



# Social entrepreneur and its impact on the photovoltaic solar energy sector in Hidalgo

## El emprendedor social y su impacto en el sector de energía solar fotovoltaica en Hidalgo

Fabiola Martínez Vargas<sup>1</sup>  , Danae Duana Ávila<sup>1</sup>  , Tirso Javier Hernández Gracia<sup>1</sup>  

### ABSTRACT

Social entrepreneurship focuses on the development of projects that seek to solve social problems. Currently there is a growing environmental awareness in the population, derived from climate change, where the use of renewable energies is a viable alternative. renewable energies, especially solar energy, is a viable alternative. This article aims to characterize the factors that prevent entrepreneurs from entering this market sector. The relationship between business, private sector and government is explored. The research paradigm is quantitative, based on a descriptive, non-experimental and cross-sectional study. Descriptive, non-experimental and cross-sectional study. An online questionnaire was applied, structured by 11 questions. It was applied to 40 public servants performing administrative functions in the city of Cuenca, Ecuador. It was validated by means of Cronbach's Alpha test with values  $0.79 \leq X \leq 0.81$ . A topic that has been studied from different perspectives is the profile of the entrepreneur and the regulatory barriers that can hinder the development of proposals that promote environmental conservation, enhanced by sustainability studies through the responsible consumption of natural resources. The implementation made it possible to improve the planning of processes at the institutional level and to schedule the execution of activities that ensure the mission, an element that influences institutional administrative management.

**Keywords:** business management, company, entrepreneur, fossil fuels, medium company.

**JEL Classification:** D11, Q42, Q55

**Received:** 14-04-2024

**Revised:** 08-06-2024

**Accepted:** 15-06-2024

**Published:** 01-07-2024

**Editor:** Carlos Alberto Gómez Cano 

<sup>1</sup>Universidad Autónoma del Estado de Hidalgo. Pachuca de Soto, México.

**Cite as:** Martínez, F., Duana, D. y Hernández, T. (2024). El emprendedor social y su impacto en el sector de energía solar fotovoltaica en Hidalgo. Región Científica, 3(2), 2024301. <https://doi.org/10.58763/rc2024301>

### RESUMEN

El emprendimiento social se enfoca en el desarrollo de proyectos que buscan resolver problemas sociales. Actualmente hay una creciente conciencia medioambiental en la población, derivada del cambio climático, donde el uso de energías renovables constituye una alternativa viable. Este artículo pretende caracterizar los factores que impiden a los empresarios emprender en este sector de mercado; explora la relación empresa, sector privado y gobierno. El paradigma de investigación es cuantitativo, a partir de un estudio descriptivo, no experimental y transversal. Se aplicó un cuestionario online, estructurado por 11 preguntas, a 40 servidores públicos que desempeñan funciones administrativas en la ciudad de Cuenca, Ecuador. Se validó mediante la prueba Alfa de Cronbach con valores  $0.79 \leq X \leq 0.81$ . Un tema que ha sido estudiado desde diferentes perspectivas es el perfil del emprendedor y las barreras regulatorias que pueden obstaculizar el desarrollo de propuestas que fomentan la conservación del medio ambiente, potenciado por los estudios de sostenibilidad mediante el consumo responsable de recursos naturales. La implementación permitió mejorar la planificación de los procesos a nivel institucional y programar la realización de actividades que aseguran el cumplimiento de la misión; un elemento que influye en la gestión administrativa institucional.

**Palabras clave:** combustibles fósiles, empresa, empresario, gestión empresarial, medianas empresas.

**Clasificación JEL:** D11, Q42, Q55

## INTRODUCTION

Social entrepreneurship is a business alternative that arises in response to social and environmental needs that public and private sectors have not addressed; this business model aims to positively impact society and the environment while



Atribución No Comercial Compartir Igual 4.0 Internacional.

generating an economic return. In Mexico, social entrepreneurship has gained ground due to the innovative way in which it addresses the country's social and environmental challenges; however, no number of companies meet these criteria, which prevents us from knowing the exact number of social enterprises in the country. This research will address the specific topic of renewable energies, such as solar energy, a branch of this type of energy.

Mercado Solar seeks to innovate in its processes, services, and incursion to the new trends that arise in the market, is aware of the latest changes and legislation involving the energy sector, decided to create turnkey projects for the industrial sector, being the second sector that consumes more energy in the country. This energy comes from 39% of the cycle generated by fossil fuels or from carbon emissions; one of the barriers on the part of CFE is that it only authorizes 0.5 MW to sponsor distributed generation contracts, something that represents a problem for the industry because its consumption is higher than that allowed by the regulatory entities. The business model implemented is based on project design, financing management - implementation, and solar system commissioning; the client does not pay money for the initial investment; with the savings generated, it executes the financing.

The profile of the entrepreneur, as well as the barriers of external factors to identify the areas of opportunity that entrepreneurs have, are a viable option; being a trend as an alternative for electricity generation from non-polluting renewable sources, this type of technology will help combat climate change when fossil fuels are no longer used, more greenhouse gases are avoided. Thus, Mercado Solar decided to serve the industrial sector, the country's second-largest energy consumer. To serve this market niche, the company must have specific characteristics to meet the technical, financial, and corporate requirements, among others, to remain competitive.

