

## Analysis of sustainability in a company of the oil sector in the south-marine area in the states of Tabasco and Campeche for the generation of an improvement proposal

### Análisis de la sustentabilidad en una compañía del sector petrolero del área sur-marina en los estados de Tabasco y Campeche para la generación de una propuesta de mejora

De la O-Rodriguez, Karen Poulette <sup>\*a</sup>, Morejón-Sánchez, Juana María <sup>b</sup>, Eliseo-Dantés, Hortensia <sup>c</sup> and Meneses-Hernández, José Luis <sup>d</sup>

<sup>a</sup> ROR Tecnológico Nacional de México/Instituto Tecnológico de Villahermosa • GPP-3922-2022 • ID 0000-0002-1269-5861 • 918017

<sup>b</sup> ROR Tecnológico Nacional de México/Instituto Tecnológico de Villahermosa • ABE-2879-2020 • ID 0000-0002-9930-181X • 362413

<sup>c</sup> ROR Tecnológico Nacional de México/Instituto Tecnológico de Villahermosa • F-6749-2018 • ID 0000-0003-4006-4669 • 411079

<sup>d</sup> ROR Tecnológico Nacional de México/Instituto Tecnológico de Villahermosa • H-4727-2018 • ID 0000-0001-6097-4817 • 309388

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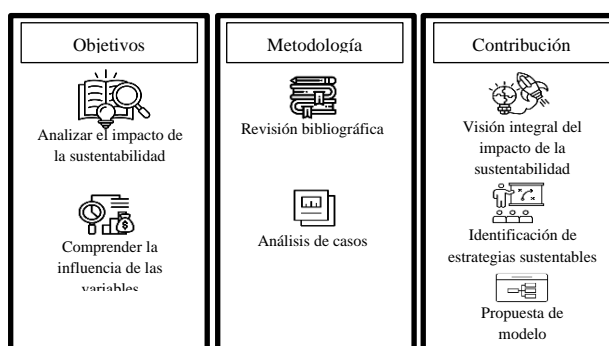
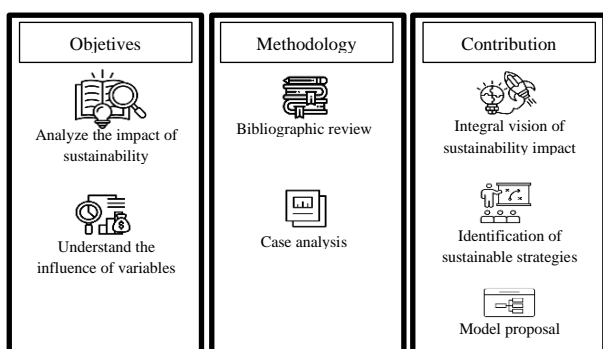
\* ✉ [\[poulettedelao@gmail.com\]](mailto:poulettedelao@gmail.com)

#### Abstract

The objective of this article is to analyze the impact of sustainability in an oil company, considering the variables of the context. It seeks to understand how these variables influence the sustainability strategies implemented by the company and its overall performance. An exhaustive bibliographic review of academic studies, company reports and press articles related to sustainability in the oil industry was carried out. Case studies of leading companies in the sector were analyzed to identify best practices and challenges in the implementation of sustainability strategies. A comprehensive view of the impact of sustainability in an oil company is provided, considering the various dimensions of the context in which it operates. The main sustainability strategies implemented by oil companies are identified and their results are analyzed. In addition, the challenges and opportunities faced by oil companies on their path to sustainability are discussed.

#### Resumen

Este artículo tiene como objetivo analizar el impacto de la sustentabilidad en una empresa petrolera, considerando las variables del contexto. Se busca comprender cómo estas variables influyen en las estrategias de sustentabilidad que implementa la empresa y en su desempeño general. Se realizó una revisión bibliográfica exhaustiva de estudios académicos, informes de empresas y artículos de prensa relacionados con la sustentabilidad en la industria petrolera. Se analizaron casos de estudio de empresas líderes en el sector para identificar las mejores prácticas y los desafíos en la implementación de estrategias sustentabilidad. Se proporciona una visión integral del impacto de la sustentabilidad en una empresa petrolera, considerando las diversas dimensiones del contexto en el que opera. Se identifican las principales estrategias de sustentabilidad que implementan las empresas petroleras y se analizan sus resultados. Además, se discuten los desafíos y las oportunidades que enfrentan las empresas petroleras en su camino hacia la sustentabilidad.



