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Contaduría y Administración
Accounting & Management

Contaduría y Administración 70 (1), 2025, e492

Competitiveness in financial management measured through profitability; A comparison of the PEMEX oil company with Equinor of Norway

La competitividad en la gestión financiera medida a través de la rentabilidad; la empresa petrolera PEMEX y su comparativo con Equinor de Noruega

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Received September 2, 2023; accepted March 14, 2024
Available online March 19, 2024

Abstract

The present research prepared a diagnosis of the competitiveness of two state oil companies, PEMEX of Mexico and Equinor of Norway, mainly evaluating the influence of the profitability indicator on the competitiveness of both companies. The financial statements were used to measure and substantiate the previous indicator. The quantitative analysis was carried out using an ARIMA econometric model to examine the economic-financial performance of both companies from 2008 to 2019. With the results obtained from the model, we made a comparison and a projection of their behavior for the years 2020, 2021, and 2022; The Box Jenkins methodology was used. The results for PEMEX showed that the company's performance, in terms of its competitiveness measured by the profitability indicator, had an inefficient evolution with a decreasing trend. And for the Equinor company, the results showed that it has high business efficiency, with a stable trend. This research contributes to the generation of knowledge and provides information that could influence decision-makers to carry out business improvements.

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Peer Review under the responsibility of Universidad Nacional Autónoma de México.

http://dx.doi.org/10.22201/fca.24488410e.2025.5202

JEL Code: C53, Q43, M21
Keywords: competitiveness; profitability; oil companies; econometric model

Resumen

La presente investigación, elaboró un diagnóstico de la competitividad de dos empresas petroleras de estado, PEMEX de México y Equinor de Noruega, evaluando principalmente la influencia del indicador rentabilidad en la competitividad de ambas; para las mediciones y la fundamentación del indicador mencionado fueron utilizados los estados financieros de las mismas. El análisis cuantitativo se llevó a cabo mediante un modelo econométrico ARIMA con el objetivo de examinar el desempeño económico-financiero de ambas empresas, para un periodo del 2008 al 2019. Con los resultados obtenidos del modelo, realizamos la comparativa y una proyección de su comportamiento para los años 2020, 2021 y 2022, para ello fue utilizada la metodología Box Jenkins. Los resultados para PEMEX, mostraron que el desempeño de la empresa, en cuanto a su competitividad medido por el indicador de rentabilidad, tuvo un desarrollo ineficiente con tendencia decreciente. Y para la empresa Equinor, los resultados mostraron que tiene alta eficiencia empresarial, con tendencia estable. Esta investigación contribuye a la generación de conocimiento y proporciona información que podría influir en los tomadores de decisiones para llevar a cabo mejoras empresariales.

Código JEL: C53, Q43, M21
Palabras clave: competitividad; rentabilidad; empresas petroleras; modelo econométrico

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Introduction

The energy sector has several determinants nowadays. One is the competition among the world's biggest powers for access to oil resources. This leads to conflicts in many areas, and "in an environment of increasing uncertainties and risks in the economic, geopolitical, and climatic fields, oil companies—domestic and international—have sought to rationalize their organizational structures to withstand competition better" (Rousseau, 2008, p. 195).

Based on Rousseau's (2008) assertions, this study focuses on analyzing the economic situation of the oil company Petróleos Mexicanos (PEMEX) through financial management to measure the company's competitiveness through the financial indicator of profitability. Cano, Olivera, Balderrabano, and Pérez (2013, p. 82) state that "a company will be competitive if it is profitable"; furthermore, "any company that aspires to be competitive must adopt a certain financial strategy according to the nature of the variables that define the competition of the sector in which it operates."

Thus, profitability facilitates an analysis of the company's competitiveness and its influence on the overall health of the company. It is also worth mentioning that one of the factors that affect the company's results is that... [paragraph incomplete]

Mexico became an oil-producing country, and in 1938, the government created PEMEX as a state-owned oil company. The resources obtained from oil have represented approximately 40% of the budget revenues of the different governments in office. Consequently, it can be affirmed that there has been a significant participation of the oil sector in public finances over time, almost always to the detriment of the autonomy and finances of PEMEX (Sánchez, 2012).

In addition, the Mexican oil company "has shown a set of problems that have caused the loss of competitiveness, capabilities, and skills to boost its growth" (Romo, 2016, considerations section, paragraph 1). This shows that for countries directly committed to oil resources—as in the Mexican case—efforts are made to elucidate through different studies the various problems related to this important resource (Stavenhagen, 1979).

For several specialists, such as Acosta and Medina (1999), the term competitiveness is a key aspect of companies and represents, in a high percentage, a key factor for entrepreneurial success. Competitiveness is measured by "the relative position of the company in its sector or its competitive environment, the framework in which the generation of value by the company takes place, i.e., its income, its profit, its financial, or economic surplus, or its cash flow" (Bueno, 1987 in Villa, 2022, p. 122).

To determine the degree to which a company is competitive, measurements are established through different indicators that arise from the economic-financial results of the companies. Therefore, to provide relevant knowledge for decision making and contribute to its future development, this study is focused on analyzing and measuring the influence of the profitability indicator on competitiveness. With this objective in mind, the financial diagnosis of the Mexican oil company in terms of the profitability indicator was carried out, as well as for the Norwegian oil company, Equinor. This company is known for having a model regarded as one of the most successful at present since "the Equinor oil company started only in the seventies of the last century in the oil industry, and today is considered one of the world leaders" and this is mostly due to its tax regime (Romo, Perez & Jimenez, 2013, pp. 52-65).

This research developed a methodology to evaluate the impact of the profitability indicator on the competitiveness of both oil companies. For this purpose, both companies were analyzed, since both have some organizational similarities, to determine how the profitability indicator, which is an important part of the financial management of a company, influences its competitiveness.

First, the consolidated financial statements of both companies for a given period were used, and a financial diagnosis was made using the indicator mentioned above to establish the status of both companies. Subsequently, a comparison was made between the two companies and applying the Box Jenkins methodology, a projection was developed for the near future to determine the behavior of the profitability indicator in both organizations. All this was done to provide knowledge that allows the

development of strategies that favor the improvement of the competitiveness of the Mexican oil company, which is considered a cornerstone for Mexico.

This research aims to analyze and diagnose the economic-financial management of the oil companies PEMEX and Equinor to determine the influence of the profitability indicator on the competitiveness of both, to make a comparison between them later, and to make a projection for 2022 to generate knowledge that will help decision makers to take actions that will improve the future performance of the company. Therefore, the specific objective is summarized as follows: to compare the economic-financial situation concerning the profitability variable of the companies PEMEX and Equinor and their future projection.

Furthermore, the objective is to resolve both the research question and the hypothesis of this study. The research question is:

Q1: Is PEMEX less competitive in the profitability variable than Equinor of Norway?

The hypotheses are:

H0: Petróleos Mexicanos is as competitive as Equinor of Norway based on the financial profitability indicator.

H1: Petróleos Mexicanos is not as competitive as Equinor of Norway based on the financial profitability indicator.

Review of the literature

Scheimberg (2002) states that organizations belonging to the oil industry are important and a great trigger of the world economy. Therefore, companies must be competitive within this large industry since this allows them to achieve good profitability and positively influence the market. It is important to mention that for a producer to be competitive in an open economy, the company must be able to increase its competitiveness to the extent that it achieves the same quality at a lower price since its costs must always be lower than its sales price. Therefore, a competitive company must always be profitable. Every unprofitable company runs the risk of being expelled from the market and could close if its disadvantage persists over time (Huerta, 2009).

The concept of competitiveness comes from the word competition, understood as: “Opposition or rivalry between two or more that aspire to obtain the same thing” or “situation of companies that compete in a market offering or demanding the same product or service” (Real Academia Española, 1992). Thus, “competition would result from competitiveness, being included in the latter concept” (Arboleda, 2016, p. 15).

