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Does Environmental, Social, and Governance (ESG) Performance Vary According To A Company's Life Cycle?

ABSTRACT

Objective: To examine the relationship between ESG performance and the life cycle of companies in different countries during the COVID-19 pandemic.

Method: The sample comprises 2,206 observations of Latin American companies between 2012 and 2023, with data collected on the LSEG® platform and processed using descriptive statistics and Generalized Least Squares (GLS) and Panel-Corrected Standard Errors (PCSE) regression models.

Originality/Relevance: This study stands out for analyzing the relationship between ESG performance and the stages of the company lifecycle in the context of an exogenous shock, namely the COVID-19 pandemic. Furthermore, it disaggregates ESG into its environmental, social, and governance pillars and uses a multi-country sample of Latin American companies, thereby expanding the empirical evidence in a context that remains relatively unexplored.

Results: ESG performance showed a significant association with ECV (Environmental, Social, and Governance) factors, particularly in the maturity phase, which exhibited the strongest ESG performance. Among the pillars, Environmental showed a positive relationship with maturity and differences between countries, indicating better performance at this stage. Social showed an inverse relationship in the decline phase, indicating lower company performance, while Governance did not show a statistically significant association with ECV factors. During the COVID-19 pandemic, there was a significant increase in the relationship between ESG performance and ECV factors, especially in the "E" and "S" pillars.

Theoretical/Methodological Contributions: The study shows that ESG performance varies with a company's ECV (Environmental, Social, and Governance) value, allowing for an understanding of how ESG practices unfold at different stages of a company in the Latin American context.

Palavras-chave: ESG, Life Cycle, Pandemic, COVID-19.

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1 INTRODUCTION

ESG performance, an acronym for Environmental, Social, and Governance, often recognized as a non-financial performance indicator, has attracted increasing attention from market professionals and regulatory bodies (Atif, et al., 2022). This interest stems from the potential of ESG practices to promote value creation in organizations by increasing levels of transparency and corporate responsibility, as well as strengthening their attractiveness to investors (Li et al., 2018), since it contributes to increasing the company's added value, expanding corporate transparency, and strengthening its attractiveness to investors (Li et al., 2018).

As environmental and social concerns intensify in the contemporary landscape, investors' interest in ESG practices within the decision-making process has grown significantly. In this context, companies face increasing pressure to incorporate more sustainable and socially responsible strategies into their business models (Bezerra Júnior, 2023).

The topic has attracted increasing attention in academia, especially in developed economies. Empirical evidence indicates that adopting ESG practices can contribute to value creation for companies that incorporate them (Mervelskemper e Streit, 2017). Furthermore, studies conducted with companies from different countries, such as Australia, the United States, France, Japan, the United Kingdom, and Switzerland, indicate that improved disclosure of ESG-related information is associated with a reduction in investor risk perception (Lopez-de-Silanes et al., 2020). However, for an organization to adopt ESG practices, several factors can be decisive, such as organizational strategies, structure, processes, and investment needs (Moreira et al., 2023).

In this context, different stages of the company's life cycle are associated with distinct levels of financial constraints, which can influence both its development and its capacity to adopt and intensify ESG practices, consequently affecting the decision-making of managers

and investment policymakers (Huang et al., 2020). Therefore, it is relevant to consider the company's stage in the life cycle.

The literature suggests that different stages of the business life cycle confer distinct characteristics and resource availability on companies. These factors influence the propensity to invest in sustainable practices. For example, companies with financial constraints (common in early stages) are expected to postpone investments in sustainable actions and disclosures. In these cases, resources are prioritized to cover cash deficits resulting from negative operating results and to invest in fixed assets necessary for operations (Moreira et al., 2023).

The Business Life Cycle Theory describes how organizations progress through distinct phases throughout their trajectory. According to Dickinson (2011), these phases are birth, growth, maturity, turbulence, and decline, identified by analyzing operating, investment, and financing cash flows. Ahmed et al. (2021) state that these stages significantly impact company operations, as each phase presents unique financial conditions and investment priorities that directly influence the organization's investment strategies over time.

According to Dickinson (2011), the life cycle of companies is reflected in their cash flows, and the author proposes that a combined analysis of signals from operating, investing, and financing cash flows enables the definition of a company's life-cycle stage. The model was inspired by the work of Gort e Klepper (1982).