#### Sustainability, Integral and Strategies

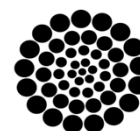
#### Sustentabilidad Integral y Estrategia

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## Introduction

"The oil and gas industry plays a key role in global energy production, but its operations often pose significant environmental and social challenges" (Emeka-Okoli, S. et al., 2024).

In this context, the need arises to assess the sustainability of a company operating in this sector, with the aim of identifying opportunities to improve its practices and minimise its environmental footprint, as well as to improve part of its productivity in relation to the environment.

The study focuses on three key dimensions: environmental, social and economic, with the objective of identifying the company's strengths and weaknesses in each of them. The company's current practices in environmental management, social responsibility and economic performance will be assessed, identifying its strengths and weaknesses.

Unlike other research that has been carried out on the subject, this thesis is characterised by its holistic approach, as productivity will also be assessed in relation to contextual variables.

From this analysis, a proposal for improvement will be formulated that will include recommendations to reduce the environmental impact of the company's operations, improve the working conditions of its employees and strengthen its commitment to local communities.

## Rationale

It is important for companies to enter into the context of sustainability, because it allows for improved management that is appropriate to the company's needs. In other words, *'it is an alternative to the traditional growth model and maximisation of profitability to formulate this type of management model that aims to generate mechanisms that favour permanence in the market'* (Portales, et al, 2009).

The implementation of a sustainable model is fundamental for the long-term success of the company.

The economic, environmental and social benefits of sustainability are clear and compelling. By taking a proactive approach to sustainability, you can help position yourself as a leader in the energy industry and contribute to a more sustainable future for all. Sustainability is not just an option for business, it is a necessity. By not adopting a sustainable model you risk falling behind and missing out on important opportunities.

## Overall objective

To carry out an analysis of the sustainability of a company in the hydrocarbon sector in the south-marine area in the states of Tabasco and Campeche in order to generate a proposal for improvement.

## Specific objectives

To make an integral diagnosis through the application of measurement tools, in such a way that we start from the general to the particular.

To design a business sustainability proposal for the company in the south-marine area.

## Research hypothesis

The context variables influence the sustainability of the company in the south-marine area.

## Theoretical framework

The most significant antecedent of sustainability arises from the environmental movements in the United States in 1962. In 1987, the possibility of growth with development and care for resources, i.e. *'growth that satisfies the needs of current generations without endangering future generations'* (González, 2011).

Sustainability means the existence of certain economic, environmental, social, cultural and political conditions that allow these two principles to be fulfilled: harmony with nature and social justice, which implies a redefinition of the role played by human beings within the biosphere and a profound change in the relationships established between different social and racial groups.

The concept of sustainability has been related to the environment, but over the years contextual variables have been integrated into this relationship. According to (Calvante, 2007), *'Sustainable development refers to the capacity that the human system has developed to satisfy the needs of current generations without compromising the opportunities and resources for the growth and development of future generations*, on the one hand, there is awareness and reflection when talking about future generations, and the environmental component (Ramírez, Sánchez, & García, 2004) because when talking about resources, we must necessarily mention the environment, which is where all the resources that man needs to subsist are found.

The relationship between the oil sector and sustainability is evident. This relationship is evidenced by the environmental, social, technological, cultural and political impacts generated by the sector (Baii, Guillén, & Abreu, 2017).

The term sustainable development has a very broad meaning, referring to the set of changes in the economic, institutional and political structure of the different countries of the world. It is synonymous with improvement, progress, indicating a change towards a situation that is preferable to the current one, leading to a positive transformation.