According to Arboleda (2016), Michael Porter—who in the 80s began to study the concept of competitiveness—has pointed out that every company that operates in an industry must have a competitive strategy, emphasizing that competitiveness should be something natural in those organizations that have a presence in the market. In addition, Porter focuses through the analysis of competitive advantage and strategy on the "link with two other definitions that have been widely used in the historical development of economic theory, which are competition and comparative advantage" (Porter, 1982, quoted by Arboleda, 2016, p. 14).

Arboleda (2016) states that comparative advantage is transferred to the macroeconomic environment, where the amortization of macroeconomic policies in the fiscal area becomes important. In addition, it is seen as the ability of a person or organization to form competitive advantages that allow them to compete in their environment, thus achieving a prominent position. Therefore, when this concept is related to the business environment, it is determined that the company is competitive when it can obtain greater profitability than its competitors (Medeiros, Gonçalves, & Camargos, 2019).

Montoya (2010, p. 61) also points out that "competitiveness carries within itself the idea of a business quality indicator, in such a way that it indicates how companies behave individually and collectively in the markets and their financial and productive success." This coincides with Acosta and Medina (1999) when they point out that the ideal is to achieve a financial structure that contributes to achieving the highest possible yield to achieve financial stability to meet its obligations.

Authors such as Barrios, Acosta, and Correa agree that the concept of competitiveness is quite complex, so it can be analyzed from different perspectives "due to the ambiguity derived from the multiplicity of variables and factors related to this term and the non-existence of agreements when presenting a measurement (or set of them) that unequivocally quantifies and values this concept" (2004, p. 96).

Notwithstanding, Muinelo and Hounie (2004) explain that for an organization to be competitive, it must be at the forefront of the changes occurring in the environment, intending to remain in force and achieve a good level of profitability in accordance with its objectives. Furthermore, the results of studies such as Zamorano and Jaramillo (2015) and Saavedra and Camarena (2017) affirm that determining factors—such as profitability and financial risk—are indispensable to determine adequate financial management related to the strategies developed with competitiveness. Thus, profitability should be considered when explaining and managing competitiveness.

In other words, oil organizations are struggling to remain within the competitive framework. Therefore, it is necessary to be fully aware of companies' economic-financial situation in a globalized and

competitive world, and this is where financial management plays an important role in the full development of companies (Batallas, 2015).

Financial management is taken as a tool for this study, in which it is considered important to know how the company is doing, thus evaluating it using profitability. This indicator is considered by Acosta (1999) as one of the cornerstones that "contribute as a measure of the degree of competitiveness of the companies" and "the differences recorded by the financial profitability indices throughout the period of analysis and for any of the sectors analyzed unequivocally show a greater degree of success of the managers of competitive companies in the choice of their financing policy" (Acosta, 1999, pp. 570-575).

Regarding competitiveness and its relation to financial management from the point of view of profitability, as explained by Martínez, Cazallo, Meñaca, and Uribe (2020), "the lack of evaluation of financial performance indicators is a constant problem within the business sector, given that most companies do not have efficient financial management, which is reflected in the decrease of their income and limited business growth."

Therefore, competitiveness ensures that the organization can compete in the market, achieving growth and permanence by selecting appropriate strategies. Financial management is an important issue in the organization's competitiveness, so its correct analysis translates into a key factor for sustainability and permanence, becoming a strategic function where the determination of the organization's profitability is key to its competitiveness (Cano, Olivera, Balderrabano, & Pérez, 2013, p. 82).

It should be emphasized that financial management, as stated by Guardo, Arrieta, and Cardozo (2018), translates into properly managing information vital for the organization and its proper development. Accordingly, carrying out a correct analysis of the information becomes crucial for decision making because in the latter, the comparison of qualitative data that impact the economic figures is carried out, with which it is possible to interpret the performance of organizations (Dosi, 1988, cited by Bonales, Pedraza, & Paz, 2015).

To diagnose an economic sector or an industry such as the oil industry, there are international studies such as those by Capece, Di Pillo, and Levialdi (2013), Correa, Castaño, and Meza (2010), Correa, Castaño, and Meza (2011), De la Hoz, Fontalvo, and Morelos (2014), Gutiérrez and Abad (2014), Rivera and Ruiz (2011), Rivera and Padilla (2013), and Villegas and Dávalos (2005) that consider that financial management, seen from the point of view of the profitability indicator, contributes to and significantly influences competitiveness.

It should be noted that measuring a company's profitability is important because, through it, the return on investment over a certain period is identified. A company's profitability is commonly used as a

measurement that "allows analysts to evaluate the company's profit regarding a certain level of sales, a certain level of assets, or the owners' investment" (Gitman, 2007, p. 59).

According to Ortiz (2011), profitability indicators, such as return or profitability, are used to measure the effectiveness of the company's management in controlling costs and expenses, thus transforming sales into profits. Therefore, "the value of the company will be given by its capacity to generate income, that is, by the profitability of its productive assets. Value creation and profitability are therefore inseparable concepts" (Cuervo, 1994, pp.87-89).

From this perspective, profitability as a measure of the company's value generation has usually been understood as the essential and in some cases the only indicator of its competitiveness (Institute of Management Development and the World Economic Forum, 2008; Cuervo, 1994; Salas, 1993). As can be seen in Pérez-Carballo (2010, pp. 19-44), there is a methodological explanation of profitability as a measure of the degree of success of the business strategy since without profitability to benefit from or demand to meet, there would be no interest in investing.

Furthermore, profitability indicators try to evaluate the amount of profit obtained compared to the investment that originated them, for which there are two types of profitability: economic and financial. Economic profitability makes it possible to determine the overall efficiency of profit generation concerning total assets, while financial profitability indicates the productive power over the book value of the shareholders' investment. These indices provide relevant information for investors' decision making. Nonetheless, investors are more interested in financial profitability since, unlike the economic profitability index, financial profitability only considers the resources invested by the owners (De La Hoz Suárez, Ferrer, & De La Hoz Suárez, 2008).

On the other hand, Marshall (1980) was one of the first economists to deal with the issue of profitability, stating that the company should generate returns on the capital invested and on the opportunity cost of the resources used. For this reason, creditors are interested in the company's profitability, as they need to know and be sure that the company is healthy. The management and the shareholders are concerned about the company's financial situation, so they try to generate financial ratios that benefit the owners and creditors. In addition to these ratios, emphasis is placed on how profitability is used to evaluate the company's performance over a certain period (Gitman & Zutter, 2012).

Thus, profitability has become an essential indicator in financial analysis since it can calculate how the company can create a surplus, which can be distributed to its associates after carrying out its main activity, sales. Similarly, it can be equated with the total resources invested in the activity to measure the efficiency achieved (Bonsón, Cortijo, & Flores, 2009).

Thus, it becomes necessary and of great relevance for organizations to study the profitability indicator in companies. Studies, such as those of Acosta (1999) and Cardona, Martínez, Velásquez, and López (2015), have stated that profitability has become a key part of the indicators considered important for determining how the economic sector is doing. Along with this, one study provides a novel vision that addresses competitiveness and how it can be achieved through the internal factors of organizations, according to Acosta (1999, p. 39).

The importance of measuring this indicator can be understood so that, to answer the research question and fulfill the established research objective, the need to measure the profitability of the companies under study to evaluate their competitiveness is determined. For this reason and because of its importance, it is necessary to consider the profitability indicator that measures the gross profit margin, as explained in the next section.

Profitability indicator; Gross profit margin (gross profit/total sales)

First, to carry out a detailed evaluation of the companies under study, the financial ratios analysis was used to establish a diagnosis. Then, the dependent and independent variables were defined, for which the profitability indicator was used, and the performance of the companies was evaluated so that the existing relation between competitiveness and the financial profitability indicator could be analyzed. The results are shown in Tables 1 and 2.

