correlation, heteroscedasticity, and autocorrelation.

Table 9

Model 4 results. Dependent variable: Intalent. logarithmic transformation

Variable	Meaning	No. models in which it is significant*	Correct sign	Significant in PCSE**
lnied	Foreign direct investment	2	0	no
lnexpmerca	Export of goods	3	1	no
lntelmovil	Mobile telephony	4	0	no
lnacinternet	Internet access	2	2	no
lnpuntoventa	Point of sale terminals	2	2	no
lncajautom	ATMs	3	4	Yes
lnanalfab	Illiteracy	3	1	No
lnescolaridad	Scholarship	3	1	No
lnabsedsup	Absorption in higher education	2	3	Yes
lnmortinf	Child mortality	4	4	Yes
lnmujeract	Economically active women	2	3	Yes
lninflaboral	Labor informality	4	3	Yes
lnpartlaboral	Labor participation	2	2	Yes
lnhomicidio	Homicides	4	3	Yes
lnincdelictiva	Criminal incidence	2	2	Yes
lnvolresiduos	Volume of solid waste generated	2	1	No
lnintenerg	Energy intensity of the economy	2	3	Yes

*Significant and correct sign. ** any level of representativeness (10, 5, and 1%)

CONCLUSIONS

In this paper, the meso level of the systemic competitiveness model is empirically tested. This test should be seen as a first attempt since developing a more accurate model requires compliance with a series of requirements: a) Theoretical concepts are developed without considering the statistical series that may represent them, so an accommodation must be sought between both.

Although it is pointed out that the meso level is integrated by policies, many of them corresponding to the intermediate levels of government (states or provinces), it can be established that the statistical series correspond to the effects of said policies (education, health, technology, integration of the financial system, the commercial logistics system, the foreign sector, and public security policy, among others.

Regarding the results of the paper, it can be noted that the starting concept defines the competitiveness of states as the ability to attract investment and human talent. Two models were estimated that have the above variables as dependent. Two specifications were used for each model: absolute numbers and logarithmic transformation. In general, there are coincidences in the results, which are highlighted below.

The results of the empirical estimates highlight that a federal entity is more competitive if they have a good educational policy that increases schooling, decreases illiteracy, and whose higher education system has a greater capacity to absorb the demand for this service. States whose public security policies allow the incidence of crime to be lowered, including violent crimes, are also more competitive. Federal entities whose public health policy enables low infant mortality, among other important effects, are more competitive. States that export more goods and services and attract more foreign direct investment are also more competitive. In the same way, federal entities whose labor policy allows greater participation of women, decrease informality, and increase the participation of the population in the labor market are more competitive. Finally, states that have better connectivity and greater integration of their financial and commercial systems are more competitive.

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Chapter 10

Malting Barley Competitive Factors in Mexico, 2000-2020

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Malting Barley Competitive Factors in Mexico, 2000-2020

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INTRODUCTION

Barley (*Hordeum vulgare*) is a crop with a short vegetative cycle that does not require loads of fertilizer and water to obtain the desired yield. In addition, it performs better in areas with late storms and short frost-free periods. (SIAP, 2006).

The production and yield of barley in Mexico have increased in recent years which is mainly destinated to the production of beer. Mexico is currently the largest exporter of malting barley in the world increasing the demand for barley in the country, in this sense, a greater efficiency in yield per hectare is sought by incorporating new technologies related to production to determine the quantity that maximizes production and minimizes environmental problems, also improving the profitability of the crop (Pagani, 2009).

In this regard, the importance of increasing competitive advantages, which essentially increases with the value that a company can provide. The concept of value represents what buyers are willing to pay and the growth of the value to a higher level is due to the ability to offer lower prices than competitors for a similar advantage or offer an advantage in the market that can compensate higher prices (Porter, 1985).