The stages of the company life cycle are also linked to ESG issues. Gao et al. (2023) explored the relationships among ESG, financial risks, and corporate performance across various stages of the life cycle. They observed that, during the decline phase, investing in ESG activities or practices can deplete internal resources and increase financial pressure.

Moreira et al. (2023) found that during the birth and turbulence periods, there is less disclosure of ESG-related practices, particularly in the environmental and social pillars. According to the authors, this low disclosure can be explained by uncertainties regarding future

cash flows and the financial constraints companies face at these stages. However, the study has some limitations, such as a small sample size, an exclusive focus on companies listed on the B3 (Brazilian stock exchange), and a lack of sectoral data over time.

In this sense, the present study seeks to broaden this research agenda by investigating the relationship between ESG performance and the life cycle of companies in different countries and sectors. Furthermore, the period of the COVID-19 pandemic (2020-2023) is incorporated as a context for analysis. The pandemic represented an unprecedented economic and social shock, characterized by high uncertainty, disruptions in production chains, economic contraction, and increased systemic risk in financial markets (Baker et al., 2020; Goodell, 2020). In this scenario, ESG practices assumed an even more prominent role, as companies were pressured to demonstrate greater social responsibility, transparency, and organizational resilience amid the crisis (Albuquerque et al., 2020; Broadstock et al., 2021).

Recent literature suggests that, during periods of crisis, companies with better ESG practices tend to exhibit greater resilience, lower market volatility, and increased investor confidence (Albuquerque et al., 2020; Broadstock et al., 2021; Ding et al., 2021). This is because such practices can serve as risk-mitigation mechanisms, strengthening organizational legitimacy and helping maintain corporate value in highly uncertain environments (Eccles et al., 2014; Lins et al., 2017).

However, the effects of these dynamics can vary with the company's life cycle stage. Companies in early or declining stages tend to face greater financial constraints and greater vulnerability to external shocks, which can limit their ability to invest in ESG initiatives during periods of crisis (Dickinson, 2011; Huang et al., 2020). Conversely, companies in more mature stages, characterized by greater operational stability and greater resource availability, can intensify ESG practices as a strategy to strengthen their reputation and manage risks, given the institutional pressures amplified by the pandemic.

Thus, the COVID-19 pandemic constitutes a particularly relevant empirical context for examining the interaction between ESG performance and the company lifecycle, as it intensifies institutional pressures, amplifies economic uncertainty, and highlights differences in companies' responsiveness throughout their different stages of development (Goodell, 2020; Ding et al., 2021). Therefore, investigating this relationship during this period allows for a deeper understanding of how structural factors within companies influence the adoption and intensity of ESG practices in contexts of high economic instability. Considering that investment priorities vary at each stage of the company lifecycle, and that uncertainties in future cash flows and financial constraints can influence the adoption of these practices, this study aims to answer the following research question: What is the relationship between ESG performance and the lifecycle of companies in different countries during the COVID-19 pandemic? Therefore, the objective of this research is to verify the relationship between ESG performance and the company's life cycle, segregated by each ESG pillar, considering the COVID-19 pandemic period as the temporal benchmark for the analysis.

In today's dynamic and ever-evolving business landscape, understanding the stages of a company's life cycle and adopting ESG-related strategies have become fundamental for organizations that aim not only to remain in the market but also to thrive in the long term (Rangel, 2024). ESG practices, when examined across the life cycle of companies, help us understand how competitive advantages, access to financial resources, and cash flow predictability vary across the stages of organizational development (Atif & Ali, 2021). From this perspective, exploring the intersection between the business life cycle and ESG strategies reveals how companies can integrate environmental, social, and governance aspects at each stage of their development (Rangel, 2024).

Thus, identifying the stages of the life cycle in which companies perform best on ESG, reflecting greater investment in these practices, can signal to the market the phases with the

greatest propensity to adopt sustainable strategies (Li et al., 2018). Furthermore, understanding the interaction between the company's life cycle and ESG strategies enables organizations to generate sustainable value and strengthen their competitive advantages in an ever-evolving business environment (Rangel, 2024).

2 THEORETICAL FOUNDATION

2.1 Life Cycle Theory

Companies follow a consistent pattern of development, known as the life cycle (Stepanyan, 2012). This pattern is characterized by distinct stages with specific activities, characteristics, and organizational structures. As a company transcends from one stage to another, it undergoes a highly multifaceted process. In this context, the study of the company life cycle aims to understand the transformations that occur over time, since organizational changes follow predictable patterns, marked by various stages of development, and transitions are expected as organizations progress from simple and young structures to more complex and mature structures (Costa et al., 2017).