This article aims to characterize the factors that prevent entrepreneurs from entering this market sector and explores the relationship between business, the private sector, and the government.

## METHODOLOGY

The research paradigm is quantitative, based on a descriptive, non-experimental and cross-sectional study. An online questionnaire was applied, structured by 11 questions (items); all the information was retrieved in a single application of the questionnaire.

### Description of the instrument

The questionnaire was structured into two questions: dichotomous and Likert scale. The authors validated the instrument based on expert criteria; for the dichotomous questions, the Kuder-Richardson 20 statistical test was used to obtain reliability, and for the Likert scale questions, the Cronbach's Alpha test was used. In iterations of its application, the instrument obtained validity values of  $0.79 \leq X \leq 0.81$ , which is not a minor thing that evidences the instrument's applicability reliably.

### Population

The questionnaire was applied to 40 public servants who perform administrative functions in Cuenca, Ecuador, who work in non-centralized executive branch institutions. The results of the instrument's application are processed in a Microsoft Excel 2019 spreadsheet.

It should be noted that supply is related to the behavior of producers and sellers. This process is defined as the price at which producers -during a period- are willing to sell the products they produce in the market as goods or services, and distributors and producers offer those in various markets at different prices. Demand was measured by the quantity provided as a function of time, as the main head to determine prices for production costs is the Law of Supply, which specifies that when the price of a good or service increases, the quantity of this good or service that can be produced and sold during a given period increases in the same proportion, if the price decreases the quantity also offered (Astudillo, 2012).

## RESULTS AND DISCUSSION

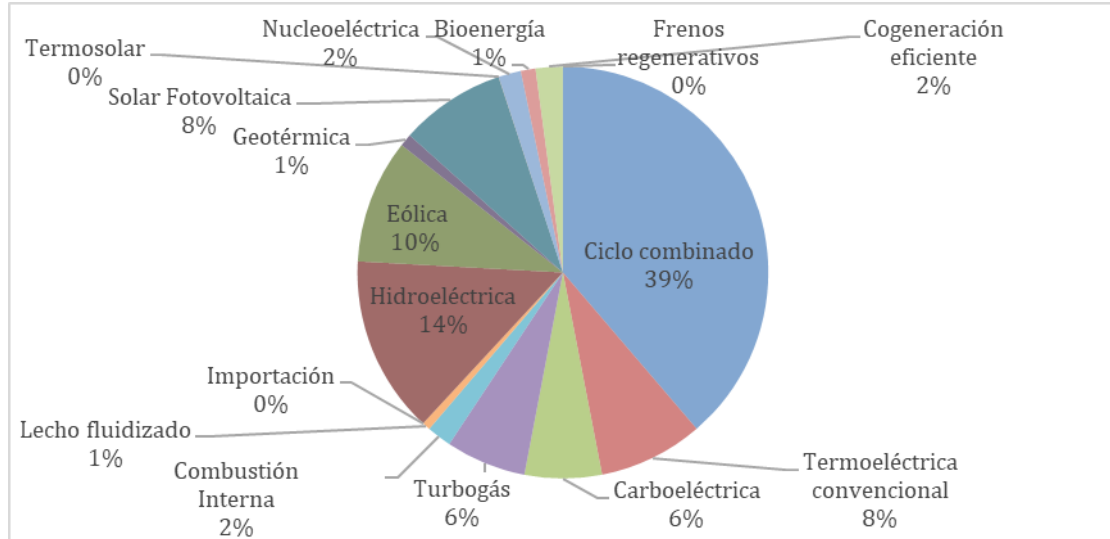
The most significant example in this sector is the National Electric System (SEN), the largest producer and distributor in the world; its wide coverage managed to supply electric service to 128 million Mexicans dispersed in two million square kilometers, covering 98.7% of the service (Secretaría de Energía, 2022).

The installed generation capacity for 2021 was 90 817.93 MW in the different types of technology (Figure 1); the

analysis showed that the largest generation comes from conventional technology, representing 61.91% (combined cycle, conventional thermoelectric, carboelectric, internal combustion turbogas fluidized bed); On the other hand, renewable clean energies already represent 33.02% (hydroelectric, wind, geothermal, solar photovoltaic, solar thermal); in this case, a study we will work mainly with solar photovoltaic, which represents 8.32%, and other clean energies, which generate 5.07% (nuclear power, bioenergy, efficient cogeneration, regenerative brakes).