The importance of increasing competitive advantages provides better opportunities for insertion in international markets. It is therefore important to analyze the situation of some economic sectors. In this sense, the objective of this chapter is to describe the competitive factors of Mexican malting barley in the period from 2000 to 2020, through competitiveness indices. This will allow dimensioning the importance of imports of malting barley, its

significance about exports; and its influence on the trade balance, local consumption (taking national production into account), and trends in the sector's development.

The scope of this study is to describe the production, export and import of malting barley in the world market by identifying the main producing and consuming countries, as well as the countries involved in the international trade of this cereal, and helping propose strategies to improve their competitive factors.

DEVELOPMENT

Malting barley

Barley (Hordeum vulgare L) is a cereal growing in most climates, been one of the most cultivated cereals in the world for about 7,000 years. This cereal is native from Western Asia in countries such as Saudi Arabia, Armenia, Azerbaijan, Bahrain, Qatar, Cyprus, United Arab Emirates, Georgia, Iraq, Iran, Israel.

Barley is cultivated in two species: *Hordeum distichon and Hordeum hexastichon*, among its most important uses are fodder for cattle feed, for pearl barley, for human consumption and barley extract for brewing beer.

International Context

Barley is the fourth most important cereal in the world just after wheat, corn and rice. It represents two thirds of the world's feed grains, due to the market attractiveness. Barley cultivation has developed throughout history due to its fundamental role in animal feed, industry and human consumption, especially in regions of Asia and Africa (Abbasian, 2010).

In the production of malting barley worldwide during the year 2019, the main countries were China followed by the United States, Brazil and Mexico (Table 1).

Table 1

Malting barley breweries countries

Nº	Country	Tons	%
1	China	38,254,200	17.3
2	China, Continental	37,653,000	17.0
3	United States of America	21,088,400	9.5
4	Brazil	17,143,518	7.8
5	Mexico	12,450,242	5.6
6	Germany	8,040,566	3.6
7	Russia	7,692,420	3.5
8	Vietnam	4,600,000	2.1
9	Spain	3,930,000	1.8
10	UK	3,924,700	1.8

Note: Elaboration based on FAOSTAT. *Database Results*, tons., 2022

Barley is an important grain crop for Mexico as raw material in the agricultural industry to produce beer and food, being the main malting barley exporter worldwide, followed by the Netherlands, Belgium, Germany and France; from a total of 167 malting barley exporter countries (Table 2).

Table 2

Malting barley exporting countries

Nº	Country	Tons	%
1	Mexico	3,225,416	20.0
2	Netherlands	1,879,572	11.6
3	Belgic	1,787,630	11.1
4	Germany	1,513,024	9.4
5	France	526,369	3.3
6	Czech Republic	507,078	3.1
7	UK	462,100	2.9
8	Ireland	456,930	2.8
9	China	425,603	2.6
10	Poland	406,674	2.5

Source: Elaboration based on FAOSTAT *Database Results*, tons., 2022

The participation of Mexico in relation to the countries that import malting barley is low, since it ranked 64, with 29,240 tons imported in 2020. The country with the highest imports of malting barley is the United States of America with 25%, followed by the United Kingdom and France (Table 3).

Table 3

Malting barley importing countries

Nº	Country	Tons	%
1	United States of America	4,268,830	25.0
2	UK	1,063,576	6.2
3	France	1,023,630	6.0
4	China	958,286	5.6
5	Germany	683,283	4.0
6	Italy	611,906	3.6
7	China, Continental	584,229	3.4
8	Netherlands	558,789	3.3
9	Spain	523,108	3.1
10	Russia	501,610	2.9
64	Mexico	29,240	0.2

Source: Elaboration based on FAOSTAT *Database Results*, tons., 2022

Nacional Context

Malting barley is of great social and economic importance in Mexico, it represents the main income of families living in the harvest areas of the Valles Altos (Puebla, Tlaxcala, Hidalgo, Estado de México, Durango y Zacatecas). In the same manner, it is important as a raw material for: the brewing industry, animal feed and, to a lesser extent, for human food (Zamora, 2008).

