

Relationship between the Environmental Sustainability Index and the Age of Msmes in Mexico

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Summary: Business sustainability is positioned as an alternative to traditional growth models and maximization of financial profitability (Portales, 2011). Companies must contribute to the solution of social, economic and environmental problems; their lucrative nature does not exempt them from this necessary contribution (Navarro, 2018). The paradigm change that is proposed requires the identification of environmental aspects and the evaluation of the effects associated with business activity (Gómez, 2018).

In Mexico, there are few research that examines environmental management processes (Palomo, 2005) in companies. Vivanco, Aguilera and González (2011) relate the age of the companies (young and mature) with the implementation of certain management control systems; therefore, it can be considered that there is a possible relationship between the age of the companies and the adoption of environmental management systems.

The results obtained motivate us to reflect on the panorama of the operation of business processes and their relationship with the care of the environment. It is suggested to raise other hypotheses in relation to the contrast of possible subgroups related to the business of the company, its geographical location, among other variables.

Keywords: Sustainability, MSMEs, Age of the company

1. INTRODUCTION

The use and consumption of resources are key elements in sustainable development, involving the consumption of resources without exceeding their regeneration capacity (Garzón & Ibarra, 2014). Business sustainability is a new approach to business management, presented as an alternative to the traditional model of growth and profit maximization rooted in the economic paradigm that dominated much of the 20th century (Portales, 2011). This means that other ways of generating profitability for companies are sought, taking into account the social and environmental impacts of the process itself, which breaks away from the capitalist tradition of seeking maximum gains without considering the repercussions on human processes or the environment.

Portales (2021) states that business sustainability has developed over time in two directions: the first comes from administrative theory, in which organizations are recognized as needing awareness of the social and environmental issues their business activities generate in the localities where they operate. This implies taking responsibility for the changes and effects their actions have on people and their surroundings. The second direction originates from the United Nations (UN) environmental guidelines; the UN considers companies crucial actors in achieving sustainable development goals (SDGs).

To move toward a culture of responsible management, it is necessary to recognize that companies have a social commitment to address and help solve the problems faced both locally and globally, and that their economic nature does not exempt them from this obligation (Navarro, 2018).

Corporate Social Responsibility (CSR)

Holguín, Carrasquero, and Suárez (2023) view CSR as an organizational management approach for sustainability. CSR seeks a balance between economic performance, community social benefits, environmental protection, and proper governance. It is a business vision that considers the perspectives

and concerns of stakeholders, aiming to permeate sustainability in both the internal and external aspects of business activity, which encourages organizations to commit to their surroundings.

Another significant definition is that proposed by Jacóme-Lara, Salazar-Corrales, and Borja-Brazales (2017, p. 1155), who define CSR as an "innovative, multi-dimensional model that affects various areas of the company, encompassing responsible behavior as a cross-cutting element in organizational management."

In recent years, corporate social responsibility has increasingly been incorporated into the organizational strategies of Mexican companies. Mexico, considered an emerging economy, has managed to remain one of Latin America's main economies and has implemented public policies to fulfill the commitment to the 2030 Agenda and achieve its Sustainable Goals, together with companies and organized society (Huerta-Estévez & López-Morales, 2023).

Companies and Environmental Actions

Governments worldwide have begun to include environmental policies in their development plans, where corporate innovation plays a fundamental role (Carrillo, 2022).

Carbal, García, and Álvarez (2020) cite prior studies spanning twenty years, which evidence the low level of responsibility companies show toward environmental stewardship; it is evident that for the management of small and medium-sized enterprises in Latin America, social and environmental issues are not relevant or prioritized. This lack of interest may be due to factors such as limited capacity of environmental authorities to enforce regulations, low interest from clients and suppliers in requiring environmental practices, informality, and others (Ortiz, Izquierdo & Rodríguez, 2013; Hillary, 2004; Van Hoof, 2005).

Ortiz, Izquierdo, and Rodríguez (2013) indicate that SMEs are unaware of their environmental impacts and lack experience in handling these issues; however, like large companies, they can exert considerable pressure on the environment. On the other hand, Remacha (2017) argues that the absence of a business culture, few regulatory tools establishing responsibility for environmental care, and inadequate management in seeking external resources keep SMEs on the margins of contributing to sustainable objectives.