The literature presents different approaches to the business life cycle, but there is consensus that the Life Cycle Theory holds that companies go through initial, maturity, and final stages (Jacksén & Pettersen, 2012). Information about an entity's cash flows provides users of financial statements with a basis for assessing the entity's ability to generate cash and cash equivalents, as well as its needs for these cash flows (Accounting Pronouncements Committee, 2010). Dickinson (2011) proposes a model that highlights the importance of using the Statement of Cash Flows (SCF) to assess the ability to pay debts and to facilitate reconciliation between accounting regimes. The model distinguishes five stages of the organizational life cycle and analyzes the behavior of cash flow components across operating activities (the company's main activity), investing activities (buying/selling long-term assets), and financing activities (how

the company raises funds). To achieve this, the author assigns a positive or negative sign to each flow, yielding eight combinations, allowing for multiple combinations within the same stage of the life cycle.

Table 1

Cash inflows/outflows during the firm's life cycle

	1	2	3	4	5	6	7	8
	Introduction	Growth	Maturity		Turbulence		Decline	
Operating Cash Flows	-	+	+	-	+	+	-	-
Cash Flows from Investing Activities	-	-	-	-	+	+	+	+
Cash Flows from Financing Activities	+	+	-	-	+	-	+	-

Source: Adapted from Dickinson (2011)

The different phases of a company's life cycle directly influence its operating cash flows and financial activities. In the expansion phase, it is common to observe positive operating cash flow, but it is insufficient to cover expansion investments. In the maturity phase, companies tend to have large operating cash inflows and moderate investment outflows. However, in this phase, financing activities show negative flows due to loan repayments and higher dividends to shareholders. In the decline phase, a positive balance in investment activities may indicate a warning sign of business contraction, as the company may be selling fixed assets (Almeida, 2009).

Dickinson (2011) states that early-stage companies face challenges such as a lack of customers and management inexperience, resulting in negative cash flows. To ensure growth, significant investments are necessary, resulting in negative cash outflows and investment outflows, while financing remains positive. In the growth and maturity phases, companies increase their profit margins through investments, resulting in positive cash flows. The gradual

increase in costs over time can generate negative investment cash flows, although less intense than in the early and growth phases.

However, it is worth noting that the literature presents criticisms and limitations to life cycle models. In this sense, Levie and Lichtenstein (2010) argue that although organizations share analogies with biological beings (people, animals, plants), their trajectories (or life stages) are not reliably predictable. The authors primarily highlight two points: first, that the transition time between youth and maturity varies drastically across decades or even centuries; and second, that companies have the capacity to reverse stagnation through strategic renewal processes.

2.2 ESG Practices and the Company Life Cycle

ESG practices refer to a company's performance in three main areas: environmental, social, and governance (Atif et al., 2022). These criteria are used to assess the effects of the organization's operations and its relationships with stakeholders, including investors, employees, customers, and society (Silva & Oliveira, 2023). Although the concept of ESG has its roots in awareness of companies' environmental impacts, it has evolved as a more comprehensive extension of Corporate Social Responsibility (CSR) practices. According to Bezerra Júnior (2023), while CSR has integrated environmental and social factors for decades, ESG has introduced a structured approach to evaluating organizational performance more strategically.

According to Irigaray and Stocker (2022), companies are increasingly using ESG metrics to guide strategic decisions, establish sustainable practices, and predict outcomes related to society and their stakeholders. For the authors, this concept encompasses a broad set of issues, from carbon footprint and labor practices to combating corruption, thus justifying the

creation of criteria and practices that guide businesses' roles and responsibilities regarding ESG factors.

As research indicates, mature companies tend to direct more substantial investments towards ESG initiatives, leveraging their financial stability (Habib & Hasan, 2019). This is because they are more inclined to disclose ESG-related practices to achieve legitimacy, strengthen their reputation, and improve their relationships with stakeholders. Furthermore, the disclosure of ESG practices is correlated with a lower risk of default (Atif & Ali, 2021).

Ahmed et al. (2021) analyzed the influence of company lifecycle stages on investment efficiency in non-financial companies listed in Pakistan. Their findings indicated that the correlation between investment levels was lowest during the introduction and decline phases and highest during the growth and maturity phases. Additionally, regression analysis results showed that mature companies exhibited the highest level of investment efficiency, followed by growth-stage organizations.