Table 1
PEMEX Profitability Indicators

	6											
Profitability indicators	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
a) Gross profit margin												
Formula: Gross Profit/Total Sales	0.51	0.49	0.51	0.50	0.49	0.53	0.48	-0.10	0.52	0.18	0.31	0.14
Gross profit	674 917 493	528 813 376	649 773 894	777 803 383	814 421 466	858 725 137	758 999 791	-116 847 302	562 234 960	246 554 355	526 079 097	189 684 303
Total Sales	1 328 949 952	1 089 948 331	1 282 064 310	1 558 428 922	1 646 912 040	1 608 204 625	1 586 727 874	1 166 362 469	1 079 545 671	1 397 029 719	1 681 119 150	1 401 971 185
b) Operating Profit Margin												
Formula: Operating Profit/Total Sales	0.43	0.39	0.43	0.44	0.55	0.45	0.39	-0.13	0.39	0.07	0.22	0.03
Operating Profit	571 111 449	428 304 376	545 521 163	681 425 325	905 339 297	727 622 229	615 480 011	-154 387 081	424 350 187	104 725 231	367 400 407	37 029 570
Total Sales	1 328 949 952	1 089 948 331	1 282 064 310	1 558 428 922	1 646 912 040	1 608 204 625	1 586 727 874	1 166 362 469	1 079 545 671	1 397 029 719	1 681 119 150	1 401 971 185

Source: created by the authors based on PEMEX's Consolidated Financial Statements from 2008 to 2019; the units of account of the original files in Mexican pesos were used for this descriptive table.

Table 2
Equinor profitability indicators

EQUINOR Profitability Indicators from 2008 to 2019												
Profitability indicators	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
a) Gross profit margin												
Formula: Gross Profit/Total Sales	0.50	0.56	0.51	0.52	0.50	0.52	0.52	0.56	0.53	0.54	0.52	0.54
Gross profit	326 838	259 563	272 221	350 600	360 300	329 800	321 300	271 600	210 864	32 974	41 076	34 826
Total Sales	656 020	465 433	529 648	670 205	723 400	637 300	622 600	482 800	399 033	61 186	79 592	64 358
b) Operating Profit Margin												
Formula: Operating Profit/Total Sales	0.30	0.26	0.26	0.32	0.29	0.24	0.18	0.03	-0.00	0.23	0.25	0.14
Operating Profit	198 832	121 640	137 228	211 784	206 600	155 200	109 400	14 800	-1 665	13 770	20 136	9 299
Total Sales	656 020	465 433	529 648	670 205	723 400	637 300	622 600	482 800	399 033	61 186	79 592	64 358

Source: created by the authors based on the Consolidated Financial Statements of Norway from 2008 to 2019; the units of account of the original files in Norwegian kroner (nok) were used for this descriptive table.

Methodological tools

For this research study, information from the official web pages of the companies mentioned above[1] was used as a data collection tool, and different sources were consulted: books, specialized magazines, scientific articles, and research papers from several universities. Additionally, the consolidated financial statements of PEMEX and Equinor, obtained from the official web pages of both oil companies for a period of eleven years, were used to analyze and determine, employing the Box Jenkins methodology, the forecasts for 2022.

Methodological framework and comparative statistical model for PEMEX and Equinor

This research used the consolidated financial statements of PEMEX and Equinor to develop a quantitative model, characterized as a longitudinal, comparative, retrospective, and prospective study, which considered both companies' available and public information from 2008 to 2019.

Profitability indicators

These indicators measure how the company manages to create a surplus after carrying out its main activity—sales and benefiting those factors involved. They enable the evaluation of the profits obtained

1PEMEX official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx
Equinor official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

regarding the investment that originated them, analyzing the capacity to generate profits. It can also be compared with the total resources invested in the activity to measure the efficiency achieved (Bonsón, Cortijo, & Flores, 2009; p. 261).

a) Gross Profit Margin (Gross Profit/Total Sales)

b) Operating Profit Margin (Operating Profit/Total Sales)

Therefore, two factors are considered to determine financial profitability: the gross profit margin and the operating profit margin. The former indicates the percentage of each monetary unit in sales after the company has paid for all its assets, and the latter represents the pure profits (without interest and taxes) earned by the company between each monetary unit of sales (De La Hoz Suárez, Ferrer, & De La Hoz Suárez, 2008).

Therefore, for the case of this research and derived from the information available from the financial statements of both companies, the gross profit margin has been considered because it calculates the percentage of each peso of sales that remains after deducting all costs and expenses, including interest and taxes. Thus, it does not exclude them—unlike the operating profit margin—which is more appropriate for the research, according to Gitman and Zutter (2012).

Therefore, from the ratios mentioned, the gross profit margin (Gross Profit/Total Sales) is selected because it does not exclude interest and taxes, which provides relevant information appropriate for this research due to the type of company that PEMEX is. Having determined the indicator to be studied, the statistical techniques to be used are also determined. These belong to the analysis of economic time series, applying the historical sequence forecasting methods—specifically, the classical approach and the decomposition methods—to carry out the descriptive analysis of the behavior of the series considered and the Box-Jenkins methodology to obtain the financial forecasting models.

Competitiveness analysis model

For the statistical-financial analysis, the financial statements of PEMEX and Equinor were compared to measure the degree of impact on business competitiveness using the profitability indicator. The Box-Jenkins methodology allowed for statistical analysis employing several models that handle time series and predict their future evolution.

Box-Jenkins methodology

The Box-Jenkins statistical analysis method can fit the series obtained to Autoregressive Integrated Moving Average (ARIMA) models. It also contributes to the task of building a time series model to explain its structure and predict the evolution of the series in the future (Bowerman, O'Connell, & Koehler, 2007).

ARIMA model (p, d, q)

To estimate the ARIMA model, it is necessary to have a stationary series in mean and variance. When the economic series is not stationary, it is necessary to modify it, generally by applying logarithms to stabilize the variance and differences to stabilize the mean so that the order of these differences is the order of integration of the series.

"An autoregressive integrated moving average ARIMA (p, d, q) model is an ARIMA (p, q) model applied to an integrated series of order d, denoted I(d), i.e., to which it has been necessary to differ d times to eliminate the trend" (Bowerman, O'Connell, & Koehler, 2007, p.10). These authors state Equation 1 for an ARIMA model (p, d, q) obtained by applying the ARIMA model of differences:

$$\Delta^d y_t = \mu + \phi_1 \Delta^d y_{t-1} + \cdots + \phi_p \Delta^d y_{t-p} + \cdots + \theta_1 a_{t-1} + \cdots + \theta_q a_{t-q} \tag{1}$$

The significance tests of the model parameters were based on Hancke and Wichern (2010), who indicate that the model parameters contribute to verifying the statistical significance of the parameters that constitute the Box-Jenkins model, with ω being any parameter of a Box-Jenkins model, $\hat{\omega}$ its point estimator, and $s_{\hat{\omega}}$ the standard error of that indicator. The statistical significance test for this parameter is shown in Equation 2.

$$Ho: \omega = 0$$
$$Ha: \omega \neq 0 \tag{2}$$

The test statistic (TS) is given by:

$$TS = \frac{\widehat{\omega}}{s_{\widehat{\omega}}}$$

(3)

The TS has a Student's t probability distribution with $n - n_p$ degrees of freedom, where n_p is the number of parameters of the model. According to the authors Hancke and Wichern (2010), Ho is rejected if:

$$|TS| = t_{(n-n_p),\frac{\alpha}{2}}$$

(4)

Regarding confidence intervals for forecasts, as indicated by Hancke and Wichern (2010), if the point estimate of a forecast $\boldsymbol{\tau}$ periods after the n observations is denoted as:

$$\hat{y}_{n+\tau}(n)$$

(5)

a $100(1-\alpha)\%$ confidence interval for such a forecast is given by:

$$\hat{y}_{n+\tau}(n) \pm t_{(n-n_p),\frac{\alpha}{2}} SE_{n+\tau}(n)$$

(6)

Where

$SE_{n+\tau}(n)$ is the standard error of the forecast, which in turn depends on:

$$s = \sqrt{\frac{SSE}{n-n_p}}$$

(7)

It should be noted that the interval is narrower if the standard error is smaller or the confidence is lower, and it is wider if the standard error is larger or the confidence is higher (Hancke & Wichern, 2010).

Data, analysis, and discussion

In the quantitative field, the research is non-experimental, longitudinal, comparative, retrospective, and prospective since it considers the information available for the period for which the information of interest is collected, and from this, it obtains forecasts for subsequent periods. Therefore, the study is comparative of the behavior of the related profitability indicator, which, according to authors such as Acosta and Medina (1999), Gitman and Zutter (2012), Cardona, Martínez, Velásquez, and López (2015), and Van Horne and Wachowicz (2010), explains that they have an important relation with the competitiveness of the companies.