**Figure 1.**

*Installed capacity by technology type 90 817.93 MW in 2021*

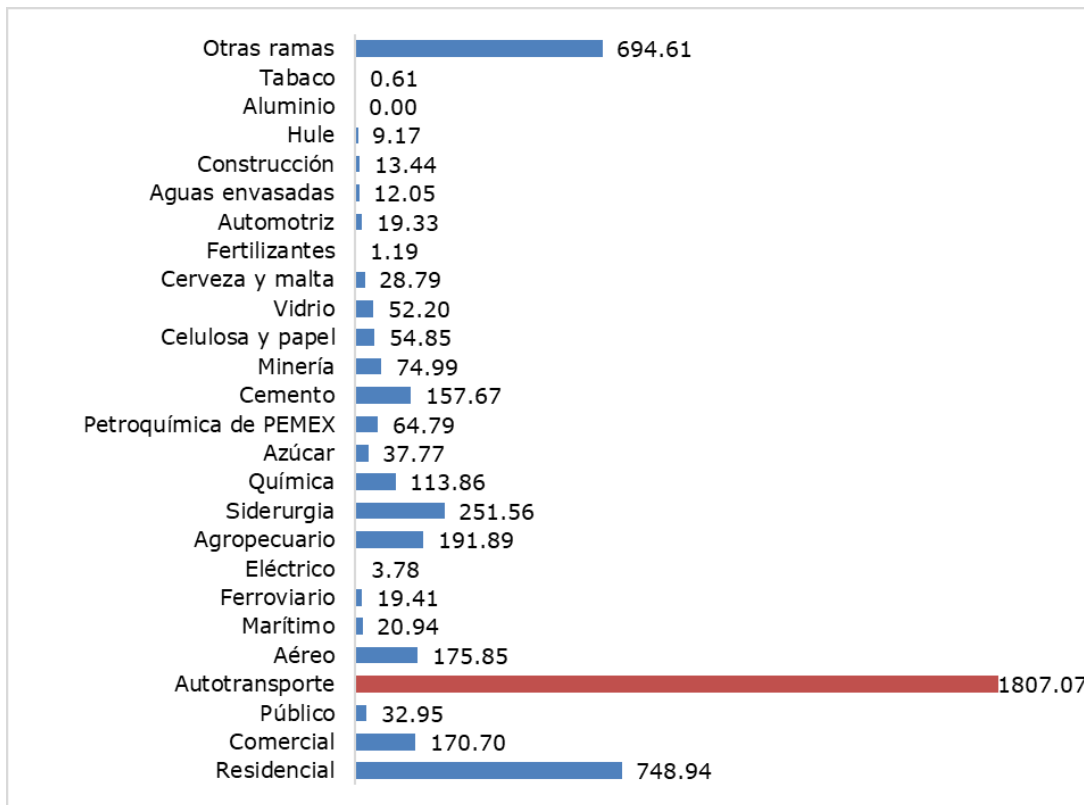


**Source:** own elaboration, based on the Ministry of Energy (2019)

**Note:** appears in the original language.

**Figure 2.**

*National Energy Balance: Final energy consumption by sector*



**Source:** prepared by the author, based on data from the Ministry of Energy (2019)

**Note:** appears in the original language.

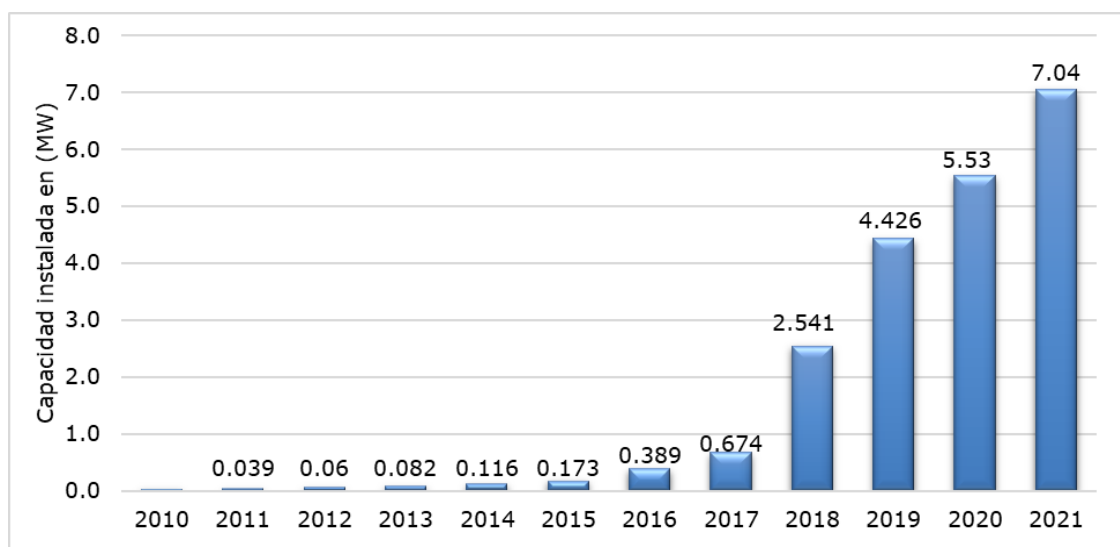
The Mexican state, led by President Manuel López Obrador, inaugurated the largest photovoltaic power plant in Latin America and the eighth largest in the world, located in Puerto Peñasco (Sonora); it has an installed capacity of 120 megawatts and will be executed in three stages, to be completed in 2028. This project will promote this type of technology, and approving a project of this magnitude generates a favorable outlook for the solar photovoltaic energy sector (Presidency of the Republic, 2023). Figure 2 shows the energy demand generated by the economic sector in Mexico, based on data provided by the Ministry of Energy for the year 2019, and available here. It should be noted that, based on this data, the potential demand is residential, commercial, and industrial. They can acquire solar systems to supply electricity for self-consumption.