Ames & Hein (2023) investigated the influence of the company life cycle on the relationship between corporate governance and cost of capital, showing that the different stages have a significant impact on the implicit cost of capital. According to the authors, companies in the early stages tend to allocate greater investment to corporate governance mechanisms, thereby increasing their costs due to the need for market consolidation. Conversely, as they progress to more mature stages, these investments decline.

Dickinson (2011) highlights that during periods of turbulence, companies experience declines in growth, investment, innovation, and operational efficiency. Faff et al. (2016) add that, in this phase, companies may resort to selling assets to generate cash flow and pay off debts.

During the decline stage, companies may need to resort to external financing to sustain operations, finance assets, and implement restructurings (Hansen et al., 2018). This phase,

characterized by greater fragility, directs companies' focus towards market recovery, which likely influences their investment choices (Zhao & Xiao, 2019).

Given this, the first research hypothesis is proposed:

H_1: There is a differentiation in ESG performance across the stages of the Firm Life Cycle.

Additionally, at the end of 2019, the world began to face a large-scale health crisis due to the spread of the novel coronavirus, which was later recognized as a pandemic. The rapid spread of the disease had significant impacts on the global economy, affecting various sectors and leading to the suspension or curtailment of productive activities (Organization for Economic Co-operation and Development – OECD, 2020).

Throughout 2020, the COVID-19 pandemic intensified organizations' operational limitations, contributed to the contraction of economic activity, and increased market uncertainty (Medeiros & Carraro, 2022). According to the authors, this adverse environment compromised companies' liquidity and posed additional challenges for financial management, particularly in budget planning and cash flow management.

Given the economic downturn, increased uncertainty, and financial constraints observed during the COVID-19 pandemic, and considering that companies at different stages of their life cycle have distinct resource structures and financial capabilities, it is assumed that the effects of this shock have not been homogeneous across ESG performance.

Thus, the second research hypothesis is formulated:

H2: The COVID-19 pandemic has moderated the relationship between the stages of the firm's life cycle and ESG performance.

3 METHODOLOGICAL PROCEDURES

3.1 Data Collection and Sample

This research was conducted using data from the LSEG platform, which was selected to evaluate corporate-level ESG ratings for its broad coverage and information availability. Aoudi and Marsat (2018) state that data in this database are collected from various sources, including English-language media outlets and non-governmental organizations, with frequent updates to the information reported by companies.

ESG is composed of three dimensions: i) environmental, which includes resource use, emissions, and innovation; ii) social, which includes workforce, human rights, community, and responsible production; iii) governance, which highlights management, shareholders, and corporate social responsibility strategy. The life cycle model proposed by Dickinson (2011) was used, which classifies the organization into five phases based on the signals observed in its cash flows: (1) birth, (2) growth, (3) maturity, (4) turbulence, and (5) decline.

The sample consisted of Latin American countries available on the LSEG platform. The countries included in the final sample were: Argentina, Brazil, Chile, Colombia, Mexico, and Peru. These countries account for 78.53% of Latin America's combined GDP, according to World Bank data (World Bank, 2025). The sample formation process excluded financial companies, which have distinct characteristics compared to other sectors (Garcia & Orsato, 2020; Moreira et al., 2023; Ames & Hein, 2023).

3.2 Data Processing

The data were organized into an unbalanced panel to minimize observation loss and improve the robustness of the estimates. Winsorization was performed at the 1st percentile to reduce the impact of outliers. Bacon's test revealed no multivariate outliers. The F-Chow test (POLS versus fixed), Breusch-Pagan test (POOLED versus random), and Hausman test (fixed

versus random) were used to select the appropriate panel. The results revealed that the panel adheres well to the fixed effect.

Additionally, multicollinearity was assessed using the Variance Inflation Factor (VIF), and no evidence of multicollinearity was identified, with an average VIF below 2. The data exhibited autocorrelation (Wooldridge test) and heteroscedasticity (White test). Therefore, the Panel Corrected Standard Errors (PCSE) model was used, which is more efficient when these two problems are present. The Kruskal-Wallis test was also performed to compare the means of the variables between the groups. The grouping was before the pandemic (2010 to 2019), during the pandemic (2020 to 2021), and after the pandemic (2022 to 2023).

3.3 Research Variables and Definition of the Econometric Model

Table 2 presents the variables in the econometric model, along with their descriptions, metrics, and respective theoretical foundations.