In 2022, the Fundación para el Análisis Estratégico y Desarrollo de la Pequeña y Mediana Empresa (FAEDPYME) and the Asociación Española de Contabilidad y Administración de Empresas (AECA) presented results on sustainable development studies for MSMEs in Ibero-America, observing that environmental measures with the highest penetration in MSMEs include waste management, water management, management of plastic packaging and derivatives, and energy management. Measures with lower levels of adoption include consideration of environmental criteria in process design, supplier selection, and, notably, a low level of adoption of environmental certifications.

SME Age and Performance

According to Zahra, Sapienza, and Davidsson (2006), younger companies have higher mortality rates than older companies in the market, though these rates decrease with age and size. It should be noted that young companies, due to their lack of market experience, have agility in changing quickly; this lack of experience can prove advantageous, even if change decisions are made through experimentation and improvisation.

In contrast, mature companies, defined as those with more than ten years of existence, have greater market knowledge and experience. They are considered to generate more employment over time (Persson, 2004). However, older companies are observed to be more resistant to environmental changes (Zahra, Sapienza & Davidsson, 2006).

Describing the qualities of young and mature companies sets guidelines for research, as performance indicators are expected based on these qualities, especially concerning environmental care—a current and regulated theme in the pursuit of sustainable development. It is believed that mature companies, due to their capital, could access management and control systems; however, regarding the above, the adoption and inclusion of these themes are more likely to be adopted by young SMEs.

Competitiveness is an aspect that strengthens with the age of SMEs, as they gain experience in various areas, such as understanding the environment, social and market needs, improving management processes, and others.

Studies by Vivanco, Aguilera, and González (2011) related to SMEs and the adoption of management control systems consider the age (antiquity) of the companies studied as a substantial variable.

Montoya, Martínez, and Somohano (2013) conducted research considering the size and age of the company, whose results reveal that young companies dedicate more time to organizational planning and highlight a direct relationship between company size and strategic planning.

Each company's motivation to address and/or contribute to environmental issues differs depending on its size, export/import activity, or corporate values. However, the primary interest lies in compliance with environmental regulations when mandatory, to avoid penalties. It should be noted that market pressure also plays an essential role in motivating companies to comply with environmental standards, as it has been shown that competitiveness in domestic and international markets directly impacts environmental behavior. It is believed that companies that do not respect environmental regulations or have no inclination towards the SDGs will be excluded from international markets (Yance, 2019).

Environmental management goes beyond the involvement of senior management; it entails cooperative work with all areas of the company, with the commitment and participation of employees. Environmental responsibilities must be assumed, environmental objectives set and achieved, and performance measured through environmental indicators (González, 2017).

González, Alaña, and Gonzaga (2017) indicate that implementing an environmental management system yields improvements such as cost reduction, increased customers, better market positioning, and lower production costs.

Vargas, Flores, and Saavedra (2022) studied the dependency between environmental management and competitiveness, considering four indicators: the company's environmental policies, environmental protection strategies, awareness and training of personnel on environmental issues, and waste management. The results revealed a significant relationship between competitiveness and processes related to environmental management.

The complexity of SMEs in Mexico is framed by various aspects that limit their competitiveness, continuity in the market, and growth, including public insecurity, high costs of service payments, high tax rates, excessive government procedures, high raw material costs, unfair competition, and competition from informal businesses (INEGI, 2021).

Given the above, the research question arises: Are mature MSMEs those with a higher Environmental Sustainability Index than younger companies?

Research Objective: To establish and compare the environmental sustainability of young and mature companies. To this end, the following research hypothesis is proposed:

H: Mature MSMEs have a higher Environmental Sustainability Index than younger companies.

2. RESEARCH METHODOLOGY

The research follows a quantitative approach and is descriptive, non-experimental, and cross-sectional. The population consists of Mexican MSMEs (micro, small, and medium-sized enterprises) from various states across the northern, northwestern, central, and southeastern regions of the country:

- a) The research is descriptive (comparative) as it analyzes a quantitative variable, in this case measuring the perception of environmental sustainability relative to the age of the MSMEs.
- b) The research is cross-sectional since the data collected and analyzed correspond to a single point in time. This study considers data from 2021, collected in 2022.
- c) The universe or population includes all MSMEs in Mexico; however, in this study, the population was limited to economic units established in specific Mexican states, aiming to include entities from all regions of the country (target population). The sample size accounted for the total regional distribution of the country's entities in eight regions, establishing this size for estimating the proportion of MSMEs that present the characteristic of interest in the study, with a confidence level of 95% and a 5% margin of error. Thus, considering the population under study for each region and a 20% non-response rate, the sample size was initially determined to be 3,688 MSMEs but effectively resulted in 4,106 companies (4,121 surveys were conducted, but 15 did not provide information on their size). This sample is considered representative of the target population.

d) The data used in this work are taken from the FAEDPYME Mexico research team's proprietary database, constructed with information obtained through a digital survey conducted from February to May 2022. Data collection methods included telephone and electronic surveys (via email and WhatsApp messages), using a closed-ended digital questionnaire. The digital survey was directed to the company's general manager or director.