The profitability indicator is obtained from the analysis of the information obtained from the consolidated financial statements and the financial performance of the oil companies PEMEX and Equinor from 2008 to 2019. In addition, using the Box-Jenkins methodology, a forecast model was obtained for 2022 for the selected indicator—profitability—related to the measurement of competitiveness. Therefore, the results of the descriptive study of the series associated with the profitability index of Pemex and Equinor are presented.

PEMEX

PEMEX, gross profit margin ratio

The following time series graph shows Pemex's Gross Profit Margin Ratio.

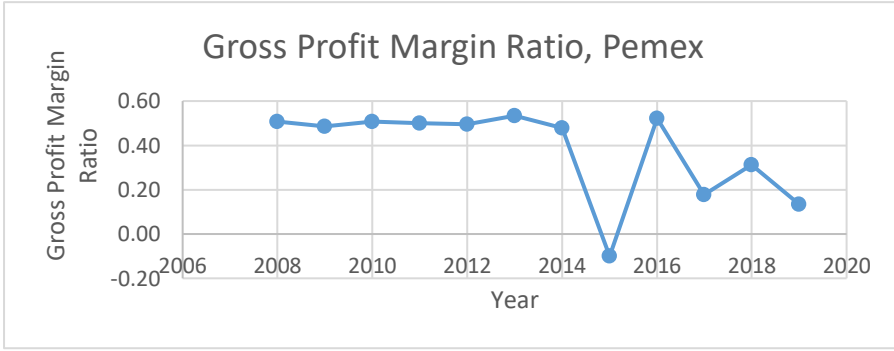

Figure 1. Gross Profit Margin Ratio, Pemex. Source: created by the authors based on Pemex financial statements from the official website https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

The formula that contributes to the calculation of the propensity of the variable, as well as the R^2 that measures to what degree the linear regression model fits, given by $y = - 0.0339x + 68.611$ with $R^2 = 0.3567$ indicating Pemex's Gross Profit Margin Ratio, proves that there is a decreasing trend of 0.03 points per year on average.

For this reason, the trend model is optimized, and the series is smoothed using the moving average technique. The moving average of different orders is measured, thus showing that the moving average of order 5 is the model that achieves the best fitting line to the data, with the equation of this line being $y = - 0.044x + 0.6711$ with an $R^2 = 0.9309$, which proves that the Pemex Gross Profit Margin Ratio is of decreasing trend, decreasing 0.04 points per year on average. The graph related to the Pemex Gross Profit Margin Ratio is presented in Figure 2.

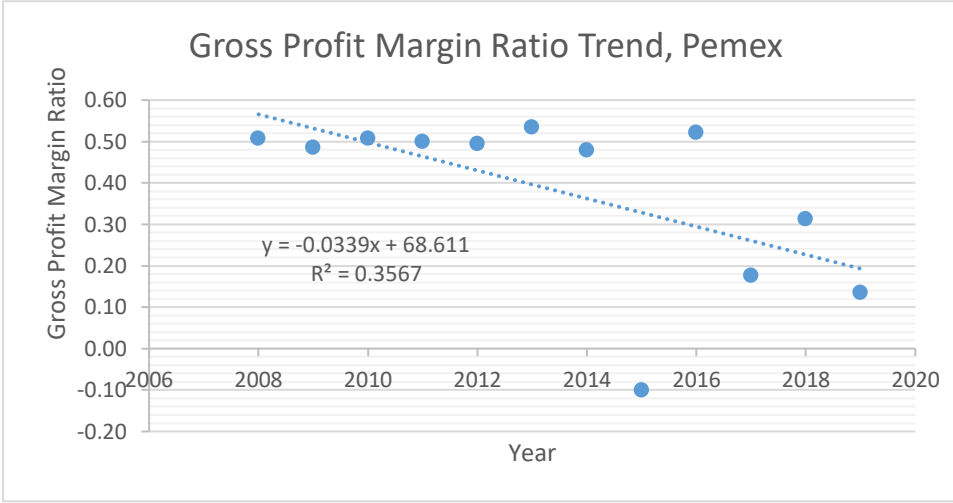

Figure 2. Trend of Pemex's Gross Profit Margin Ratio. Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

EQUINOR

Equinor, gross profit margin ratio

The time series graph below shows Equinor's Gross Profit Margin Ratio.

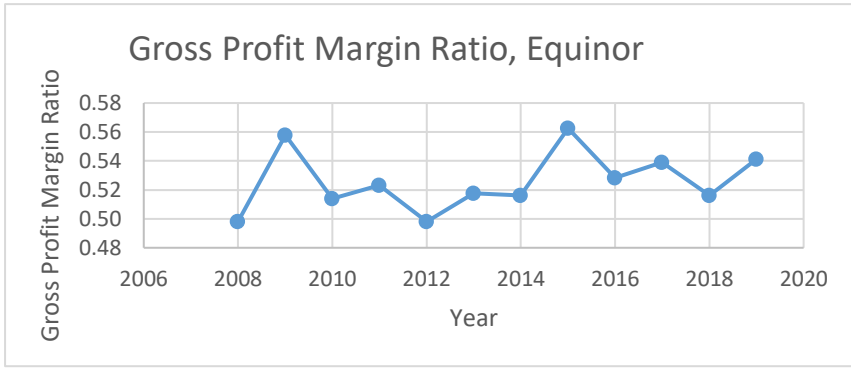

Figure 3. Equinor's Gross Profit Margin Ratio. Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

The formula that contributes to the calculation of the propensity of the variable, as well as the R^2 that measures to what degree the linear regression model fits, given by $y = 0.0017x - 2.9302$ with $R^2 = 0.0893$, indicating Equinor's Gross Profit Margin Ratio, proves that there is an increasing trend, increasing 0.002 points per year on average.

For this reason, the trend model is optimized, and the series is smoothed using the moving average technique. The moving average of different orders is measured, thus showing that the moving average of order 5 is the model that achieves the best fit to the data, with the equation of this line being $y = 0.0029x + 0.5067$ with $R^2 = 0.7885$, which proves that Equinor's Gross Profit Margin Ratio is of increasing trend, increasing 0.003 points per year on average. The graph related to Equinor's Gross Profit Margin Ratio is presented in Figure 4.

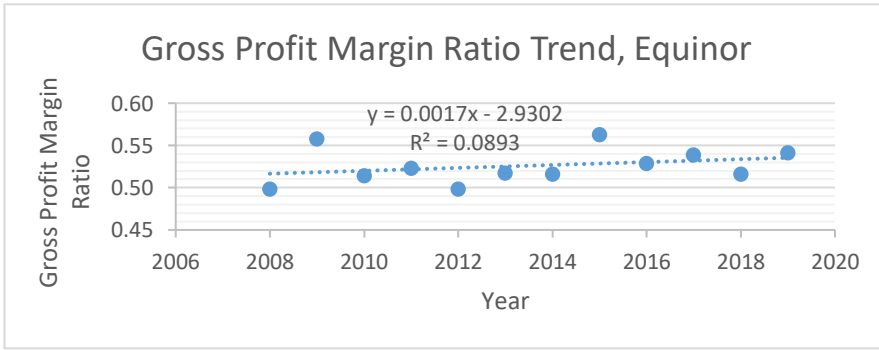

Figure 4. Gross Profit Margin Ratio trend. Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

Results of the forecasting models

The Box-Jenkins Methodology was used to obtain a forecast model for the selected profitability value in 2020, 2021, and 2022 since, as mentioned before, this indicator is closely related to the competitiveness of the Pemex and Equinor companies. Therefore, the results are obtained using the Stagraphics Centurion XVI packages for the descriptive study, GRETL for stationarity tests, and Ljung Box and IBM SPSS Statistics 21 to carry out the construction of the models, considering for this a significance level of 0.1 and to obtain the forecasts a confidence of 90%.