Regarding the operationalization of variables related to ESG performance, this study uses the Environmental (E), Social (S), and Governance (G) scores provided by the Refinitiv Eikon database. These indicators are derived from the evaluation of a broad set of metrics related to corporate sustainability, social responsibility, and governance practices, based on publicly disclosed company information. The ESG Score is an aggregated assessment of the three dimensions (E, S, and G), reflecting the company's overall commitment to sustainable and responsible practices.

Regarding the operationalization of variables related to the business life cycle, this study adopts the methodology proposed by Dickinson (2011), widely used in the literature to identify the stages of organizational development based on cash flow patterns. The model is based on the combined analysis of the signs (positive or negative) of operating cash flows (OCF),

investing cash flows (ICF), and financing cash flows (FCF). From this combination, companies are classified into five stages of the life cycle: birth, growth, maturity, turbulence, and decline.

Table 2

Definition of Research Variables

Dependent variables	Description	Metric	Expected Signal	Theoretical Basis
ESG score	Environmental, Social, and Governance score	ESG disclosure score ranging from 0.1 to 100%		Cheng et al. (2014)
E score	Environmental score	Environmental disclosure score ranging from 0.1 to 100%.		
S score	Social score	Social outreach score ranging from 0.1 to 100%.		
G score	Governance score	Disclosure score for Governance ranges from 0.1 to 100%.		
Independent Variables				
NASC	Birth	A dummy variable that indicates the stage of the life cycle, being assigned 1 when the variable is present and 0 when it is absent.	-	Dickinson (2011)
CRESC	Growth		+	
TURB	Turbulence		-	
MAT	Maturity		+	
DECl	Decline		-	
Control variables				
ROA	Return on total assets	ROA = EBIT/(média do ativo total)	+	Wang & Sarkis (2017). Aouadi & Marsat,(2018), Almeida & Kale (2021).
LIQG	General Liquidity	LIQG = (ativo circulante + RLP)/(PC + exigível a LP)	+	Conca et al. (2021)
END	Debt	END = (passivo oneroso)/(ativo total)	-	Atif & Ali (2021)
TAM	Size	Natural logarithm of total assets	+/-	Costa et al. (2017); Habib & Hasan (2019); Bravo (2018)
SETOR	Sector	Main economic activity of the company	+/-	Jaafar & Mcleay, (2007); Alfalih (2023)

Notes: EBIT = Earnings Before Interest and ¨Taxes; RLP = Long-Term Receivables; PC = Current Liabilities; LP = Long-Term Liabilities.

The inception stage is characterized by negative operating cash flow, negative investment cash flow, and positive financing cash flow (CFO<0; CFI<0; CFF>0), reflecting early-stage companies that depend on external financing to sustain their operations. The growth

stage presents positive operating cash flow, negative investment cash flow, and positive financing cash flow (CFO>0; CFI<0; CFF>0), indicating expansion of activities and a need for capital to finance new investments. In maturity, companies tend to present positive operating cash flow, negative investment cash flow, and negative financing cash flow (CFO>0; CFI<0; CFF<0), reflecting greater operational stability and less dependence on external financing (Dickinson, 2011).

The turbulence stage is characterized by combinations of cash flows that indicate operational and financial instability, while the decline stage generally presents negative operating cash flow, positive investment cash flow, and variable financing cash flow (Dickinson, 2011). The classification of companies into different stages was conducted annually using these criteria, enabling analysis of how ESG performance varies across the organizational life cycle.

To examine the relationship between ESG performance and the stages of the company life cycle, a Generalized Least Squares (GLS) regression model was used with unbalanced panel data, as specified in Equation 1, in order to minimize sample losses and increase the robustness of the estimates.

$$ESG_{it} = \beta_0 + \beta_1 NASC_{it} + \beta_2 CRESC_{it} + \beta_3 TURB_{it} + \beta_4 MAT_{it} + \beta_5 DECL_{it} + \beta_6 ROA_{it} + \beta_7 LIQG_{it} + \beta_8 END_{it} + \beta_9 SIZE_{it} + \beta_{10} i.SECTOR_{it} + u_{it} \quad (1)$$

In Equation 1, ESG_{it} represents the dependent variables (ESG score, E score, S score, G score). β_0 is the intercept. β_1 to β_{11} are the coefficients of the explanatory variables. u_{it} is the model error, assuming heteroscedasticity and possible autocorrelation of the errors. Based on the econometric model presented in Equation 1, its application and subsequent analysis of the results were conducted.