At the national level, the agricultural production of barley is distributed among the state of Hidalgo followed by Guanajuato. The yield of this crop has significant differences, while in Guanajuato the amounts rise to 5.1 tons/ha, in Hidalgo barely reaches 1.8 tons/ha. This is attributed to the surface affected by hydro meteorological phenomena (SIAP, 2020).

Table 4

Main malting barley producers in Mexico

State	Harvest area (has.)	Tons	Yields
Guanajuato	68,262.16	349,047.44	5.1
Hidalgo	109,842.56	200,237.46	1.8
Tlaxcala	57,274.43	139,985.58	2.4
México	39,872.33	71,530.62	1.7
Puebla	30,637.16	82,698.44	2.7

Source: Elaboration based on SIAP, 2020.

Barley is the key element to produce beer. Mexico is the fifth world beer producer (12,450,242 tons), mainly exporting to The United States of America, Australia and the United Kingdom.

Based on the FAO information, it was possible to obtain the production, export and import of malting barley, with the purpose of accomplishing and obtaining the competitive factors of this sector (table 5).

Table 5

Mexican malting barley production, export and import

Year	Production (P)	Export (X)	Import (M)
2000	5,985,100	1,052,618	47,894
2001	6,163,200	1,208,435	63,517
2002	6,370,000	1,305,000	87,154
2003	6,642,000	1,385,700	96,031
2004	6,848,200	1,448,577	94,371
2005	7,255,800	1,623,696	112,669
2006	7,816,200	1,923,907	129,183
2007	8,100,000	1,937,444	142,315
2008	8,234,300	2,026,872	148,950
2009	8,232,500	1,646,096	131,716
2010	8,071,520	1,794,857	129,012
2011	8,559,563	2,148,331	132,934
2012	8,729,517	2,403,606	140,472

Year	Production (P)	Export (X)	Import (M)
2013	8,521,038	2,344,111	161,209
2014	8,588,180	2,747,099	172,055
2015	9,692,811	2,848,625	256,643
2016	10,431,595	3,222,786	252,942
2017	11,005,496	3,312,471	262,267
2018	12,162,562	3,952,033	282,538
2019	12,450,242	3,654,659	116,256
2020	11,827,730	3,225,416	29,240
Media	8,651,788	2,248,207	142,351
TMCA %	3.30%	5.48%	-2.32%

Source: Elaboration based on FAOSTAT *Database Results*, tons., 2022

RESEARCH METHOD

Competitiveness is understood as the degree to which a country; under free and fair market conditions, can produce goods and services accepted in international markets, steadily increasing the real income of its population (Schwab & Zahidi, 2020). The Institute for Management Development (IMD) mentions that competitiveness is the ability of a country or a company to, proportionally, generate more wealth than its competitors in international markets. While The Inter-American Development Bank (IDB) joints the competitiveness of an economy to the creation of the necessary conditions for business development and the sustainable increase in productivity and per capita income. In the IDB's vision, a country's export performance and its level of competitiveness are different but interrelated concepts, to the extent that export success tends to be a consequence of high levels of competitiveness (Pat, et al, 2016).

Competitiveness is measured through indicators to evaluate different aspects of a country's life. These types of measures are used for different purposes. On the one hand, they are a reference for decision-making on investment (establishing a company, business expansion, change of headquarters, etc.) and because they offer a diagnosis about many vital elements for the operation of companies (educational attainment of the population, health

conditions, available infrastructure, etc.), so that a more competitive country or region translates into a better investment option, and therefore, for employment generation.

Degree of Export Openness (DEO)

This indicator provides a comparison the exporting based on their internal consumption, that is, excluding apparent consumption. With an index close to 0, it is less competitive, since a large part of its production is oriented to the internal market. It is expressed in the following formula 1.

$$DEO = \frac{X}{P+(M-X)} \quad (1)$$

P, Production: X, Exportations; y M, Importations.