PEMEX

PEMEX, gross profit margin (gross profit/total sales)

For the stationary series related to this index, the correlograms of the autocorrelation (fas) and partial autocorrelation (fap) functions were obtained to establish the p and q values. For this reason, Figure 5 shows the final model.

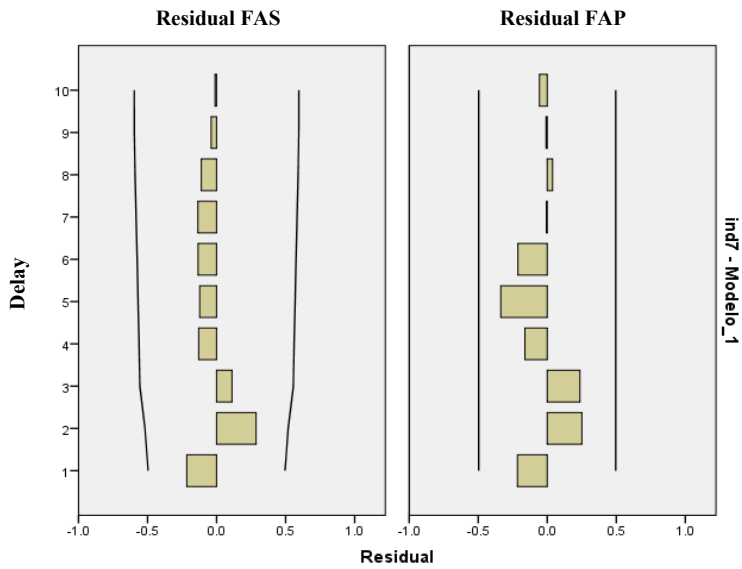

Figure 5. Autocorrelation and partial autocorrelation functions for PEMEX's Gross Profit Margin. Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

To corroborate the stationarity of the initial model, the Augmented Dickey-Fuller (ADF) test was used, whereby the null hypothesis of non-stationarity of the series was rejected (p-value = 0.001). Consequently, its stationarity condition was proven. The non-autocorrelation of the residuals was also examined through the Ljung Box test, where the null hypothesis is the condition of non-autocorrelation of the residuals, which has been confirmed (p-value = 0.832).

To determine the RMSE and MAPE as measures of model fit, the following is shown: RMSE = 0.108 indicates that, on average, Pemex's Gross Profit Margin differs by 0.108 points from the mean value of the series in the study period, and MAPE = 38% represents 38% of said mean value. The statistical significance of the parameters and the constant were also corroborated, the latter not being statistically significant. According to the analyses and in the case of this index, the model identified was an ARIMA (1,1,0), as well as the presence of an outlier in 2015 (p-value = 0.001), a situation that was considered in the construction of the model (Tables 3, 4, and 5).

Table 3
Description of Gross Profit Margin Model, PEMEX

			Type of model
Model ID	Pemex, Gross Profit Margin	Model_1	ARIMA (1,1,0)

Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

Table 4
Gross Profit Margin model outliers, PEMEX

			Estimate	SE	t	Sig.
Pemex, Gross Profit Margin - Model_1	2015	Additive	-.465	.089	-5.207	.001

Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

Table 5
Parameters of the ARIMA model of Gross Profit Margin, PEMEX

				Estimate	SE	t	Sig.
Pemex, Gross Profit Margin - Model_1	Pemex, Gross Profit Margin	No transformation	AR Delay 1 Difference 1	-.669	.265	-2.528	.032

Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

Once the number of observations in the analyzed series has been considered and the model has been validated, the forecasts or predictions for the indicator for 2020, 2021, and 2022 and their 90% confidence intervals for PEMEX are obtained, as shown in Table 6.

Table 6
Forecast, PEMEX's Gross Profit Margin

Model		2020	2021	2022
Pemex, Gross Profit Margin - Model_1	Forecast	.25	.17	.23
	LCS	.45	.38	.49
	LCI	.06	-.03	-.03

Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

According to what is described in Table 6, it is expected that in 2022, Pemex's Gross Profit Margin Ratio will present a marginal growth with respect to the previous year. Meanwhile, the graph in Figure 6 shows the original and adjusted series according to the model and the confidence intervals related to the forecasts.

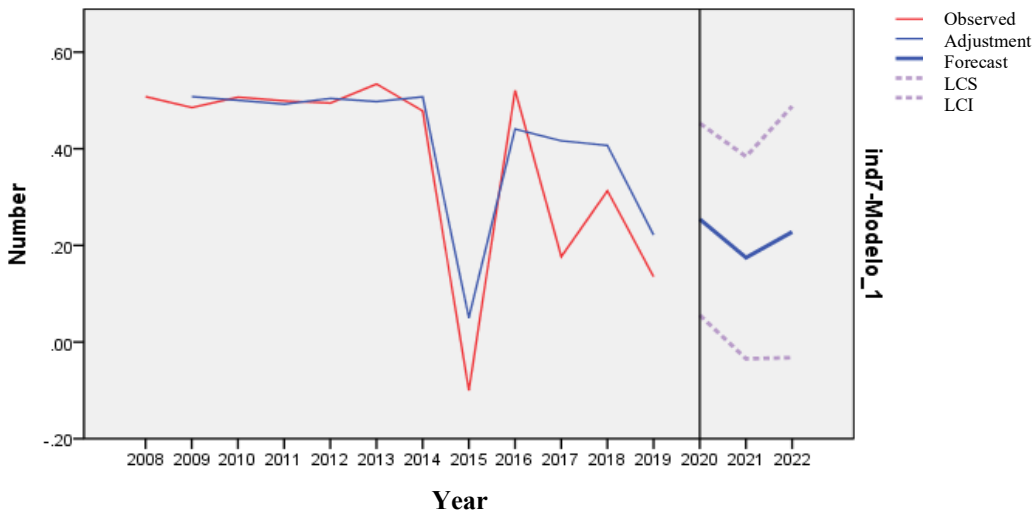

Figure 6. Original and adjusted series according to the model for PEMEX's Gross Profit Margin and forecast intervals. Source: created by the authors based on Pemex financial statements from the official website, https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

Equinor, gross profit margin (gross profit/total sales)

The correlograms of the autocorrelation functions (fas) and partial autocorrelation functions (fap) were obtained for the stationary series related to this index, and thus the values of p and q could be established. Figure 7 shows the final model.

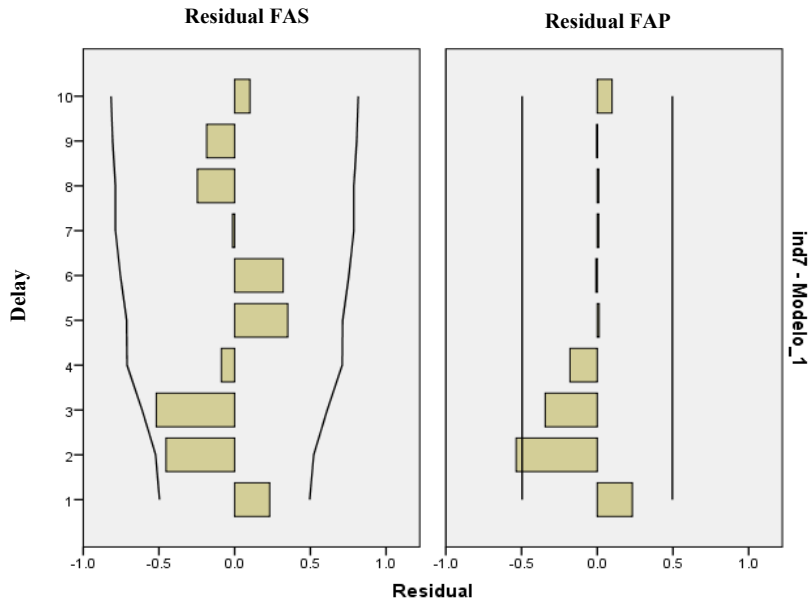

Figure 7. Autocorrelation and partial autocorrelation functions for Equinor's Gross Profit Margin. Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

To test the stationarity of the initial model, the Augmented Dickey-Fuller (ADF) test was used, whereby the null hypothesis of non-stationarity of the series was rejected (p-value = 0.032), confirming its stationarity condition. The non-autocorrelation of the residuals was also examined through the Ljung Box test, whereby the null hypothesis is the condition of non-autocorrelation of the residuals, which was confirmed (p-value = 0.265).