The research problem suggests differences between the age of companies and their relationship with environmental sustainability indices. The research hypothesis is:

Ho: There are statistically significant differences in the Environmental Sustainability Index between mature and young companies.

Therefore, the variables involved in this study are:

- The use and importance of environmental criteria, which will be measured through the Environmental Sustainability Index (ESI),
- Company age.

The two variables used in the study and their measurement methods are described below.

Environmental Sustainability Index (ESI)

This variable was created to measure the use and importance of environmental criteria among MSMEs. To measure the variable, company managers or administrators were asked, on a Likert scale, about their perception of the importance of implementing seven environmental criteria in their company during 2021. The scale ranged from 1 (indicating unfavorable progress) to 5 (indicating very favorable progress). The seven criteria addressed were:

1. Environmental criteria in supplier selection
2. Environmental criteria in plastic packaging and derivative management
3. Environmental criteria in process design
4. Environmental criteria for energy management
5. Environmental criteria in water management
6. Environmental criteria in waste management
7. Environmental certifications (e.g., ISO14001 / EMAS)

Based on the responses to the seven Likert-scale items in the survey, the Environmental Sustainability Index (ESI) was constructed on a scale of 0 to 100 for each observation unit (in this case, the surveyed managers or administrators) as the subject of the study, using the sum of responses to the ordinal-scale items, calculated with the following expression:

$$IPECF_j = \frac{V_{max}(\sum_{i=1}^n x_{ij} - V_{minant})}{V_{maxant} - V_{minant}}$$

where $IPECF_j$ is the index value corresponding to observation unit j (i.e., entrepreneur j), the summation corresponds to the total points accumulated on the original ordinal scale, V_{max} is the maximum value on the new scale (i.e., 100), and V_{maxant} and V_{minant} are the maximum and minimum values on the original 1 to 5 ordinal scale.

Company Age
Gómez and López (2011) classify companies as “mature” if they are more than 10 years old, and as “young” if they have been operating for 10 years or less. To determine the age of the company, respondents were asked about the number of years the company has been in operation. This variable was then transformed into the “Company Age” variable, with the following values:

- a) Young
- b) Mature

The IBM SPSS Statistics software, version 21, was used for variable processing. First, a descriptive analysis of the variables was conducted to determine the absolute and relative frequency, as well as the

mean, in order to gain an initial understanding of the data distribution. A T-test for independent samples was then performed to determine whether there were statistically significant differences between the sustainability index and company age.

3. RESULTS

According to the data obtained, Table 1 shows that water resource management is the criterion that received the most favorable attention from both young and mature companies. This is particularly relevant, as the issue of water management by companies has recently garnered public attention due to its implications for citizens’ daily lives, given the scarcity of water resources that—in certain areas of Mexico—has led to shortages and unequal access.

In contrast, environmental certification standards show the largest differences in means between young and mature companies, as well as in participation and favorable perception regarding environmental standards. This finding diverges from the existing literature, as noted in the corresponding section; according to González (2017), environmental management through the implementation of systems dedicated to this purpose has a direct relationship with competitiveness. This approach not only helps address and mitigate environmental issues but also contributes to employee training and skill development within companies. Nevertheless, it is also worth considering that participation in certifications sometimes involves high financial and human costs for companies, costs that younger companies, given their current resources, may not be able to fully bear.

Table1. Environmental Criteria Averages by Company Age

age	[1. Environmental criteria supplier selection]	[2. Environmental incriteria plastic packaging and derivatives management]	[3. Environmental incriteria process design]	[4. Environmental incriteria energy management]	[5. Environmental forcriteria water management]	[6. Environmental incriteria waste management]	[7. Environmental incertifications (e.g., ISO14001 / EMAS)]
young	2.65	2.55	2.47	2.45	2.66	2.54	1.94
mature	2.81	2.62	2.51	2.62	2.84	2.76	2.14
Total	2.71	2.58	2.48	2.51	2.72	2.62	2.01

Source: Own elaboration

Based on the results obtained for each of the previous criteria, the environmental sustainability index was calculated, using a base indicator of 100 for the obtained responses. Thus, the results are presented in Table 2.