Establishing the worldwide market participation or a specific market. It not only examines exports, but also establishes the country's export specialization and its ability to build permanent advantages, evidenced by the product's trade balance (Pat, et al., 2016).

Import Penetration Rate (IPR)

It shows the relationship between a country's imports, with respect to its apparent consumption. If the index is higher, it will represent a greater purchasing power, and therefore it is said that that country is less competitive, since it is not capable of producing enough to supply its internal market. It is expressed by the formula 2.

$$IPR = \frac{M}{P+(M-X)} \quad (2)$$

The objective of the index is to characterize the behavior of the exports and imports as well as the competitiveness indicators of malting barley. As this indicator is higher, the competitiveness of the productive 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 null, even managing to destinate part of the national production for export (idem).

Relative Balance of Trade (RBT)

This indicator measures the relationship between the product trade balance and the product total trade for a country in the worldwide market. It consists of getting an overall about the condition of the chain in the market. It is assumed that an export chain is more competitive than one that is not or that has to fundamentally import its raw materials or intermediate goods

$$RBT = \frac{X-M}{X+M} \quad (3)$$

If RBT approaches the value 1, the greater the importance of exports in relation to imports. An indicator close to –1 allows identifying potential markets; and, in the beginning, countries with BOTs close to 1 can be discard as potential buyers because they satisfy both, the domestic market besides export. It is expressed in the following formula 3.

Tradable Index (TI)

When the indicator is greater than zero, the sector is considered an exporter, since there is an excess supply, in other words, it is a competitive sector within the country. When the indicator is less than zero, the sector is an import substitute, since there is excess

$$Tij = \frac{X-M}{P+(M-X)} \quad (4)$$

If the RTM value is close to -1, they may be important recipients of the products, since they are countries totally dependent the imports of the evaluated goods. Countries with RTM close to 0 indicate capacity close to self-supply. In this manner, positive values indicate that they are exporters. It is expressed by the arithmetic formula 4.

RESULTS AND DISCUSSION

This part focuses on the variables analysis related to Mexican malting barley production, exports and imports in tons, from which the competitiveness indices were built which characteristics determined Mexico as an international market leader of this cereal.

Degree of Export Openness

This index allows to appreciate the importance of exports from a producing country in the international market, considering local production relating exports to the internal market. In other words, it considers whether, in the first instance, the national demand market is met.

Table 6

Mexico Malting barley degree of openness index

Year	P	X	M	M-X	P+(M-X)	X/(P+(M-X))
2000	5,985,100	1,052,618	47,894	-1,004,724	4,980,376	0.21
2001	6,163,200	1,208,435	63,517	-1,144,918	5,018,282	0.24
2002	6,370,000	1,305,000	87,154	-1,217,846	5,152,154	0.25
2003	6,642,000	1,385,700	96,031	-1,289,669	5,352,331	0.26
2004	6,848,200	1,448,577	94,371	-1,354,206	5,493,994	0.26
2005	7,255,800	1,623,696	112,669	-1,511,027	5,744,773	0.28
2006	7,816,200	1,923,907	129,183	-1,794,724	6,021,476	0.32
2007	8,100,000	1,937,444	142,315	-1,795,129	6,304,871	0.31
2008	8,234,300	2,026,872	148,950	-1,877,922	6,356,378	0.32
2009	8,232,500	1,646,096	131,716	-1,514,380	6,718,120	0.25
2010	8,071,520	1,794,857	129,012	-1,665,845	6,405,675	0.28
2011	8,559,563	2,148,331	132,934	-2,015,397	6,544,166	0.33
2012	8,729,517	2,403,606	140,472	-2,263,134	6,466,383	0.37
2013	8,521,038	2,344,111	161,209	-2,182,902	6,338,136	0.37
2014	8,588,180	2,747,099	172,055	-2,575,044	6,013,136	0.46
2015	9,692,811	2,848,625	256,643	-2,591,982	7,100,829	0.40