RMSE and MAPE were also determined as measures of model fit. The value obtained for RMSE = 0.014 indicates that, on average, Pemex's Gross Profit Margin differs by 0.014 points from the mean value of the series in the study period, and MAPE = 1.8 represents 1.8% of said mean value. The statistical significance of the parameters and the constant were confirmed, the latter not being statistically significant. According to these analyses and in the case of this index, the model identified was an ARIMA (1,1,1), as well as the presence of an outlier in 2009 and 2015 (p-value = 0.056 and 0.023, respectively), a situation that was considered in the construction of the model. See Tables 7, 8, and 9.

Table 7
Description of the Gross Profit Margin Model, Equinor

			Type of model
Model ID	Norway, Gross Profit Margin	Model_1	ARIMA (1,1,1)

Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

Table 8
Outliers of the Gross Profit Margin model, Equinor

		Estimate	SE	t	Sig.
Norway, Gross Profit Margin - Model_1	2009Additive	.036	.016	2.286	.056
	2015Additive	.025	.009	2.908	.023

Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

Table 9
Parameters of the ARIMA Gross Profit Margin Model, Equinor

					Estimate	SE	t	Sig.
Norway, Gross Profit Margin - Model_1	Norway, Gross Profit Margin	No transformation	AR	Delay 1	-1.000	.004	-273.997	.000
			Difference		1			
			MA	Delay 1	-.975	.372	-2.624	.034

Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

Once the number of observations in the analyzed series has been considered and the model has been validated, it is possible to obtain the forecasts or predictions for the indicator for 2020, 2021, and 2022, and their 90% confidence intervals for Equinor, as shown in Table 10.

Table 10
Gross Profit Margin Forecast, Equinor

Model		2020	2021	2022
Norway, Gross Profit Margin - Model_1	Forecast	.53	.54	.53
	LCS	.55	.57	.56
	LCI	.50	.51	.49

Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

As described in Table 10, it is expected that in 2022, Equinor's Gross Profit Margin Ratio will show a marginal growth compared to the previous year. Meanwhile, the graph in Figure 8 shows the original and adjusted series according to the model and the confidence intervals related to the forecasts.

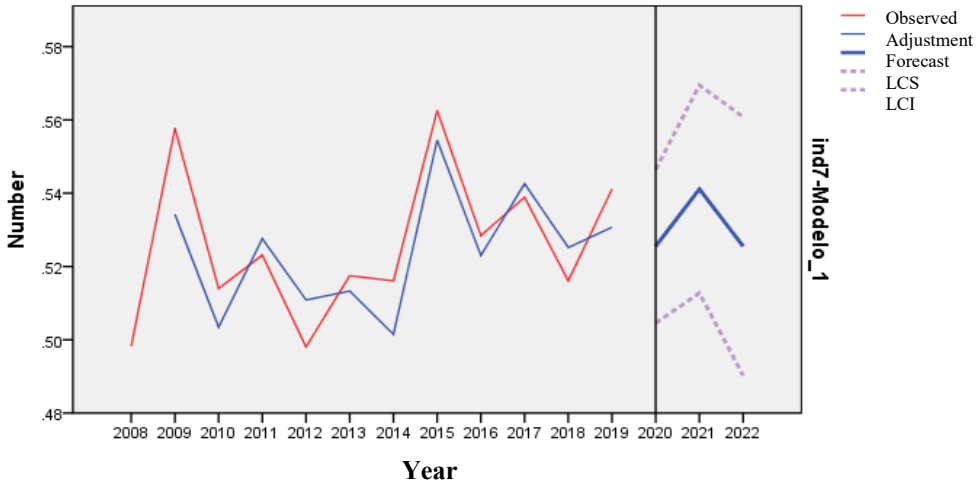

Figure 8. Original and model-adjusted series for Equinor's Gross Profit Margin and forecast intervals. Source: created by the authors based on Equinor's financial statements from the official website, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html

Regarding the Pemex - Equinor comparison

As can be seen in the results of Table 11, in 2020, 2021, and 2022, the data obtained for PEMEX's Gross Profit Margin is lower than Equinor's, which shows that Equinor is stronger than PEMEX in terms of the indicator analyzed. The projection for 2022 indicates that if the company continues to operate as it has done, the results will not change significantly.

Table 11
Pemex- Equinor comparison for 2020, 2021, and 2022

Ratio	2020		2021		2022	
	Pemex	Equinor	Pemex	Equinor	Pemex	Equinor
Gross profit margin	0.25	0.53	0.17	0.54	0.23	0.53

Source: created by the authors based on the financial statements of Pemex and Equinor from the official web pages, https://www.equinor.com/en/investors/our-dividend/annual-reports-archive.html and https://www.pemex.com/ri/finanzas/Paginas/resultados.aspx

In Table 11, PEMEX shows a decreasing trend of 0.25, 0.17, and 0.23 points for 2020, 2020, and 2022, respectively, concerning the statistical calculation carried out to find the degree of profitability

of the companies. For Equinor and concerning the same years, the gross profit margin results in 0.53, 0.54, and 0.53, indicating a more prolonged stability than PEMEX. In other words, PEMEX is weaker in the analyzed profitability indicator than Equinor.

Conclusions

Oil is a trigger of the world economy. Therefore, this research is relevant because it carries out a study concerning the influence of the profitability indicator on the competitiveness of two state-owned oil organizations, PEMEX of Mexico and Equinor of Norway. Data from the consolidated financial statements of both companies were taken using an ARIMA model, and results were obtained that made it possible to find several relevant aspects that contribute to the generation of knowledge that can be used as a tool for future research and as essential information for decision makers.

Oil organizations struggle to remain within the current competitive framework in an open economy model. Consequently, the economic-financial situation of these organizations is framed within a current globalized and competitive world and plays an important role in the full development of the companies. Thus, competitiveness has become a crucial and necessary aspect that sets the standard for companies to be competitive in the world market. To achieve this, they must consider the profitability indicator to be efficient over time so that their income is greater than their costs and expenses, allowing them to obtain profits and advantages over their competitors. This is how profitability becomes a crucial and necessary indicator to achieve the companies' objectives and to be at the forefront of the changes occurring in the world oil market.

The results of the model reject the null hypothesis and provide an answer to the research question regarding whether PEMEX is less competitive in the profitability variable compared to Equinor, which is related to hypothesis H1: Petróleos Mexicanos is not as competitive as Equinor of Norway based on the financial profitability indicator. The answer is that PEMEX shows a decreasing trend of 0.25, 0.17, and 0.23 points for 2020, 2021, and 2022, respectively (*ceteris paribus*) regarding the statistical calculation carried out to find the degree of profitability of the companies, which indicates the obtaining of a gross profit that is decreasing every year.

At the time of the comparison, it was found that Equinor has a stable trend according to the results of 0.53, 0.54, and 0.53 for 2020, 2021, and 2022 (*ceteris paribus*). This shows that the hypothesis (H1) is fulfilled since, given the data and the results derived from the hypothesis test, there is sufficient evidence to reject the null hypothesis.

The theory reinforces the results of the model since most of the authors cited in this research agree with the importance of financial management and profitability as indicators that contribute to the measurement of competitiveness because, through it, companies manage to discover existing problems within them and thus develop better tools to work on appropriate solutions.

References

Acosta, M. (1999): Factores financieros internos y competitividad empresarial. Departamento de Economía Financiera y Contabilidad, Universidad de La Laguna. Disponible en: https://riull.ull.es/xmlui/bitstream/handle/915/10039/cs60.pdf?sequence=1&isAllowed=y y Consultado el 24 de febrero de 2023.

Acosta, M. y Medina, U. (1999). Función financiera y estrategia competitiva de la empresa. Investigaciones Europeas de Dirección y Economía de la Empresa. Universidad de la Laguna. Vol. 5, pp. 55-68. Disponible en: https://dialnet.unirioja.es/servlet/articulo?codigo=785054 y Consultado el 16 de abril del 2023.