Table2. Environmental sustainability index by age/seniority of the company.

age		ISM Index
young	Mean	49.366
	Median	51.400
	Minimum	.0
	Maximum	100.0
	Standard deviation	33.8866
mature	Mean	52.314
	Median	57.100
	Minimum	.0
	Maximum	100.0
	Standard deviation	33.1978
Total	Mean	50.432
	Median	54.300
	Minimum	.0
	Maximum	100.0
	Standard deviation	33.6646

Source: Own elaboration

The T-test for independent samples allows for comparing the means of two groups, assuming normality, to determine if there are statistically significant differences. The results obtained are presented in Table 3.

Table 3. T-test of the means of the environmental sustainability index

		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F	Sig. (Significance)	t	df (degrees of freedom)	Sig. (two-tailed)	Mean difference	Standard error of the difference	95% Confidence interval for the difference	
									Lower	Upper
Environmental Sustainability Index	Equal variances assumed	4.484	.034	-2.578	3746	.010	-2.9484	1.1437	-5.1907	-.7061
	Equal variances not assumed			-2.593	2859.53	.010	-2.9484	1.1372	-5.1782	-.7186

Source: Own elaboration

As can be seen in Table 3, the test initially runs Levene's statistic to identify whether there is equality of variances. In this regard, with an F value of 4.484 and a p-value lower than the expected alpha of 0.05 ($p=0.034$), it is possible to reject the null hypothesis, and therefore, equality of variances will be assumed.

As mentioned, the null hypothesis is:

(H_0): There are statistically significant differences in the Environmental Sustainability Index between mature and young companies.

Under this premise, we can observe:

$$t = -2.578,$$

$$df = 3746,$$

$$p = 0.010.$$

In this regard, the degrees of freedom (df) refer to the sample value obtained from $n-1$ based on independent observations. The t value measures the size of the difference relative to the variation in the sample data and can be presented as both positive and negative. The larger the magnitude of t, the stronger the evidence against the null hypothesis. This means there is more evidence of a significant difference. The closer t is to 0, the more likely it is that there is no significant difference. In this case, the t value is relatively high, considering that for this type of test, values are measured in tenths close to zero. The result with the p-value is consistent because with a significance level lower than 0.05, the null hypothesis is rejected ($p\text{-value} = 0.010$). Therefore, it can be accepted that there are statistically significant differences in the environmental sustainability index between mature and young companies, with the former placing more importance on these criteria.

This difference between the data coincides with authors such as García, Marín, and Martínez (2006), who found significant differences between young and mature companies, with the latter incorporating environmental implications into their costing systems 23% more than young companies.

As observed, statistically significant differences were found in the means of the environmental sustainability index between young and mature companies. The latter showed greater concern for the environment. When compared to the descriptive results, participation in environmental certifications and criteria for waste management stand out, where the main differences may lie. However, it is important to approach these results with caution, as equality of variances could not be assumed, meaning there is significant dispersion in the data.

4. DISCUSSION AND CONCLUSIONS

The descriptive and hypothesis contrast results allowed for accepting the premise of H_0 : There are statistically significant differences between the ISM of young and mature companies, fully meeting the objective of this research. This result is consistent with the related literature, which reports that, indeed, mature companies or those with longer market presence tend to place greater importance on

environmental preservation and protection indicators and, in fact, include them in their costing and annual budgeting.

The results obtained encourage reflection on the functioning of business processes and their relationship with environmental care. Despite policies established as competitiveness criteria, there are organizational elements, along with economic capital, that influence the development of resource-generating strategies based on environmental sustainability.

This, therefore, opens the possibility of viewing organizations as entities with specific needs and acting in their favor across various operational levels, with the aim of providing technical and management tools to contribute to their development, growth, and positive impact on the development of administrative practices with a focus on social responsibility.

For future studies, it is suggested to explore additional lines of research in both quantitative and qualitative domains. Quantitatively, further hypotheses could be formulated concerning other potential subgroups related to the company's industry, geographic location, management style, among other variables. Qualitatively, it would be valuable to understand the meanings attributed to the concept of the environment, as well as corporate social responsibility and its presence in the communities it impacts.