Year	P	X	M	M-X	P+(M-X)	X/(P+(M-X))
2016	10,431,595	3,222,786	252,942	-2,969,844	7,461,751	0.43
2017	11,005,496	3,312,471	262,267	-3,050,204	7,955,292	0.42
2018	12,162,562	3,952,033	282,538	-3,669,495	8,493,067	0.47
2019	12,450,242	3,654,659	116,256	-3,538,403	8,911,839	0.41
2020	11,827,730	3,225,416	29,240	-3,196,176	8,631,554	0.37

Source: Elaboration based on FAOSTAT *Database Results*, tons., 2022.

As it can be seen in table 6, the index is greater than 0 every year, and represents that Mexican malting barley is competitive, since the sector covers the domestic market, and a large part of the production is export oriented. As of 2011, a greater increase is observed.

Import Penetration Rate

It is the proportion of apparent consumption supplied with imports. As this indicator is higher, the competitiveness of Mexican malting barley will be lower. If the index is higher, it will represent a greater purchasing power, and therefore, it is said that the country is less competitive, since it is not capable of producing enough to supply the internal market.

Table 7

Mexico malting barley imports penetration rate

Year	P	X	M	M-X	P+(M-X)	M/P+(M-X)
2000	5,985,100	1,052,618	47,894	-1,004,724	6,032,994	0.01
2001	6,163,200	1,208,435	63,517	-1,144,918	6,226,717	0.01
2002	6,370,000	1,305,000	87,154	-1,217,846	6,457,154	0.01
2003	6,642,000	1,385,700	96,031	-1,289,669	6,738,031	0.01
2004	6,848,200	1,448,577	94,371	-1,354,206	6,942,571	0.01
2005	7,255,800	1,623,696	112,669	-1,511,027	7,368,469	0.02
2006	7,816,200	1,923,907	129,183	-1,794,724	7,945,383	0.02
2007	8,100,000	1,937,444	142,315	-1,795,129	8,242,315	0.02
2008	8,234,300	2,026,872	148,950	-1,877,922	8,383,250	0.02
2009	8,232,500	1,646,096	131,716	-1,514,380	8,364,216	0.02
2010	8,071,520	1,794,857	129,012	-1,665,845	8,200,532	0.02
2011	8,559,563	2,148,331	132,934	-2,015,397	8,692,497	0.02

Year	P	X	M	M-X	P+(M-X)	M/P+(M-X)
2012	8,729,517	2,403,606	140,472	-2,263,134	8,869,989	0.02
2013	8,521,038	2,344,111	161,209	-2,182,902	8,682,247	0.02
2014	8,588,180	2,747,099	172,055	-2,575,044	8,760,235	0.02
2015	9,692,811	2,848,625	256,643	-2,591,982	9,949,454	0.03
2016	10,431,595	3,222,786	252,942	-2,969,844	10,684,537	0.02
2017	11,005,496	3,312,471	262,267	-3,050,204	11,267,763	0.02
2018	12,162,562	3,952,033	282,538	-3,669,495	12,445,100	0.02
2019	12,450,242	3,654,659	116,256	-3,538,403	12,566,498	0.01
2020	11,827,730	3,225,416	29,240	-3,196,176	11,856,970	0.00

Source: Self elaboration based on FAOSTAT *Database Results*, tons., 2022.

Table 7 shows that the import penetration indicator tends to zero, this means that the competitiveness of Mexican malting barley is greater, and that imports can become null, even managing to designate part of national production for export.

Relative Balance of Trade

The index is mainly used to recognize the products destined for export. It can be interpreted as a competitive advantage index indicating the presence of a competitive advantage if the result is a positive value. On the contrary, if the result is negative, it indicates that a country is oriented towards imports.