4 PRESENTATION AND ANALYSIS OF RESULTS

4.1 Presentation of Results

Table 3 presents the descriptive statistics of the quantitative variables included in Equation 1, highlighting the mean, standard deviation, minimum, and maximum values for the dependent variable (ESG) and the control variables, segmented by life cycle.

Table 3

Descriptive statistics of ESG dimensions and research variables

Variable	Observations	Average	Variation	Minimum	Maximum
Environmental, Social and Governance	2,206	47.1582	21.99157	2.57156	88.1466
Environmental	2,206	42.14425	26.88266	0	93.0289
Social	2,206	49.28171	26.12799	0.559501	93.3751
Governance	2,206	50.00703	22.5962	4.10714	91.4521
Return on Assets	2,206	0.0776253	0.0723963	-0.1285714	0.3396226
Size	2,206	21.92471	1.457272	17.76675	25.2006
Lever	2,206	0.6008796	0.208018	0.1197183	1.481481
Company Age	2,206	46.31097	27.18869	7	123

Table 3 presents the descriptive statistics of the variables used, based on 2,206 observations.

Overall, the results indicate significant heterogeneity in ESG performance among the companies in the sample, with an average of 47.16 and a standard deviation of 21.99. It should be noted that this average falls within the range considered satisfactory (25-50), according to Refinitiv's criteria (2023).

It is observed that the three pillars exhibit distinct levels of performance, with the governance pillar standing out and, on average, delivering superior results relative to the environmental and social dimensions. This result suggests that corporate governance practices tend to be more consolidated among the companies analyzed. This can mainly be explained by the fact that governance practices are in demand among stakeholders. Therefore, companies

tend to invest more in these practices, while the environmental and social aspects are still more recent, and companies are still evolving.

Regarding the control variables, the results indicate significant variation in the financial and structural characteristics of the companies analyzed, including differences in leverage levels (average of 60% and a standard deviation of 21%). Regarding company size, the average logarithm of total assets was 21.92, while the average age was 46.31 years with a standard deviation of 27.19 years. These characteristics may influence both the capacity to invest in ESG practices and the strategies organizations adopt at different stages of development.

4.2 Discussion of Results

Table 4 presents the results of the panel data multiple linear regression.

Table 4

ESG's association with other variables

	PCSE without lifecycle variables	**GLS without lifecycle variables**	**PCSE with life cycle variables**	**GLS with lifecycle variables**
Constant	-140.901***	-142.020***	-141.091***	-142.095***
	(14.697)	(14.709)	(14.743)	(14.764)
Growth			4.046*	3.978*
			(2.015)	(2.013)
Maturity			5.533**	5.437**
			(1.935)	(1.934)
Turbulence			0.942	0.804
			(2.212)	(2.212)
Decline			-1.307	-1.135
			(2.779)	(2.779)
Return on Assets	26.416***	26.319***	19.285**	19.098**
	(5.773)	(5.769)	(5.965)	(5.964)
Size	7.489***	7.496***	7.308***	7.320***
	(0.353)	(0.354)	(0.355)	(0.356)
Lever	7.972***	8.086***	8.096***	8.209***
	(2.026)	(2.025)	(2.028)	(2.028)
Age	0.063***	0.063***	0.062***	0.061***
	(0.016)	(0.016)	(0.016)	(0.016)
Parental control	Yes	Yes	Yes	Yes
Sector control	Yes	Yes	Yes	Yes
Year control	Yes	Yes	Yes	Yes
N	2.206	2.206	2.206	2.206
N_g	12	12	12	12
r2	0.291		0.298	
chi2	897.107	890.276	927.774	919.087

A significant influence of the life cycle on ESG performance is observed. This influence is most evident in the maturity phase and less pronounced in the birth, growth, turbulence, and decline phases. This finding corroborates the study by Moreira et al. (2023). Furthermore, in the growth and maturity stages, companies tend to make greater investments in ESG.

This pattern aligns with the research of Habib and Hasan (2019), Ahmed et al. (2021), and Atif and Ali (2021), which indicates a greater propensity for investment at the maturity stage. This factor may explain the observed better performance, suggesting a positive association between the growth and maturity stages and ESG performance. Thus, confirming the first hypothesis of this research, demonstrating that there is a differentiation in ESG performance between the stages of the Firm Life Cycle.

Regarding sectors, the association between ESG performance and sectors was not statistically significant. Although studies such as Carlos (2024) highlight the challenges of implementing ESG practices in the insurance sector, Silva and Oliveira (2023) point to similar difficulties in agribusiness, and Bezerra Júnior (2023) emphasizes the greater propensity of cooperative companies to adopt these practices due to their proximity to the community, the results did not confirm a significant difference in ESG performance between sectors.