Distributed generation tends to increase due to the installation of solar systems interconnected to the grid, which is ideal for the following target public that consumes electricity:

- The residential sector: High Consumption Domestic tariff (DAC), which, due to its level of consumption, does not have subsidies from the federal government, makes the system more profitable.
- SMEs: this segment has medium and low-voltage electricity rates and is ideal for this type of system.
- Industry: industrial tariffs for High Demand Medium Voltage Ordinary (GDMTO) are used in companies with a demand of less than 100 KW, and the energy cost is the same 24 hours a day. The High Demand Medium Voltage Hourly Rate (GDMTH), demand exceeds 100 KW, and the cost of energy is divided into a schedule of 3 levels the cost of energy; depending on the time at which it is consumed, solar systems can be installed regardless of the industrial tariff, the benefits for both schemes meet specific characteristics in energy savings in intermediate hours and reduce the charge for energy demand.
- Solar Farms: producing energy on a large scale for total sale.

In the North American region, specifically in Mexico, 7.04 MW of solar photovoltaic systems will be installed in 2021 (Figure 3); these installations are for commercial, personal use, industrial, or solar farms directly self-sufficient for the CFE. Another interesting factor is that the manufacturing cost of photovoltaic modules has decreased drastically in recent years, making this type of technology more accessible and resulting in the cheapest way to generate electricity (International Renewable Energy Agency, 2022b).

**Figure 3.**  
Installed capacity trends (MW)



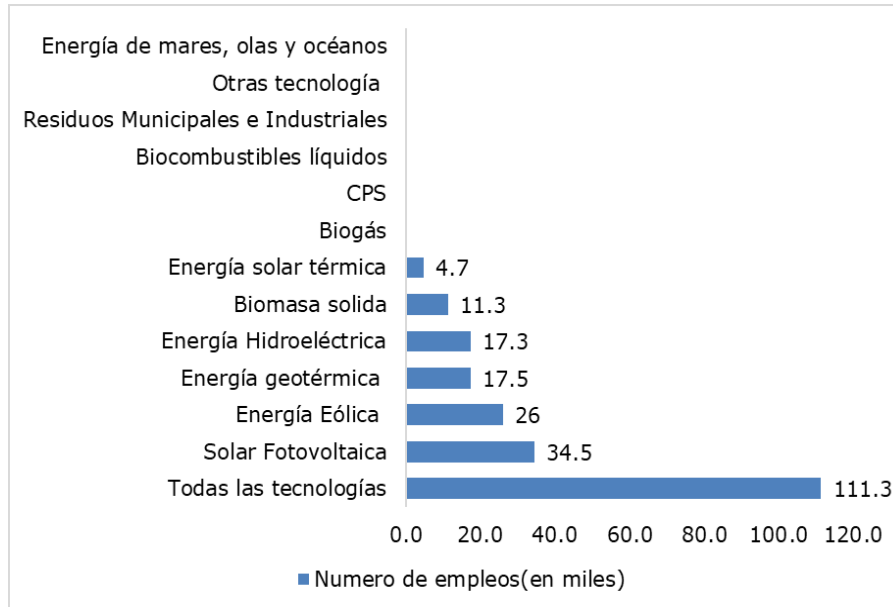
**Source:** dates de International Renewable Energy Agency (2020)

The average cost of a solar photovoltaic system varies in each project due to the specifications made from the structure; if it is on tiles, sheet metal, or a different application, it is difficult to agree on an average price per Watt installed. However, for solar equipment, it is more usual to obtain average costs that range in the market from 0.70 dollars per Watt and with installation up to 1.35 dollars per Watt installed.

The article shows an alternative that drives economic growth while generating the public and private sectors to drive through prosperity, social equity, and innovation. Mitigating climate change implies generating structural changes from sustainable production, responsible consumption, energy efficiency, and the use of clean energies;

speaking specifically of this type of technology, Mexico can become the seventh solar energy power in the world since 85% of the national territory has optimal conditions for solar projects (International Renewable Energy Agency, 2022). Mexico is among the 20 countries in the world that invest in renewable energy, according to data from the International Renewable Energy Agency (IRENA). The jobs generated in this sector were 34 490 in 2020 (Figure 4), which contributed to the country's economic growth. The industry has a broad outlook to continue promoting this type of technology and generating more direct and indirect jobs in the engineering, installation, maintenance, and administrative areas.

**Figure 4.**  
*Jobs generated in Renewable Energy 2020*



**Source:** International Renewable Energy Agency (2020)

**Note:** appears in the original language.

Mexico is ranked 55th in innovation (Global Entrepreneurship Monitor, 2023). Data from INEGI (2021) shows 35 219 141.00 establishments in the country, of which Hidalgo has 139 294. The state has an average life expectancy of 8.4. The monthly mortality rate is 1.45%, and the birth rate is 0.81%; that is, out of 10 000 establishments in a given period, 145 companies die, and 81 new companies are born. These new companies intend to generate technological changes, new markets, inclusion, and social interest. In Mexico, 90% of businesses are SMEs, highlighting that entrepreneurship is the primary way to regenerate the economy and improve people's quality of life.