REFERENCES

- [1] Carrillo, G., & Hernández, R. (2008). Desarrollo de mercados ambientales e innovación en México. *Sinnco*. Recuperado de http://plataforma.responsable.net/sites/default/files/desarrollo_de_mercados_ambientales_en_mexico.pdf
- [2] Cardoza, L. y Fong, C. (2016) La pequeña empresa exitosa: diferencias entre empresas jóvenes y maduras. *Global Conference on Business and Finance Proceedings*. 11 (2) 538-547
- [3] Carbal, A., García, M., & Álvarez, Y. (2020). Sistema de Gestión ambiental para pymes industriales. *Revista Espacios*. 41 (24) 129-138 Recuperado de <http://www.revistaespacios.com/a20v41n24/a20v41n24p11.pdf>
- [4] Esparza, J., y Reyes, T. (2019). Prácticas de Responsabilidad Social Empresarial desarrolladas por empresas familiares mexicanas y su efecto en el éxito competitivo y la innovación. *Tec Empresarial*. 13 (2) 45-57 Recuperado de <https://www.scielo.sa.cr/pdf/tec/v13n2/1659-3359-tec-13-02-45.pdf>
- [5] Fundación para el Análisis Estratégico y Desarrollo de la Pequeña y Mediana Empresa y la Asociación Española de Contabilidad y Administración de Empresas (2022). *Informe: Digitalización y desarrollo sostenible de la mypime en Iberoamérica*. Recuperado de <http://faedpyme.upct.es/sites/default/files/article/174/principalesconclusiones.pdf>
- [6] García, D. Marín, S. y Martínez, F. (2006) La contabilidad de costos y rentabilidad en la Pyme. *Contaduría y Administración*. (218) 39-59 Recuperado de: https://www.researchgate.net/publication/36720775_La_contabilidad_de_costos_y_rentabilidad_en_la_PYME
- [7] Garzón, M. e Ibarra, A. (2014) Revisión sobre la Sostenibilidad Empresarial. *Revista de Estudios Avanzados de Liderazgo*. 1 (3) 52-78 Recuperado de <https://www.regent.edu/acad/global/publications/real/vol1no3/4-castrillon.pdf>
- [8] Gómez, A. & López, M. (2011). Importancia de los factores competitivos en el rendimiento de la Pyme industrial de Puebla: Una aproximación empírica. Recuperado de <https://investigacion.fca.unam.mx/docs/memorias/2011/1.14.pdf>
- [9] González, A. (2017). La gestión ambiental en la competitividad de las pymes. *Revista Científica Agroecosistemas*, 5 (1), 60-70. Recuperado de <http://aes.ucf.edu.cu/index.php/aes/index>
- [10] González, A., Alaña, T., & Gonzaga, S. (2017) La Gestión Ambiental en la Competitividad de las Pymes del Ecuador. *INNOVA Research Journal*. 2(8.1) 235-248 Recuperado de <https://revistas.uide.edu.ec/index.php/innova/article/view/371>
- [11] Hillary, R. (2004). Environmental management systems and the smaller enterprise. *Journal of cleaner production*, 12 (6) 561-569. Recuperado de <https://www.sciencedirect.com/science/article/abs/pii/S0959652603001549>
- [12] Holguín, L., Carrasquero, S. & Suárez, O. (2023). Participación de las PYMES en los procesos de responsabilidad social empresarial en Guayaquil, Ecuador. *Revista Universidad y Sociedad*, 15(2), 461-466. Recuperado de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202023000200461&lng=es&tlng=es.
- [13] Huerta-Estévez, A. y López-Morales, J.S. (2023), Corporate Social Responsibility and Its Impact on the Sustainable Development Goals: A Study of Mexican Companies, en Gupta, A.D. (Ed.) *Strategic Corporate Responsibility and Green Management (Critical Studies on Corporate Responsibility, Governance and*