*'Sustainability is the ability to achieve sustained economic prosperity over time while protecting the planet's natural systems and providing a high quality of life for people'* (Calvante, A. 2007). (Calvante, A. 2007).

Large organizations and nations were concerned with their economic growth, but did not consider the consequences that were generated; instead, they only considered what they believed would give them productivity, but this productivity was fixed only on the economic aspect, without even taking into consideration whether their employees were being paid adequately. An analysis was needed as a result, as suggested by Espinosa, J. to assess sustainability, if necessary. In addition to being quantitative, sustainable development objectives are also qualitative. Development is a dynamic process that is constantly unbalanced and tends to improve the living conditions of everyone on the planet.

Sustainable Development proposes three fundamental pillars: the economic, the social and the environmental, by uniting the three pillars we have as a result the dimensions of sustainability, the equitable, the bearable and the viable (Escuela Nacional Colegio de Ciencias y Humanidades, 2017).

Economic, economic expansion generates wealth that has to be made compatible with the social and environmental. Ecological damage and resource depletion must be avoided. Innovation and efficient and clean technologies must be used. To aim to boost our growth means that future generations will be richer, have a higher income per capital and a higher quality of life. Sustainable behaviour means creating value from an economic point of view.

Socially, Sustainable Development proposes that future generations have the same or more opportunities than previous generations. It aims to lay the foundations for an improvement of our economy through incentives for the improvement of education, knowledge and innovation. The concept of equity is also implicit in this social dimension: intergenerational equity: this involves considering the demand of future generations in the costs of present economic development. Intergenerational equity: implies the inclusion of hitherto disadvantaged groups (e.g. women heads of households or the disabled) in decision-making. Inter-country equity: a change is needed between the relations between developed and developing countries.

Environmental, this dimension is based on the idea that sustainable development depends on the capacity of actors, including institutions and different economic agents, to understand and manage all that is framed by natural resources in the long term, renewable and non-renewable resources.

Biologically speaking, sustainable development presupposes that cycles must be closed in an effort to mimic nature and that the economy is circular, to avoid producing waste as these resources either return to nature or are used as raw material for other manufactured goods, therefore, production systems are created to use only renewable energy and resources.

On the other hand, sustainable development implies advancing simultaneously in five dimensions: economic, human, environmental, institutional and technological.

Economic activity under the perspective of sustainability cannot continue to operate under the motto '*business as usual*'. Progress must be made to change the '*polluter pays*' paradigm to the '*pollution prevention pays*' paradigm. The market can take advantage of the opportunities offered by the application of national and international environmental regulations, the implementation of cleaner and more efficient production processes and the addition of value to raw materials in its favour and in favour of sustainable development. In a sustainability scheme, it is not the growth of production that counts, but the quality of the services provided.

The goal of sustainable development is to improve the quality of life of all people by eradicating poverty, addressing basic needs and achieving income equality. Given that environmental constraints are real, poverty reduction requires both economic growth and meaningful development. However, this increased growth for the poor must be balanced with stabilization of output for the rich. It is also crucial to achieve demographic stability, curb over-consumption and move towards building human and social capital.

It is not possible to conceive of development and human life without the sustenance of nature. Development models are inevitably linked to ecological and environmental issues. In a sustainable model, the use of natural and energy resources is limited to their regenerative capacity and the generation of waste to the assimilative capacity of the ecosystem.

A low level of representation of the population in state initiatives and action, as well as excessive centralism, are clearly unsustainable. Sustainability implies making significant progress in the decentralization of political and administrative decision-making in order to stimulate new forms of organization and citizen participation. To reduce dependence on natural resources for some economic activities and to raise the level of production, innovation and technological development must be accelerated.

The search for and transition to more efficient technologies in industrialised nations, as well as the creation of cleaner and more efficient technologies in rapidly industrialising nations, are implicit in the technological dimension. Appropriate, small-scale technologies need to be developed to boost agricultural productivity, etc., in developing countries with agriculture-based economies.