On the other hand, Mexico's commitment to the 2030 Agenda was approved in 2015 to combat poverty, protect the planet, and ensure prosperity. This is established through the Sustainable Development Goals (SDGs). There are 17 objectives, each with targets that must be met by 2030, with number 7 being particularly noteworthy, focusing on "Affordable and Clean Energy." However, the lack of clarity on how to achieve this and the limited budget to achieve these goals are driving everyone to join this commitment, including the government, the private and civil sectors, and personally, to contribute directly by acquiring this type of technology and indirectly by creating jobs, innovating, and creating companies that provide comprehensive solutions.

Likewise, solar energy is a raw material found in virtually every corner of the planet; Mexico is a potential renewable energy country due to its location. Most of its states have average irradiance levels of 5.5 peak hours per day. The solar energy sector has generated 3.975 billion jobs worldwide, 34 940 of which are in Mexico.

## CONCLUSIONS

Renewable energies are alternatives that can solve energy policy problems in the short, medium, and long term. The potential of this technology is not yet fully developed; despite falling costs, failure to promote the energy transition, policies that help ensure efficient use to reduce energy consumption, and the promotion of renewable energies will, in the long run, have very alarming consequences for energy security, climate change impacts, and economic impacts due to the continued use of fossil fuels, which, in addition to being exhaustible, require high

investment and their import generates increased costs.

The assignment of duties to personnel is closely related to the job skills they are capable of developing and significantly influences the achievement of strategic objectives. In this sense, knowledge of current legal regulations regarding public resources and goods will contribute to administrative management, improve strategic indicators at the institutional level, and increase customer and employee satisfaction.

The implementation of the research allowed for improved planning of processes and activities at the institutional level, assigning, sequencing, and scheduling activities that ensure mission fulfillment; this factor influences institutional administrative management and its interaction with the environment (institutions and related stakeholders).

## REFERENCES

- Agüero, J. (2007). Teoría De La Administración: Un Campo Fragmentado Y Multifacético. *Revista Científica "Visión de Futuro"*, 7(1), 27. <https://rid.unam.edu.ar/handle/20.500.12219/4897>
- Álava, N., Quinde, M., y Álava, N. (2023). Análisis explicativo del liderazgo transformacional en el perfil emprendedor social de jóvenes universitarios. *Formación universitaria*, 16(2), 49–60. <https://doi.org/10.4067/S0718-50062023000200049>
- Antero, J., y Ramírez, V. (2014). Evolución De Las Teorías De Explotación De Recursos Naturales: Hacia La Creación De Una Nueva Ética Mundial. *Revista Luna Azul*, 39, 291–313. <http://www.scielo.org.co/pdf/luaz/n39/n39a17.pdf>
- Arias, J., Villasís, M., y Miranda, M. (2016). El protocolo de investigación III: La población de estudio. *Revista Alergia México*, 63(2), 201–206. <https://doi.org/10.29262/ram.v63i2.181>
- Asociación Mexicana de Energía Solar. (2021). Promovemos la Generación de Energía en México [ASOLMEX]. *Introducción*. <https://asolmex.org/>
- Astudillo, M. (2012). *Fundamentos de Economía* (1ra Ed.). Trillas. <http://ru.iiec.unam.mx/2462/1/FundamentosDeEconomiaSecuenciaCorrecta.pdf>
- Ávila, E. (2021). La evolución del concepto emprendimiento y su relación con la innovación y el conocimiento. *Investigación & Negocios*, 14(23), 32. <https://doi.org/10.38147/invneg.v14i23.126>
- Banco Interamericano de Desarrollo. (2021). *El papel de la transición energética en la recuperación sostenible de América Latina y el Caribe*. Nota Técnica IDB-TN-02142. <https://www.technosun.com/es/blog/listado-paneles-solares-tier-1/>
- Borja, A., Carvajal, H., y Vite, H. (2020, junio 19). Entrepreneurship model and analysis of the determining factors for its sustainability. *Revista Espacios*, 41(24), 14
- Bravo, C. (2016). Schools of Thought in Social Entrepreneurship. *Tec Empresarial*, 10(3), 19–28. <https://doi.org/10.18845/te.v10i3.2937>
- Bravo, O., y Marín, F. (2008). El desarrollo sostenible en la transición epistemológica. *Multiciencias*, 8(Extraordinario), 228–233. <https://www.redalyc.org/pdf/904/90411691033.pdf>
- Cajiga, J. (s.f). El concepto de responsabilidad social empresarial. *Centro Mexicano Para La Filantropía*, 1-35. [https://www.cemefi.org/esr/images/stories/pdf/esr/concepto\\_esr.pdf#:~:text=En%20base%20a%20lo%20anterior%2C%20una%20empresa%20socialmente,benefician%20a%20su%20negocio%20e%20impactando%20positivamente%20a](https://www.cemefi.org/esr/images/stories/pdf/esr/concepto_esr.pdf#:~:text=En%20base%20a%20lo%20anterior%2C%20una%20empresa%20socialmente,benefician%20a%20su%20negocio%20e%20impactando%20positivamente%20a)
- Ley del Impuesto sobre la Renta Pública. (2021). Ley No. 312. <https://www.diputados.gob.mx/LeyesBiblio/ref/lisr.htm>
- Ley de Transición Energética. (2015). Ley No. 40. <https://www.diputados.gob.mx/LeyesBiblio/pdf/LTE.pdf>