- Sustainability*, Vol. 16, Emerald Publishing (pp. 21-38) Recuperado de <https://doi.org/10.1108/S2043-905920230000016002>
- [14] Jacóme-Lara I, Salazar-Corrales A, Borja-Brazales Y. La responsabilidad social empresarial en la gestión administrativa. *Dominio de las Ciencias*. 3 (3)1147-1158.
- [15] Martínez, F., Sánchez V., Somohano F., García D., Marín S. (2008) Análisis Estratégico para el Desarrollo de la Micro, Pequeña y Mediana Empresa, Vol. I, Universidad Autónoma del Estado de Hidalgo.
- [16] Montoya, J., Martínez, F. y Somohano, R. (2013) Análisis estratégico para el desarrollo de las Pymes en Cantabria, España. *Sotavento*. (22) 8-26 Recuperado de <https://dialnet.unirioja.es/descarga/articulo/5137627.pdf>
- [17] Navarro, L. (2018). La responsabilidad social empresarial: teorías que fundamentan su aplicabilidad en Venezuela. *Sapienza Organizacional*. 3 (6) 167-186 Recuperado de <https://www.redalyc.org/journal/5530/553056828011/html/>
- [18] Ortiz, A., Izquierdo, H., & Rodríguez, C. (2013). Gestión ambiental en PYMES industriales. *Interciencia*, 38 (3), 179-185. Recuperado de: <https://www.redalyc.org/pdf/339/33926977006.pdf>
- [19] Palomo, M. (2005) Los procesos de gestión y la problemática de la PYMES. *Ingenierías*. VIII (28) 25-31. Recuperado de https://www.researchgate.net/publication/228623217_Los_procesos_de_gestion_y_la_problematika_de_la_s_PYMES
- [20] Persson, H. (2004). The Survival and Growth of New Establishments in Sweden, 1987-1995. *Small Business Economics*. 23, 423-440.
- [21] Portales, L. (2011). Evolución del concepto del desarrollo en el siglo XX y XXI, implicaciones metodológicas. *Ciencias Administrativas. Teoría y Praxis*,7(1),23-28.
- [22] Portales, L (2021). Las cinco dimensiones de la sostenibilidad empresarial. En García de la Torre, C., Portales, L. & Yepes-López, G. (Compiladores) *Sostenibilidad en las Pymes de América Latina y el Caribe* Bogotá. Universidad Externado de Colombia. <https://doi.org/10.57998/bdigital.handle.001.8604>
- [23] Remacha, M. (2017). Medioambiente: desafíos y oportunidades para las empresas. *Cuadernos de la Cátedra CaixaBank de Responsabilidad Social Corporativa* No. 33. Recuperado de <https://media.iese.edu/upload/ST0431.pdf>
- [24] Sagar, P. y Agarwal, P. (2022) Ten Ways or Managing Corporate Social Responsibility Effectively. *International Journal of Organizational Behaviour & Management Perspectives*. (1) 150-7.
- [25] Su, L., Pan, Y., & Chen, X. (2017). Corporate social responsibility: Findings from the Chinese hospitality industry. *Journal of Retailing and Consumer Services*, 34, 240-247. <https://doi.org/10.1016/j.jretconser.2016.10.013>
- [26] Van Hoof, B. (2005). Políticas e instrumentos para mejorar la gestión ambiental de las pymes en Colombia y promover su oferta en materia de bienes y servicios ambientales. Santiago de Chile: CEPAL - SERIE Medio ambiente y desarrollo (94). Recuperado de <https://www.cepal.org/es/publicaciones/5634-politicas-instrumentos-mejorar-la-gestion-ambiental-pymes-colombia-promover-su>
- [27] Vargas, T., Flores, A.y Saavedra, M. (2022) La importancia de la gestión ambiental en la competitividad de las Pymes de la industria restaurantera: Caso Hidalgo, México. *Ciencias de Gestión*. (147) 93-113. Recuperado de https://www.researchgate.net/publication/363666379_La_importancia_de_la_gestion_ambiental_en_la_competitividad_de_las_Pymes_de_la_industria_Restaurantera_Caso_Hidalgo_Mexico
- [28] Vivanco, J., Aguilera, E. y Gonzalez, M. (2022) Los sistemas de control de gestión y la cultura organizacional en la pymes. *Mercados y Negocios* 12 (1-2) 55-70. Recuperado de <https://www.redalyc.org/articulo.oa?id=571863952004>
- [29] Yance, C. (2019). *Incidencia de las Pymes Industriales en la conservación del medio ambiente en territorios en vías de desarrollo: caso de la provincia del Guayas-Ecuador*. (Tesis Doctoral, Universidad Politécnica de Cataluña) Recuperado de <https://upcommons.upc.edu/bitstream/2117/182126/1/TCYC1de1.pdf>
- [30] Zahra, S; Sapienza, H; Davidsson, P. (2006) Entrepreneurship and Dynamic Capabilities: a review, model and research agenda. *Journal of Management Studies*. 43 (3), 917-955.

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