In recent decades, both environmental and sustainability indicators have boomed and proliferated. However, systematic studies of sustainability and environmental indicators at scale, where scale is understood as the spatial, temporal, quantitative or analytical dimensions used to measure and study a given phenomenon, are so far very scarce. This scarcity affects the international, national and regional level.

Indicators to monitor progress in different dimensions are needed to help decision and policy makers at all levels to stay focused on the path to sustainable development. The process of developing indicators is slow and complex and requires numerous consultations.

When a new indicator appears it must be tested and modified in the light of experience and quality of life. While economic indicators are commonly used, social, environmental and institutional indicators are essential to get a more complete picture of what is happening with development.

Open Access Digital Institutional Repository, National University of Quilmes The Constitutional Reform of 1994 incorporates the Environmental Clause in its Art. 41, a provision that has been regulated through the minimum budget laws that have been added for more than a decade. This article enshrines the right of every person to a healthy and balanced environment and, to this end, assigns the authorities to carry out a series of actions aimed at achieving sustainable development. The legal protection of the environment must be projected into the future, taking into account the irreversibility of the damage that may result from human activities. According to most definitions, corporate social responsibility refers to the practice voluntarily adopted by companies of integrating social and environmental considerations into their daily operations and interpersonal interactions.



Being socially responsible involves going beyond legal requirements by investing 'more' in human capital, the environment and interpersonal relationships with stakeholders.

Going beyond legal compliance can boost a company's competitiveness, based on lessons learned from investing in environmentally friendly technologies and business practices. Productivity can also be directly affected by applying stricter standards than those required by social legislation, such as in the areas of training, working conditions and management-employee relations. It offers a means of managing change and balancing social progress with increased competition.

Corporate social responsibility should not be seen as a replacement for laws or regulations governing social rights or environmental standards, and cannot stop the creation of new and appropriate standards. In nations that do not have such regulations, efforts should concentrate on establishing the appropriate legislative or regulatory framework to define a uniform environment from which to develop socially responsible practices.

While the promotion of social responsibility has so far been associated mainly with a few large or multinational companies, it is important in all types of companies and all sectors of activity, from SMEs to multinational enterprises. As the main contributors to the economy and job creation, small and medium-sized enterprises, including micro-enterprises, need to increase their use.

While many SMEs have already taken their share of social responsibility, particularly through their involvement at the local level, greater awareness and support for the dissemination of good practices could help to promote social responsibility among this particular class of enterprises. The interests of other stakeholders are structurally embedded in worker cooperatives and participatory systems, as well as in other business entities (cooperatives, mutuals or associations), and these entities voluntarily assume social and civic responsibilities. Some enterprises that pay sufficient attention to social and environmental issues claim that engaging in such activities can boost growth, generate higher profits and generate better results.

It is a new activity that needs to be fully evaluated for many companies in the long run.

It is possible to separate the direct and indirect effects of social responsibility on the economy. Directly beneficial results can come, for example, from better working conditions (which increase employee engagement and productivity) or from the effective use of natural resources. In addition, indirect effects are achieved through increased focus of investors and consumers on the business, which will increase its market opportunities. On the other hand, a company's reputation may occasionally suffer if its business practices are criticized. The company's main assets, such as its brands or reputation, can be affected by this. For this, constant monitoring of its environment, both internally and externally, is essential.

According to Beltrán Ayala et al (2020), the PESTEL method '*is a strategic analysis technique to determine the external environment affecting the following factors, namely political, economic, socio-cultural, technological, ecological and legal. It consists of determining the forces affecting the specific environment: sector, employment market, target groups, competition, among others*'.