- Ley del Impuesto sobre la Renta. (2021). Ley No. 312. <https://www.diputados.gob.mx/LeyesBiblio/ref/lisr.htm>
- Cantillon, R. (2010). *An essay on economic theory*. Ludwig von Mises Institute. <https://mises.org/library/essay-economic-theory-0>
- Castelo, C., y Muñoz, J. (2019). La teoría ecológica de John Dryzek: 30 años de pensamiento político ambiental. *Azafea: Revista de Filosofía*, 21, 209–219. <https://doi.org/10.14201/azafea201921209219>
- CEPAL. (2020). *La Agenda 2030 para el Desarrollo Sostenible en el nuevo contexto mundial y regional: Escenarios y proyecciones en la presente crisis*. Naciones Unidas. <https://doi.org/10.18356/62f80065-es>
- Chiavenato, I. (2006). *Introducción a la teoría general de la administración*. McGraw-Hill
- Cuadrado, J. (2014). ¿Es tan “nueva” la “Nueva Geografía Económica”? Sus aportaciones, sus límites y su relación con las políticas. *EURE*, 40(120), 5–28. <http://dx.doi.org/10.4067/S0250-71612014000200001>
- Reforma Energética (2013). Diario Oficial de la Federación. [https://www.gob.mx/cms/uploads/attachment/file/10233/Explicacion\\_ampliada\\_de\\_la\\_Reforma\\_Energetica1.pdf](https://www.gob.mx/cms/uploads/attachment/file/10233/Explicacion_ampliada_de_la_Reforma_Energetica1.pdf)
- Domingo, O., y Gómez, M. (2013). *Evaluación de impacto ambiental*. Mundi-Prensa Libros
- Domínguez, R., León, M., Samaniego, J., y Sunkel, O. (2019). *Recursos naturales, medio ambiente y sostenibilidad: 70 años de pensamiento de la CEPAL*. Naciones Unidas. <https://doi.org/10.18356/b89f0453-es>
- Drucker, P. (1998). *Su visión sobre la administración, la organización basada en la información, la economía y la sociedad* (1era. ed.). Norma. [https://books.google.com.cu/books/about/Drucker\\_su\\_visi%C3%B3n\\_sobre\\_la\\_administraci.html?id=C0Nol4DipbMC&redir\\_esc=y](https://books.google.com.cu/books/about/Drucker_su_visi%C3%B3n_sobre_la_administraci.html?id=C0Nol4DipbMC&redir_esc=y)
- Espinoza, D. (2022). *Análisis de factibilidad para el diseño de una estación de carga de medios de transporte eléctrico utilizando energía solar fotovoltaica en Piura* [Tesis de grado], Universidad De Piura. <https://pirhua.udep.edu.pe/handle/11042/5455>
- Fernández, C., Pilar, B., y Hernández, R. (2014). *Metodología de la investigación*. (1ra. ed.), McGraw-Hill
- Fernández, K., McAnally, L., y Vallejo, A. (2015). Apropiación tecnológica: Una visión desde los modelos y las teorías que la explican. *Perspectiva Educacional*, 54(2), 109–125. <https://doi.org/10.4151/07189729-Vol.54-Iss.2-Art.331>
- Fujita, M., y Krugman, P. (2004). La nueva geografía económica: Pasado, presente y futuro. *Investigaciones Regionales*, 4, 177–206. <https://www.redalyc.org/pdf/289/28900409.pdf>
- Gessa, A., y Sancha, M. (2016). Alternativas de reducción de las emisiones de dióxido de carbono (CO<sub>2</sub>) en la producción de cemento. Propuesta de un modelo de evaluación. *Innovar. Revista de Ciencias Administrativas y Sociales*, 26(60), 51–66. <https://doi.org/10.15446/innovar.v26n60.55532>
- Gidalti, H., Kumul, C., Xool, R., y Sánchez Ramos, L. (2020). El emprendimiento y sus impactos en la economía por la pandemia Covid-19. *EDUCIENCIA*, 5(2). <https://doi.org/10.29059/educienciam.v5i2.196>
- Global Entrepreneurship Monitor. (2023). Global Entrepreneurship Monitor 2022/2023 Global Report: Adapting to a “New Normal”. *Global Entrepreneurship Monitor*, 255. <https://gemconsortium.org/report/20222023-global-entrepreneurship-monitor-global-report-adapting-to-a-new-normal-2>
- Herruzo, E., Hernández, B., María, G., y Sánchez, J. (2019). *Emprendimiento e innovación: Oportunidades para todos* (1era. edic.). Dykinso, S.L. <https://elibro.net/ereader/elibrodemo/129642>
- Instituto Nacional de Estadística y Geografía. (2020). *Producto Interno Bruto. PIB. Trimestral*. INEGI; Instituto Nacional de Estadística y Geografía. INEGI. <https://www.inegi.org.mx/temas/pib/>
- International Renewable Energy Agency. (2022a). *Renewable Energy Employment by Country*. IRENA. <https://>