Arboleda, Henry (2016). Competitividad: Concepto y Evolución Histórica. Revista de Economía & Administración, Vol. 13 No. 2. Julio - diciembre de 2016. Disponible en: https://webcache.googleusercontent.com/search?q=cache:MuxpXKbuqOwJ:https://revistas.uao.edu.co/ojs/index.php/REYA/article/download/21/15+&cd=14&hl=es-419&ct=clnk&gl=mx y Consultado el 12 de junio de 2023.

Barrios del Pino I., Acosta Molina M. y Correa Rodríguez A. (2004). Análisis de las ventajas competitivas económico-financieras: una aplicación empírica a la industria manufacturera española. Investigaciones Europeas de Dirección y Economía de la Empresa Vol. 10, N° 1, 2004, pp. 93-111, ISSN: 1135-2523. Disponible en: file:///C:/Users/Servicio%20Social/Downloads/Dialnet-AnalisisDeLasVentajasCompetitivasEconomicofinancie-897189%20(1).pdf y Consultado el 2 de mayo de 2023.

Batallas Pereira Malena Alexandra, (2015). Evaluación de la gestión financiera de las principales empresas de servicios petroleros de perforación de la ciudad de Quito de 2011 a 2013. Facultad de Ciencias Administrativas. Escuela Politécnica Nacional. Disponible en: https://bibdigital.epn.edu.ec/bitstream/15000/10739/1/CD-6308.pdf y Consultado el 12 de mayo de 2023.

Bonales Valencia, Joel, Pedraza Rendón, Oscar Hugo, & Paz Prado, Iván. (2015). Competitividad Internacional de las Empresas Mexicanas Exportadoras Porcícolas. Investigación

administrativa,44(116).Disponibleen:http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S244876782015000200002&lng=es&tlng=es y Consultado el 22 de junio de 2023.

Bonsón, E., Cortijo, V. y Flores, f. (2009). Análisis de estados financieros. Pearson Educación, SA, 2009. ISBN: 9788483222263. Material: 33. Páginas: 284. Disponible en: https://jalfaroman.files.wordpress.com/2019/03/analisis-de-estados-financieros-1edi-bonson.pdf y Consultado el 21 de junio de 2023.

Bowerman, Bruce L., O'Connell Richard T. y Koehler, Anne B. (2007). Pronósticos, series de tiempo y regresión: Un enfoque aplicado. Cuarta edición. Cengage Learning. México. Pp.401-438, 449-466. Libro impreso disponible en: https://bibliotecakoha.lasallebajio.edu.mx/cgi-bin/koha/opac-detail.pl?biblionumber=51424 y Consultado el 11 de enero de 2023.

Bueno, E. (1987): La Competitividad de la empresa española, AECA, monografía 12, Madrid. Libro impreso.

Cano Flores M., Olivera Gómez D., Balderrabano Briones, J., y Pérez Cervantes, G. (2013). Rentabilidad y competitividad en la PYME. Ciencia Administrativa, No. 2 Año 2013: 80-86. Disponible en: https://www.uv.mx/iiesca/files/2014/01/11CA201302.pdf y Consultado el 28 de febrero de 2023.

Capece, G., Di Pillo, F., y Levialdi, N. (2013). The performance assessment of energy companies. APCBEE Procedia, 5, 265-270. https://www.doi: 10.1016/j.apcbee.2013.05.046 y Consultado el 21 de abril de 2023.

Cardona, Martínez, Velásquez y López. (2015). Análisis de indicadores financieros del sector manufacturero del cuero y marroquinería: un estudio sobre las empresas colombianas. Informador Técnico (Colombia) 79(2) julio - diciembre 2015: 156-168. Disponible en: https://dialnet.unirioja.es/servlet/articulo?codigo=5289857 y Consultado el 21 de enero de 2023.

Correa, J. A., Castaño, C. E., y Mesa, R. J. (2010). Desempeño financiero empresarial en Colombia en 2009: Un análisis por sectores. Perfil de Coyuntura Económica, (15), 149-170. Disponible en: http://www.scielo.org.co/pdf/pece/n15/n15a8.pdf y Consultado el 18 de mayo de 2023.

Correa, J. A., Castaño, C. E., Mesa, R. J. (2011). Panorama financiero empresarial en Colombia 2009-2010: Un análisis por sectores. Perfil de Coyuntura Económica, (18), 145-165. Disponible en: https://www.redalyc.org/articulo.oa?id=86125453007 y Consultado el 18 de mayo de 2023.

Cuervo, A. (1994). El papel de la empresa en la competitividad. Papeles de Economía Española, núm.56, pp.87-89). Disponible en:

https://riull.ull.es/xmlui/bitstream/handle/915/10039/cs60.pdf?sequence=1 y Consultado el 6 de abril de 2023.

De la Hoz, E., Fontalvo, T. J., y Morelos, J. (2014). Evaluación del comportamiento de los indicadores de productividad y rentabilidad financiera del sector petróleo y gas en Colombia mediante análisis discriminante. Contaduría y Administración, 59(4), 167-191. Disponible en: https://www.redalyc.org/articulo.oa?id=39531859008 y Consultado 3 de mayo de 2023.

De La Hoz Suárez, Betty, Ferrer, María Alejandra y De La Hoz Suárez, Aminta. (2008). Indicadores de rentabilidad: herramientas para la toma decisiones financieras en hoteles de categoría media ubicados en Maracaibo. Revista de Ciencias Sociales, 14(1), 88-109. Recuperado en 11 de octubre de 2021. Disponible en: http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1315-95182008000100008&lng=es&tlng=es. y Consultado el 13 de abril del 2023.

Gitman Lawrence (2007) Principios de Administración Financiera, 11ª edición, Pearson, México 668 pp. Disponible en: https://www.academia.edu/28291167/Principios_de_Administraci%C3%B3n_Financiera_11va_Edici%C3%B3n_Lawrence_J_Gitman_FL y Consultado el 12 de mayo de 2023.

Gitman, L. J., & Zutter, C. J. (2012). Principios de administración financiera. México: Pearson Educación. Disponible en: https://economicas.unsa.edu.ar/afinan/informacion_general/book/pcipios-adm-finan-12edi-gitman.pdf y Consultado el 15 de mayo de 2023.

Guardo, F. P., Arrieta, J. V., & Cardozo, N. H. (2018). Análisis financiero: Enfoques en su evolución. Criterio Libre, 16(28), 85-104. Disponible en: https://search.proquest.com/docview/2125263709?accountid=36552 y Consultado el 8 de enero de 2023.

Gutiérrez, C., y Abad, J. (2014). ¿Permitían los estados financieros predecir los resultados de los test de estrés de la banca española? Una aplicación del modelo logit. Revista de Contabilidad.17(1), 58-70. https://doi: 10.1016/ j.rcsar.2013.08.004. y Consultado el 4 de febrero de 2023.

Hancke, John E. y Wichern, Dean W. (2010). Pronósticos en los negocios. Novena edición. Prentice Hall, México. Pp 81-84. Hernández, M. J. (2014). Administración de empresas. Madrid, España. Ediciones Pirámide (Grupo Anaya, S. A.). Disponible en: https://gc.scalahed.com/recursos/files/r161r/w25599w/L1EF118_S1_R1.pdf y Consultado el 24 de febrero de 2023.

Huerta Quintanilla, Rogelio. (2009). Ventajas comparativas y política industrial en una economía abierta. Investigación económica, 68(269), 113-141. Disponible en:

http://www.scielo.org.mx/scielo.phpscript=sci_arttext&pid=S0185-16672009000300004&lng=es&tlng=es. y Consultado el 7 de marzo de 2023.

Institute of Management Development and World Economic Forum (2008): The World Competitiveness Report 1993, Lausanne. Disponible en https://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2008-09.pdf y Consultado el 18 de diciembre del 2022.

Marshall, A. (2011[1980]). Principles of Economics. Indianapolis: Liberty Fund. Disponible en: https://eet.pixel-online.org/files/etranslation/original/Marshall,%20Principles%20of%20Economics.pdf y Consultado el 10 de marzo de 2023.