On the other hand, the TIEP is a technique that allows a comprehensive evaluation of the productivity of an organization or productive unit (Appendix A). It is based on the measurement of 10 elements that cover different aspects of the company, which are:

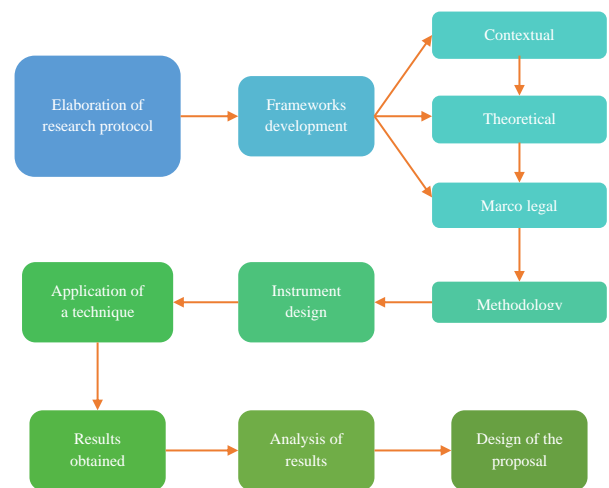
1. Conceptual approach to the company: This refers to the understanding and analysis of an organization from a holistic and integral perspective.
2. Process knowledge: This is the in-depth understanding of how a system works. This involves knowing the different steps involved in a process, the people responsible for each step, the resources needed and the tools used.
3. Social scope of the organisation: This refers to the interaction between the company and the society in which it operates.

Article

4. Planning management: This refers to the establishment of objectives, goals, strategies, policies, values, philosophy, programmes such as the AOP (Annual Operating Programme), therefore, this element seeks to evaluate the effectiveness of strategic planning management.
5. Management participation: This refers to a business management model in which workers actively participate in the company's strategic and operational decision-making. It seeks to create a more democratic working environment and to foster employee responsibility and commitment.
6. Organizational creativity and innovation: These are fundamental pillars for the success of organizations in today's world. Fostering a culture that values creativity and innovation is key for organizations to adapt to change, be competitive and generate long-term value.
7. Knowledge of the customer(s): This refers to a deep understanding of the characteristics, needs, behaviours and preferences of your customers.
8. Technological development: It is a continuous process that involves the creation, innovation and application of new technologies.
9. Macroeconomic knowledge: Everyone in the organization must understand how the economy as a whole works.
10. Integral human resource development: This is an approach that seeks to enhance the skills, knowledge and attitudes of employees so that they can reach their full potential, both individually and professionally. This approach goes beyond simple training and focuses on creating a work environment that is conducive to the personal and professional growth of employees.

The design of the study will be carried out by sequencing activities so that the analysis of the context allows the identification of internal and external problems that correspond to an important part of the coordination of management and strategic planning. Therefore, its correct application will provide the current results of the company, allowing to determine the factors that affect its culture, goals, objectives, processes and information flow.

**Box 1**



**Figure 1**

Methodological outline of the research

Source: Author's perspective, 2023

It is important to establish the general context of the research, including the research problem, justification, background and delimitation of the topic.

Having a research protocol that details the research objectives, the methodology to be used and the resources required.

Having the frameworks as support to have (Contextual framework) a detailed description of the context in which the research problem is located; (Theoretical framework) to review and analyse the existing literature on the research topic; (Legal framework) to identify the laws, rules and regulations that are relevant to the research.

Selecting appropriate research techniques or tools to collect data, such as surveys, interviews, observation or experimentation. This will enable data to be collected and analysed using statistical or qualitative techniques, as appropriate.

**Methodology**

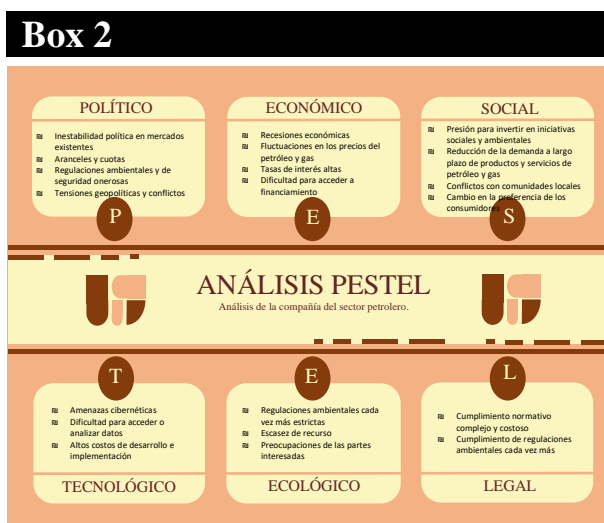
The methodological scheme consisting of stages to be followed during the research is shown below (see figure 1).