The year variable was also analyzed, revealing increased statistical significance from 2020 to 2023, indicating greater ESG performance during this period. This result indicates that, in those years, ESG performance was superior to that of the period from 2012 to 2019. This period of greater significance coincides with the beginning of the COVID-19 pandemic.

According to Moutinho and Silva (2024), companies with high ESG investment demonstrate greater resilience during crises, with better performance and lower volatility during the pandemic. This is because ESG investments tend to be more resilient, providing more sustainable returns over time.

Additionally, to verify the relationship between ESG performance and the company's life cycle, segmented by each ESG pillar, a multiple linear regression was performed on panel data for each pillar, as presented in Tables 5, 6, and 7.

Table 5 demonstrates the association between the environmental variable and the other variables in the study.

Table 5

Association of the environmental variable with the other variables.

	PCSE without lifecycle variables	**GLS without lifecycle variables**	**PCSE with life cycle variables**	**GLS with lifecycle variables**
Return on Assets	35.345***	34.773***	26.539***	25.693***
	(6.974)	(6.959)	(7.204)	(7.189)
Size	8.735***	8.683***	8.524***	8.470***
	(0.427)	(0.427)	(0.428)	(0.429)
Lever	7.017**	7.584**	7.082**	7.688**
	(2.449)	(2.444)	(2.449)	(2.444)
Age	0.067***	0.069***	0.065**	0.066***
	(0.020)	(0.020)	(0.020)	(0.020)
Brazil	7.701***	7.231***	7.538***	7.073***
	(1.919)	(1.914)	(1.909)	(1.904)
Chile	-7.781	-5.933	-9.187	-7.064
	(9.336)	(9.328)	(9.283)	(9.276)
Colombia	8.455**	8.589**	7.727**	8.007**
	(2.805)	(2.794)	(2.793)	(2.781)
Mexico	5.061	4.057	4.392	3.327
	(3.692)	(3.694)	(3.667)	(3.672)
Peru	0.457	0.343	-0.442	-0.575
	(2.581)	(2.574)	(2.573)	(2.564)
Basic Materials	10.202*	10.138*	10.062*	10.072*
	(4.654)	(4.646)	(4.629)	(4.621)
Consumer Cycles	9.273*	9.368*	9.334*	9.510*
	(4.695)	(4.686)	(4.671)	(4.663)
Non-cyclical consumers	5.489	5.838	5.526	6.008
	(4.614)	(4.606)	(4.589)	(4.582)
Energy	-2.207	-2.294	-2.262	-2.331
	(4.934)	(4.920)	(4.906)	(4.891)
Medical Assistance	14.980**	15.614**	15.423**	16.151**
	(5.182)	(5.170)	(5.155)	(5.143)
Industrial	5.579	5.542	6.087	6.104
	(4.602)	(4.583)	(4.580)	(4.559)
Real Estate Market	4.928	5.086	6.222	6.489
	(4.773)	(4.768)	(4.762)	(4.757)
Technology	-2.678	-2.310	-3.488	-2.993
	(4.829)	(4.821)	(4.810)	(4.803)
Public Utility	7.677	7.766	7.245	7.389
	(4.592)	(4.579)	(4.568)	(4.556)
Growth			5.867*	5.732*

	PCSE without lifecycle variables	GLS without lifecycle variables	PCSE with life cycle variables	GLS with lifecycle variables
			(2.428)	(2.420)
Maturity			7.404**	7.355**
			(2.330)	(2.324)
Turbulence			1.058	1.010
			(2.666)	(2.661)
Decline			-0.313	-0.293
			(3.331)	(3.324)
_cons	-192.615***	-188.080***	-193.997***	-189.004***
	(17.949)	(17.950)	(17.974)	(17.984)
N	2.206	2.206	2.206	2.206
N_g	12	12	12	12
r2	0.302		0.310	
chi2	958.925	936.587	994.649	969.713

According to Table 5, statistical significance was identified in the relationship between the Environmental pillar of ESG and the stages of the company's life cycle, with greater significance in the maturity stage compared to the others. This demonstrates that at this stage, companies perform better in the Environmental pillar. A slight significant influence was also observed in the growth stage, which, according to Moreira et al. (2023), is when companies may face some difficulties in adopting sustainable practices, related to the significant cost of implementing such practices.