Table 8

Mexico malting barley Relative Balance of Trade

Year	P	X	M	X+M	X-M	X-M/X+M
2000	5,985,100	1,052,618	47,894	1,100,512	1,004,724	0.91
2001	6,163,200	1,208,435	63,517	1,271,952	1,144,918	0.90
2002	6,370,000	1,305,000	87,154	1,392,154	1,217,846	0.87
2003	6,642,000	1,385,700	96,031	1,481,731	1,289,669	0.87
2004	6,848,200	1,448,577	94,371	1,542,948	1,354,206	0.88
2005	7,255,800	1,623,696	112,669	1,736,365	1,511,027	0.87
2006	7,816,200	1,923,907	129,183	2,053,090	1,794,724	0.87
2007	8,100,000	1,937,444	142,315	2,079,759	1,795,129	0.86

Year	P	X	M	X+M	X-M	X-M/X+M
2008	8,234,300	2,026,872	148,950	2,175,822	1,877,922	0.86
2009	8,232,500	1,646,096	131,716	1,777,812	1,514,380	0.85
2010	8,071,520	1,794,857	129,012	1,923,869	1,665,845	0.87
2011	8,559,563	2,148,331	132,934	2,281,265	2,015,397	0.88
2012	8,729,517	2,403,606	140,472	2,544,078	2,263,134	0.89
2013	8,521,038	2,344,111	161,209	2,505,320	2,182,902	0.87
2014	8,588,180	2,747,099	172,055	2,919,154	2,575,044	0.88
2015	9,692,811	2,848,625	256,643	3,105,268	2,591,982	0.83
2016	10,431,595	3,222,786	252,942	3,475,728	2,969,844	0.85
2017	11,005,496	3,312,471	262,267	3,574,738	3,050,204	0.85
2018	12,162,562	3,952,033	282,538	4,234,571	3,669,495	0.87
2019	12,450,242	3,654,659	116,256	3,770,915	3,538,403	0.94
2020	11,827,730	3,225,416	29,240	3,254,656	3,196,176	0.98

Source: Self elaboration based on FAOSTAT *Database Results*, tons., 2022.

According to the results obtained in the application of the proposed methodology, this indicator shows the presence of a competitive advantage for Mexico in the malting barley export, because the value is positive, in the analyzed period, the relative balance of trace was in average of 0.88 in the period from 2000 to 2020 (table 8).

Tradable Index

It measures the relationship between the net exports 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 producer country.

Table 9

Mexican malting barley tradable index

Year	P	X	M	X-M	M-X	X-M/P+(M-X)
2000	5,985,100	1,052,618	47,894	1,004,724	-1,004,724	0.20
2001	6,163,200	1,208,435	63,517	1,144,918	-1,144,918	0.23
2002	6,370,000	1,305,000	87,154	1,217,846	-1,217,846	0.24
2003	6,642,000	1,385,700	96,031	1,289,669	-1,289,669	0.24

2004	6,848,200	1,448,577	94,371	1,354,206	-1,354,206	0.25
2005	7,255,800	1,623,696	112,669	1,511,027	-1,511,027	0.26
2006	7,816,200	1,923,907	129,183	1,794,724	-1,794,724	0.30
2007	8,100,000	1,937,444	142,315	1,795,129	-1,795,129	0.28
2008	8,234,300	2,026,872	148,950	1,877,922	-1,877,922	0.30
2009	8,232,500	1,646,096	131,716	1,514,380	-1,514,380	0.23
2010	8,071,520	1,794,857	129,012	1,665,845	-1,665,845	0.26
2011	8,559,563	2,148,331	132,934	2,015,397	-2,015,397	0.31
2012	8,729,517	2,403,606	140,472	2,263,134	-2,263,134	0.35
2013	8,521,038	2,344,111	161,209	2,182,902	-2,182,902	0.34
2014	8,588,180	2,747,099	172,055	2,575,044	-2,575,044	0.43
2015	9,692,811	2,848,625	256,643	2,591,982	-2,591,982	0.37
2016	10,431,595	3,222,786	252,942	2,969,844	-2,969,844	0.40
2017	11,005,496	3,312,471	262,267	3,050,204	-3,050,204	0.38
2018	12,162,562	3,952,033	282,538	3,669,495	-3,669,495	0.43
2019	12,450,242	3,654,659	116,256	3,538,403	-3,538,403	0.40
2020	11,827,730	3,225,416	29,240	3,196,176	-3,196,176	0.37

Source: Self elaboration based on FAOSTAT *Database Results*, tons., 2022.