## Article

Presenting the results of the research in a clear and concise manner. And designing a proposal for improvement.

## Results

The results obtained from the application of the PESTEL analysis and the Integrated Productivity Evaluation Technique (TIEP) are intended to provide an overview of the external and internal factors that influence the productivity of a company, and how these factors can be used to develop improvement strategies.



**Figure 2**

PESTEL analysis of the challenges facing the study company

*Source: Author's perspective, 2024*

Figure 2 shows the challenges that the company under study has to face, where:

### Political

Political instability in existing markets where the company operates can generate uncertainty and risk to its operations. This may include changes in government policies, expropriation of assets or civil strife.

Tariffs and quotas on imports and exports can increase costs and reduce your competitiveness.

Burdensome environmental and safety regulations can increase costs and hinder your operation.

Geopolitical tensions and conflicts can disrupt oil and gas supplies, increase prices and create safety risks for employees.

### Economic

Economic downturns can reduce demand for oil and gas products and services, which can negatively affect revenues.

Fluctuations in oil and gas prices can affect oil sector company profitability.

High interest rates can increase costs.

Difficulty in accessing financing may limit the ability to invest in new projects and expand.

### Social

Growing concern about the environmental impact of the oil and gas industry may generate pressure to adopt more sustainable practices and reduce its carbon footprint.

Growing concern about climate change and the development of alternative energy sources may reduce long-term demand for oil and gas products and services, which could negatively affect the company's operations.

The company's operations may generate conflicts with local communities, which may damage its reputation and increase its costs.

Stakeholder expectations of corporate social responsibility may require it to invest in social and environmental initiatives, which may generate additional costs.

Trends towards renewable energy and energy efficiency may reduce long-term demand for products and services.

### Technological

Increasing sophistication can pose a significant risk to operations and reputation.

Difficulty in accessing or analysing data can make it difficult to make informed decisions.

High costs of developing and implementing new technologies can make it difficult for the company to remain competitive.

**Ecological**

Increasingly stringent environmental regulations can increase costs and make it difficult to operate. Scarcity of natural resources, such as water and land, can increase costs and make it difficult to operate.

Stakeholder concerns about the environmental impact of operations can damage your reputation and increase your costs. Air and water pollution from oil and gas industry operations can damage the environment, create public health risks and affect the company's reputation.

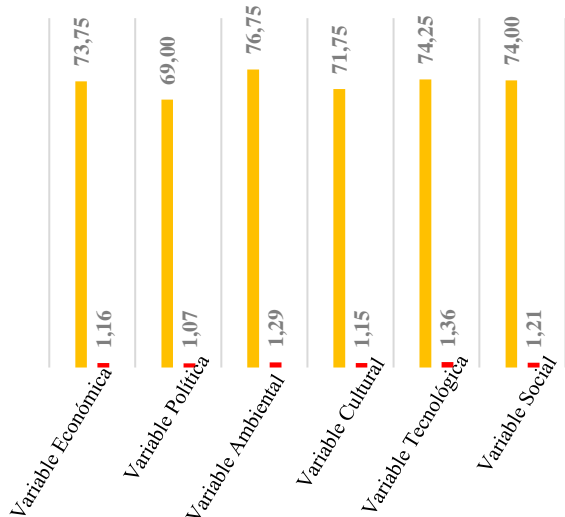
**Legal**

Compliance with environmental, labour and safety regulations can be complex and costly for the oil company.

Labour laws and safety regulations can affect the oil company's labour costs and human resource management practices. The company must protect its intellectual property, such as patents and trade secrets, to maintain its competitive advantage. It must comply with all applicable laws and regulations in the countries where it operates, which can be complex and costly. On the other hand, Graph 1 and Graph 2 represent the results obtained through the application of the Integrated Productivity Assessment Technique.