International Renewable Energy Agency. (2022b). *Solar energy*. IRENA. <https://www.irena.org/solar>

Kühne, K., Sánchez, L., Roth, J., Tornel, C., y Gerasimchuk, I. (2019). Más allá de los combustibles fósiles: Transición fiscal en México. *International Institute for Sustainable Development*, 49. <https://policycommons.net/artifacts/614217/mas-alla-de-los-combustibles-fosiles/1594394/>

López, A., Frías, M., y Díaz, S. (2003). Predictores de la conducta antisocial juvenil: Un modelo ecológico. *Estudios de Psicología*, 8(1), 15–24. <https://doi.org/10.1590/S1413-294X2003000100003>.

Macho, A., Carabaza, C., González, Á., ... y Iglesias, J. (2020). Personalidad emprendedora y género. *Cuadernos de Relaciones Laborales*, 38(1). <https://doi.org/10.5209/crla.68869>

Martínez, J., Sisca, N., Marey, E., Caminaur, S., y Molina, M. (2013). *Energía: Características y contexto* (1ra. ed.). Ministerio de Educación de la Nación. <http://www.bnm.me.gov.ar/giga1/documentos/EL005261.pdf>

Martínez, R., Palma, A., y Velásquez, A. (2020). *Revolución tecnológica e inclusión social: Reflexiones sobre desafíos y oportunidades para la política social en América Latina*. Naciones Unidas. 233, 87. <https://repositorio.cepal.org/handle/11362/45901>

Martínez, V., y Juanatey, O. (2010). Percepciones del concepto de Responsabilidad Social Corporativa: Un estudio exploratorio. *HOLOGRAMATICA - Facultad de Ciencias Sociales UNLZ*, 2(13), 3–34. <https://www.unlz.edu.ar/sociales/hologramatica>

Mejía, H. (2014). *Responsabilidad por Daños al Medio Ambiente* (1era. ed). Unidad Técnica Ejecutiva Del Sector De Justicia

Mejia, O. (2020). *Reporte tendencias capital humano México 2020*. 51. <http://www2.deloitte.com/mx/es/pages/human-capital/articles/tendencias-capital-humano-2020-edicion-mexico.html>

Nájera, J. (2018). Oportunidades de negocio y tendencias medioambientales. *Universidad & Empresa*, 20(35), 13–50. <https://doi.org/10.12804/revistas.urosario.edu.co/empresa/a.5740>

Padovan, I. (2020). *Teorías De La Motivación. Aplicación práctica* [Tesis de grado]. Universidad Nacional de Cuyo. [https://bdigital.uncu.edu.ar/objetos\\_digitales/15664/teorias-de-la-motivacin-aplicacin-prctica.pdf](https://bdigital.uncu.edu.ar/objetos_digitales/15664/teorias-de-la-motivacin-aplicacin-prctica.pdf)

Pérez, M., Yépez, A., y Tolmasquim, M. (2021). El papel de la transición energética en la recuperación sostenible de América Latina y el Caribe. *BID*, 50. <http://dx.doi.org/10.18235/0003214>

Perpiñán, O. (2020). *Energía Solar Fotovoltaica* (Creative Commons). Perpignan. <https://github.com/oscarperpignan/esf>

Portuguez, M., Valenzuela, J., y Navarro, C. (2018). Diseño y validación de un test de evaluación del potencial en emprendimiento social. *REVESCO. Revista de Estudios Cooperativos*, 128, 192–211. <http://dx.doi.org/10.5209/REVE.60207>

Presidencia de la República. (2023). *Versión estenográfica. Central Fotovoltaica Puerto Peñasco. Inauguración—Primera etapa*. Gobierno de México. <http://www.gob.mx/presidencia/articulos/version-estenografica-inauguracion-primer-etapa-central-fotovoltaica-puerto-penasco?idiom=es>

Quintana, L., y Salgado, U. (2016). Migración interna mexicana de 1990-2010: Un enfoque desde la Nueva Geografía Económica. *Problemas del Desarrollo. Revista Latinoamericana de Economía*, 47(184), 137–162. <https://doi.org/10.1016/j.rpd.2016.01.007>

Ramírez, D. (2014). Desarrollo Sostenible Como Un Proyecto De Modernidad. *Revista Ciencias Estratégicas*, 22(31), 67–81. <https://www.redalyc.org/pdf/1513/151332653005.pdf>

Ramírez, V., y Antero, J. (2014). Evolución De Las Teorías De Explotación De Recursos Naturales: Hacia La Creación