Martínez H. R., Cazallo A. M., Meñaca I., y Uribe C. M. (2020). Desempeño financiero de las empresas minoristas de alimentos y bebidas en Barranquilla – Colombia. Revista de Ciencias Sociales (Ve), vol. XXVI, núm. 1, 2020 Universidad del Zulia, Venezuela. Disponible en: https://www.redalyc.org/articulo.oa?id=28063104013 y Consultado el 16 de marzo de 2023.

Medeiros, Victor., Gonçalves Godoi, Lucas y Camargos Teixeira, Evandro. (2019). La competitividad y sus factores determinantes: un análisis sistémico para países en desarrollo. Revista de la CEPAL Nº 129. Diciembre de 2019. Disponible en: https://www.cepal.org/sites/default/files/publication/files/45005/RVE129_Medeiros.pdf y Consultado el 16 de marzo de 2023.

Montoya R., LA, Montoya R., IA y Castellanos D., OF (2008). De la noción de competitividad a las ventajas de la integración empresarial. Revista de la Facultad de Ciencias Económicas: Investigación y Reflexión, XVI (1), 59-70. Disponible en: https://www.redalyc.org/pdf/909/90916105.pdf y Consultado el 16 de abril de 2023.

Muinelo y Hounie (2004). Estudio sectorial de competitividad: subsector de tecnologías de la información. Disponibleen:https://www.funcex.org.br/material/redemercosul_bibliografia/biblioteca/ESTUDOS_URUGUAY/URY_16.pdf y Consultado 11 de marzo de 2023.

Ortiz, H. (2011). Análisis financiero aplicado y principios de administración financiera., 14a. ed., Universidad Externado de Colombia, (2011), pp. 118. Disponible en: file:///C:/Users/Servicio%20Social/Downloads/Analisis_Financiero_Hector_Anaya_14ed.pdf y Consultado el 15 de abril de 2023.

Pérez-Carballo, J. (2010), Estrategia y políticas financieras, ed. Esic, Madrid. Disponible en: https://es.scribd.com/document/470520733/Carballo-Veiga-Perez-Juan-F-La-Gestion-Financiera-De-La-Empresa y Consultado 12 de abril de 2023.

Porter, M. (1982). Estrategia competitiva: técnicas para el análisis de los sectores industriales y de la competencia. Chicago: Free Press. Disponible en: file:///C:/Users/Usuario/Downloads/ESTRATEGIA_COMPETITIVA_Tecnicas_para_el.pdf y Consultado 27 de enero de 2023.

Real Academia Española, (1992). Diccionario de la lengua española, 23ª ed., Disponible en: https://dle.rae.es/competencia. y Consultado el 24 junio de 2023.

Rivera, J. A., y Ruiz, D. (2011). Análisis del desempeño financiero de empresas innovadoras del sector alimentos y bebidas en Colombia. Pensamiento y Gestión, (31), 109-136. Disponible en: https://rcientificas.uninorte.edu.co/index.php/pensamiento/article/view/3661/2378 y Consultado el 28 de marzo de 2023.

Rivera, J. A., y Padilla, A. M. (2013). ¿Los medios de comunicación en Colombia son una industria creadora de valor? Finanzas y Política Económica, 5(2), 89-113. Disponible en: https://revfinypolecon.ucatolica.edu.co/article/view/444/444 y Consultado el 15 de junio de 2023.

Romo, Pérez y Jiménez (2013). La industria petrolera de Noruega, ¿Experiencias aplicables en México? Mundo Siglo XXI. Revista del CIECAS-IPN, Núm. 30, Vol. VII, PP. 51-66 Disponible en: https://repositorio.flacsoandes.edu.ec/bitstream/10469/7446/1/REXTN-MS30-05-Romo.pdf y Consultado el 4 de junio de 2023.

Romo Rico, D., (2016). La situación de Pemex ante el contexto de la apertura de la industria petrolera en México. Análisis Económico, XXXI (76),75-94. [fecha de Consulta 13 de febrero de 2022]. ISSN: 0185-3937. Disponible en: https://www.redalyc.org/articulo.oa?id=41344590005 y Consultado el 28 de abril de 2023.

Rousseau, I. (2008). La reorganización de Petróleos Mexicanos. Visiones encontradas sobre la gobernanza de una empresa pública (1989-2006). "En" (Coord.) La guerra de fuego. Políticas petroleras y crisis energética en América Latina (195-215). ed. Guillaume Fontaine y Alicia Puyana, Quito: Colección 50 años FLACSO. Disponible en: https://biblio.flacsoandes.edu.ec/libros/digital/46307.pdf y Consultado 15 de abril de 2023.

Sánchez, J.E. (2012). El sector energético mexicano, en el entorno global. En Barragán, S. A. Domínguez, S., Ojeda, R. N., Barrera, J. L., Rodríguez, A., Venegas, F., Sáenz, E… Sánchez, M. del C., estudios estratégicos de política energética. Pp. 137-159. Durango, México: UJED Editoriales. Disponible en: https://www.academia.edu/11577390/ESTUDIOS_ESTRATEGICOS_DE_POLITICA_ENERG%C3%89TICA y Consultado el 1 de marzo de 2023.

Saavedra, M.; Camarena, M. (2017). La Gestión Financiera de las PYME en la Ciudad de México. Contaduría Universidad de Antioquia, 71, pp. 149-173. Disponible en: https://www.researchgate.net/publication/328149317_La_Gestion_Financiera_de_las_PYME_en_la_Ciudad_de_Mexico_y_su_relacion_de_la_competitividad y Consultado el 3 de abril de 2023.

Salas, V. (1993): "Factores de Competitividad Empresarial. Consideraciones Generales", Papeles de Economía Española, nº 56, pp. 379 – 396. Disponible en: https://www.funcas.es/wp-content/uploads/Migracion/Articulos/FUNCAS_PEE/056art26.pdf y Consultado el 29 de enero de 2023.

Stavenhagen, R. (1979). Las perspectivas del petróleo mexicano. Consejo Latinoamericano de Ciencias Sociales. Editorial; El colegio de México. México D.F. Disponible en: http://biblioteca.clacso.edu.ar/Mexico/ces-colmex/20200909023134/las-perspectivas-del-petroleo-mexicano.pdf y Consultado el 16 de febrero de 2023.

Scheimberg, S. (2002). El sector petrolero es un gran generador de empleo. La Nación, Economía, 24 de febrero de 2002. Consultado en: https://www.lanacion.com.ar/economia/el-sector-petrolero-es-un-gran-generador-de-empleo-nid376261/ y Consultado el 20 de marzo de 2023.

Van Horne, J. y Wachowicz, J. (2010). Fundamentos de Administración Financiera. Prentice Hall, México, 13° Edición. Disponible en: https://fad.unsa.edu.pe/bancayseguros/wp-content/uploads/sites/4/2019/03/fundamentos-de-administracion-financiera-13-van-horne.pdf y Consultado el 15 de enero de 2023.

Villegas, E., y Dávalos, J. L. (2005). Análisis de razones financieras en la empresa lechera intensiva: Un estudio de caso en el altiplano mexicano. Veterinaria México, 36(1), 25-40. Disponible en: https://www.redalyc.org/articulo.oa?id=42336103 y Consultado el 26 de febrero de 2023.

Villa, C., y Sánchez, J. E. (2022). Evaluación del indicador liquidez para entender la competitividad: El caso comparativo de Petróleos Mexicanos y Equinor de Noruega. Panorama Económico, 18(37), 119–150. https://doi.org/10.29201/peipn.v18i37.132 y Consultado el 3 de enero de 2023.

Zamorano, y Jaramillo, A. (2015). Gestión financiera y la relación con la competitividad de las empresas del sector de la construcción en Santiago de Cali. Universidad Autónoma de Occidente, Facultad de Ciencias Administrativas. Disponible en: https://red.uao.edu.co/bitstream/handle/10614/11649/T08806.pdf?sequence=5 y Consultado el 17 de marzo de 2023.