**Box 3**

Averages per variable



**Graph 1**

Averages by company variable

Source: Author's perspective, 2024

The impact of variables on sustainability:

Economic variable: double-edged: boost to profitability if managed wisely, but risk of negative repercussions if not properly controlled.

Political variable: favourable regulatory framework: an ally for sustainability; hostile or unstable political environment: an obstacle that generates negative consequences.

Environmental variable: Significant negative impact: oil operations generate irreversible damage to the environment.

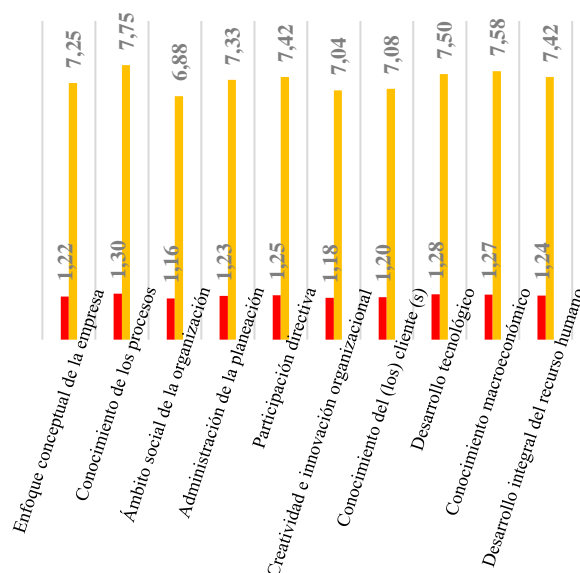
Cultural variable: Positive relations with local communities: key to success; disrespect for cultural norms or dissatisfaction with consumer expectations: ingredients for failure.

Technological variable: Clean technologies: driver of sustainable progress; irresponsible use or failure to adapt to technological change: sources of negative consequences.

Social variable: Social responsibility and employee welfare: pillars of sustainability; inadequate relations with employees or local communities: generators of negative impacts.

**Box 4**

Averages per item



**Graph 2**

Averages by company variable

Source: Author's perspective, 2024



The analysis of the simple and composite average per element is as follows:

Conceptual approach of the company: (Simple average: 7.25 and composite average: 1.22) no clear and defined vision of sustainability.

Knowledge of processes: (Simple average: 7.75 and composite average: 1.30) there is not a good knowledge of sustainable processes.

Social scope of the organization: (Simple average: 6.88 and composite average: 1.16) not a good relationship with its customers.

Management planning: (simple average: 7.33 and composite average: 1.23) the company does not have effective strategic planning for sustainability.

Management involvement: (Simple average: 7.42 and composite average: 1.25) Managers are not actively involved in sustainability management.

Organizational creativity and innovation: (Simple average: 7.04 and composite average: 1.18) The company does not encourage creativity and innovation in sustainability.

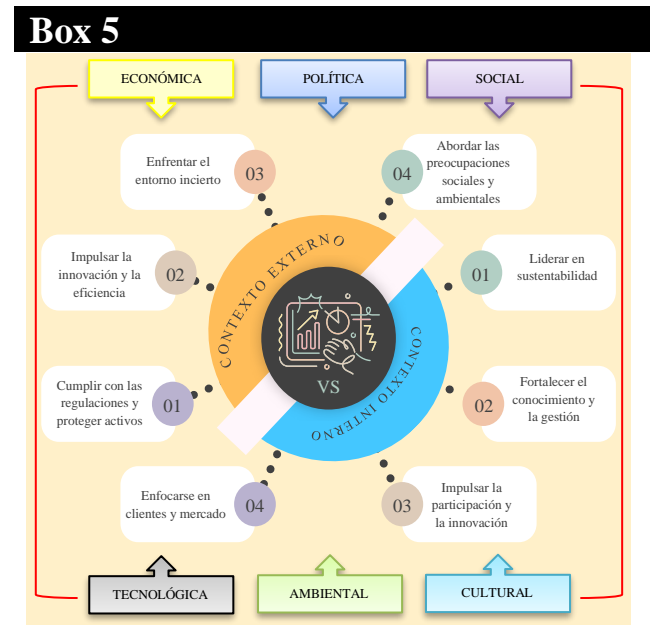
Knowledge of the customer(s): (Simple average: 7.08 and composite average: 1.20) the company does not have a good knowledge of the needs and preferences of customers in terms of sustainability.