- De Una Nueva Ética Mundial. *Revista Luna Azul*, 39, 291–313. <http://www.scielo.org.co/pdf/luaz/n39/n39a17.pdf>
- Ramírez, Y., y Caldera, D. (2017). Potencial Emprendedor (Social) De Jóvenes Universitarios. *Jóvenes en la ciencia*, 3(2), 1477–1481. <https://www.jovenesenlaciencia.ugto.mx/index.php/jovenesenlaciencia/article/view/2164>
- Ricoy, C. (2005). La teoría del crecimiento económico de Adam Smith. *Economía y Desarrollo*, 138(1), 11–47. <https://revistas.uh.cu/econdesarrollo/article/view/3955>
- Romero, A., y Milone, M. (2016). El Emprendimiento en España: Intención Emprendedora, Motivaciones y Obstáculos. *Revista de Globalización*, 10(1), 95–109. <https://doi.org/10.3232/GCG.2016.V10.N1.05>
- Salazar, I., Mockey, I., y Canal, M. (2010). Estimado de la reducción de la emisión de co2 por accione de ahorro de electricidad en las condiciones de Cuba. *Ingeniería Energética*, 31(3), 1–5. <https://www.redalyc.org/pdf/3291/329127745001.pdf>
- Secretaría de Energía. (2019). *Sistema de Información Energética Consumo final de energía por sector*. <https://sie.energia.gob.mx/bdiController.do?action=cuadro&cvecua=IE7C02>
- Secretaría de Energía. (2022). *El Gobierno de México fortalece el Sistema Eléctrico Nacional*. SENER. <http://www.gob.mx/sener/es/articulos/el-gobierno-de-mexico-fortalece-el-sistema-electrico-nacional>
- Solarweb. (2020). *Listado de todas las empresas del directorio de energías renovables de México—Solarweb.net*. <https://mexico.solarweb.net/listado-empresas-energia-solar-p10.html>
- Sotomayor, R. (2009). El fayolismo y la organización contemporánea. *Visión General*, 1, 53–62. <https://www.redalyc.org/pdf/4655/465545880010.pdf>
- Terán, Y., y Guerrero, M. (2020). Teorías de emprendimiento: Revisión crítica de la literatura y sugerencias para futuras investigaciones. *ESPACIOS*, 41(07), 16. <https://www.revistaespacios.com/a20v41n07/20410707.html>
- Toro, R., Peña, M., Avendaño, B., Mejía, S., y Bernal, A. (2022). Análisis Empírico del Coeficiente Alfa de Cronbach según Opciones de Respuesta, Muestra y Observaciones Atípicas. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, 63(2), 17. <https://doi.org/10.21865/RIDEP63.2.02>
- Vázquez, R., y Álvarez, J. (2013). *Motivación, iniciativa empresarial e innovación en las microempresas canarias*. *Revista Atlántida*, 5(15), 3-57. <https://www.ull.es/revistas/index.php/atlantida/article/view/1134/672>
- Ventura, J. (2017). ¿Población o muestra?: Una diferencia necesaria. *Revista Cubana de Salud Pública*, 43(4), 648–649. <http://scielo.sld.cu/pdf/rcsp/v43n4/spu14417.pdf>
- Verdín, V., y González, L. (2020). Análisis cualitativo de modelos de negocio para el emprendimiento social. *Entreciencias: Diálogos en la Sociedad del Conocimiento*, 8(22). <https://www.redalyc.org/journal/4576/457662386015/html/>
- Viqueira, J. (2012). *Energía e impacto ambiental*. Universidad Nacional Autónoma de México, Facultad de Ingeniería. <http://www.ingeniería.unam.mx>
- World Business Council for Sustainable Development. (2002). *El caso empresarial para el desarrollo sostenible*, p. 16. <http://www.tecnologiaslimpias.cl/chile/docs/Elcasoempresarial.pdf>
- Ynzunza, C., y Izar, J. (2021). Las motivaciones, competencias y factores de éxito para el emprendimiento y su impacto en el desempeño empresarial. Un análisis en las MIPyMES en el estado de Querétaro, México. *Contaduría y administración*, 66(1), 27. <https://doi.org/10.22201/fca.24488410e.2021.2327>

## FINANCING

The authors did not receive funding for the development of this research.

## **CONFLICT OF INTEREST STATEMENT**

The authors declare that there is no conflict of interest.

## **AUTHORSHIP CONTRIBUTION**

Conceptualization: Fabiola Martínez Vargas and Danae Duana Ávila.

Data curation: Fabiola Martínez Vargas and Tirso Javier Hernández Gracia.

Formal analysis: Fabiola Martínez Vargas and Danae Duana Ávila.

Funding acquisition: Danae Duana Ávila.

Research: Fabiola Martínez Vargas and Tirso Javier Hernández Gracia.

Methodology: Fabiola Martínez Vargas.

Project administration: Danae Duana Ávila.

Resources: Fabiola Martínez Vargas and Tirso Javier Hernández Gracia.

Software: Danae Duana Ávila and Tirso Javier Hernández Gracia.

Supervision: Fabiola Martínez Vargas.

Validation: Fabiola Martínez Vargas.

Visualization: Danae Duana Ávila and Tirso Javier Hernández Gracia.

Writing – original draft: Fabiola Martínez Vargas.

Writing – review and editing: Danae Duana Ávila.