CONCLUSIONS

This research used panel data from 2000 to 2020 from the information obtained from the Food and Agriculture Organization of the United Nations and concluded that grain barley is the key element for beer production. Mexico is the world's fourth largest beer producer. However, during 2016 domestic production represented 93.07% of the national requirements for beer barley. World beer imports have increased 46.53% in the last decade, while Mexican exports have also increased mainly to the United States, Australia and the United Kingdom.

The malting barley industry has been represented in a national and international headlight, considering variables such as production, import and export, indicating the main economic countries of this industry. The information is obtained from the Food and Agriculture Organization of the United Nations.

The degree of export openness of the Mexican malting barley was positive; which means, the beer internal demand in Mexico is being covered every year, exports are

overproducing, and Mexico is the number one worldwide exporter; with a lasting advantage in the production and export of barley; which confirms the representative data of the trade balance and the relative balance of trade.

Regarding the malting barley penetration rate imported into Mexico, it represents the apparent consumption rate due to barley imports. For this indicator, as well as for the previous indicators, along 21-year time series was analyzed. As a result of the calculations made, values greater than zero were obtained meaning the competitiveness of the malting barley industry is high and imports are very low (2%). As this index approaches zero, the competitiveness of the coffee industry will increase.

Based on the cereal market relative of balance indicator, the country is a beer exporter for the entire series analyzed. It is also important to observe that the net exports through the years indicate a positive trade balance in the foreign market for the Mexican malting barley, indicates that Mexico is an economic competitor in the international beer market. This indicator shows that Mexico has a competitive advantage in the malting barley exports due to the positive value. During the period reviewed, the relative trade of balance averaged 0.34 during the period 2000-2020.

The Mexican malting barley tradable index has shown that the industry has a high indicator. In the same matter, when the indicator is greater than zero, the sector is considered an exporter if there is an oversupply. Thus, this indicator shows that the Mexican beer industry is competitive in the domestic market. According to the results shown above, and based on previously calculated indicators, the malting barley industry is competitive, as seen in the study cases (2000-2020). Mexico has struggled to maintain and promote itself in a competitive environment through the dynamics of international trade.

Finally, the Mexican brewing industry is a clear example of how a market can be competitive even though very few companies operate there, the concentration does not determine the existence of market power. This confirms a fundamental point of empirical industrial organization: that the degree of concentration does not determine the conditions of competition within the market.

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The development of Organizational Transformation Post-Pandemic for Competitiveness is a book aimed at those who are interested in border research topics. It is integrated by ten chapters where twenty-four researchers from seven universities in Mexico participated: Universidad *Autónoma de Aguascalientes, Universidad Autónoma de Coahuila, Universidad de Guadalajara, Universidad de Guanajuato, Universidad Michoacana San Nicolás de Hidalgo, Universidad Autónoma de Nuevo León* & *la Universidad Autónoma de Querétaro,* whose contributions reflect the state of the art and empirical evidence of various public and private organizations.

Each chapter contributes transversely to various objectives of the National Strategic Programs in Mexico as well as to the SDGs. The authors address various problems regarding the transformation of organizations, which reflect the gender perspective used as part of organizational studies; the consequences faced by cooperatives after the pandemic; as well as optimization strategies and techniques in both the energy industry and agro-industrial sectors; in addition to delving into the role of emotional intelligence, organizational culture and brands in organizational competitiveness.