Technology development: (Simple average: 7.50 and composite average: 1.28) the company is not investing enough in sustainable technology.

Macroeconomic knowledge: (Simple average: 7.58 and composite average: 1.27) economic changes affecting sustainability are not being closely monitored.

Comprehensive human resource development: (Simple average: 7.42 and composite average: 1.24) the company is not investing in comprehensive human resource development in sustainability.

## Proposal



**Figure 3**

Proposed model for improvement

Source: Author's perspective, 2024

### External context:

**Political:** Monitor and mitigate risks, diversify operations, build strong relationships, advocate for fair policies.

**Economic:** Manage financial risks, optimise costs, innovate products, consider strategic mergers.

**Social:** Commit to sustainability, invest in CSR, open dialogue, adapt to consumer expectations.

**Technological:** Invest in R&D, adopt automation and robotics, data analytics, robust cybersecurity.

**Green:** Reduce carbon footprint, efficient water management, prevent and mitigate pollution, circular economy.

**Legal:** Rigorous regulatory compliance, monitoring and adapting to legal changes, intellectual property protection, litigation management.

### Internal context:

**Conceptual approach:** Clear vision, integration into strategy, sustainability culture.

## Article

Process knowledge: Impact assessment, environmental management system, clean technologies.

Social: Strong relationships with communities, respect for human rights, diversity and inclusion.

Planning management: Strategic plan, resource allocation, performance indicators.

Management involvement: Sustainability leadership, integration in performance evaluation, communication at all levels.

Creativity and innovation: Encourage creativity, sustainable R&D, protection of intellectual property.

Customer insight: Market research, sustainable products and services, communication of commitment.

Technology development: Investment in clean technologies, development and commercialization, partnerships.

Macroeconomic knowledge: Monitoring changes, identifying opportunities, managing financial risks.

Integral human resource development: Training, motivation, leadership, integration into the culture.

## Conclusions

The current environment presents both challenges and opportunities for the company. The company must be able to adapt to changing market demands, customer expectations and technological advances. At the same time, it must identify and seize opportunities arising from the energy transition, the growing demand for sustainable energy and the need for responsible business practices.

To navigate this dynamic environment, the company needs visionary leadership that can guide the company towards a sustainable and profitable future. It requires sound strategic management that integrates risk assessment, long-term planning and timely decision-making.

In addition, the company must demonstrate a genuine commitment to sustainability, corporate social responsibility and the creation of shared value for all its customers.

## Declarations

### Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that might have appeared to influence the article reported in this paper.

### Authors' contribution

*De la O-Rodríguez, Karen Poulette*: Contributed to the project idea and the design of the improvement model.

*Morejón-Sánchez, Juana María*: Contributed to the methodology and recommendations for the design of the proposal.

*Eliseo-Dantés, Hortensia*: Contributed to the provision of information on the management of the Integrated Productivity Evaluation Technique.

*Meneses-Hernández, José Luis*: Contributed to the statistical section of the project and recommendations for the design of the proposal.

### Availability of data and materials

Data were obtained by applying instruments directly to the study subjects.

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### Abbreviations

ART	Article
CONAHCYT	National Council for Humanities, Science and Technology.

## Article

ETC	Etcetera.
I+D	Research + Development.
PESTEL	Political, Economic, Socio-cultural, Technological, Ecological, Legal.
PYMES	Small and medium-sized enterprises.
POA	enterprises.
RSE	Annual Operating Programme.
TIEP	Socially Responsible Company. Integrated Productivity Assessment Technique.

## Support

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## Basics

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