Regarding sectors, the healthcare sector showed the most significant association compared to the others, indicating that companies in this segment tend to pay more attention to environmental factors, which positively impacts their ESG performance. This positive variation may be related to the growing concern of regulatory agencies, considering the high environmental impact of the sector, which makes intensive use of disposable materials essential to its activities (Pólvora, 2024), in addition to the significant consumption of natural resources (Pereira et al., 2021).

Table 6 was analyzed to demonstrate the association between the Social variable and the other variables in the study.

Table 6

Association of the social variable with the other variables.

	PCSE without lifecycle variables	GLS without lifecycle variables	PCSE with life cycle variables	GLS with lifecycle variables
Return on Assets	28.770***	28.312***	20.023**	19.532**
	(6.924)	(6.921)	(7.145)	(7.147)
Size	8.213***	8.222***	7.967***	7.985***
	(0.424)	(0.424)	(0.426)	(0.427)
Lever	5.370*	5.448*	5.525*	5.616*
	(2.429)	(2.428)	(2.430)	(2.431)
Age	0.076***	0.076***	0.073***	0.074***
	(0.020)	(0.020)	(0.019)	(0.019)
Brazil	8.133***	8.305***	8.052***	8.257***
	(1.915)	(1.914)	(1.906)	(1.905)
Chile	1.921	0.796	1.195	0.336
	(9.008)	(9.006)	(8.982)	(8.985)
Colombia	15.326***	15.365***	14.899***	15.046***
	(2.793)	(2.791)	(2.782)	(2.780)
Mexico	5.834	6.179	5.372	5.737
	(3.662)	(3.665)	(3.648)	(3.653)
Peru	5.859*	6.000*	5.082*	5.273*
	(2.564)	(2.563)	(2.555)	(2.554)
Basic Materials	6.070	6.023	5.915	5.877
	(4.588)	(4.586)	(4.564)	(4.566)
Consumer Cycles	6.567	6.521	6.445	6.393
	(4.635)	(4.634)	(4.613)	(4.615)
Non-cyclical consumers	2.157	2.382	2.118	2.377
	(4.549)	(4.548)	(4.526)	(4.528)
Energy	0.223	0.381	0.210	0.354
	(4.864)	(4.863)	(4.838)	(4.839)
Medical Assistance	9.792	9.295	9.960	9.415
	(5.109)	(5.107)	(5.084)	(5.085)
Industrial	9.104*	9.111*	9.559*	9.524*
	(4.538)	(4.532)	(4.517)	(4.513)
Real Estate Market	9.614*	9.759*	11.278*	11.377*
	(4.713)	(4.713)	(4.705)	(4.709)
Technology	5.453	5.261	4.813	4.626
	(4.762)	(4.762)	(4.745)	(4.748)
Public Utility	10.273*	10.229*	9.940*	9.890*
	(4.525)	(4.523)	(4.503)	(4.504)
Growth			2.873	2.697
			(2.409)	(2.408)
Maturity			4.215	4.041
			(2.312)	(2.312)
Turbulence			-0.762	-0.926
			(2.644)	(2.645)
Decline			-7.302*	-7.140*
			(3.330)	(3.332)
Constant	-161.003***	-162.817***	-158.091***	-159.652***
	(17.572)	(17.577)	(17.639)	(17.656)
N	2,206	2,206	2,206	2,206
N_g	12	12	12	12
r2	0.277		0.285	
chi2	843.838	840.039	877.383	871.032

There was a slight, inversely proportional, significant influence on the association between Social performance and decline. Thus, a company's classification at this stage tends to undermine the social pillar's performance. This result partially corroborates the study by Moreira et al. (2023), which found that during the birth and turbulence periods, there is low disclosure of ESG-related practices, mainly in the Environmental and social pillars. It is also related to the study by Ahmed et al. (2021), which reports lower investment efficiency during this period.

Regarding the sector variable, the health, industrial, real estate, and utilities/public services sectors showed a slightly significant percentage influence on the association with the social pillar, suggesting that companies in these sectors perform better than those in other sectors. This may be because companies in areas with the highest percentage of significance tend to have as a characteristic the impact their product or service may have on current society and future generations (Obata & Aly, 2023).

We analyze Table 7, which examines the interactions between performance in the Governance pillar and the other variables in the study.

Regarding the association between performance in pillar G and the different stages of the life cycle, the results showed no statistically significant relationship. This finding refutes the results of Ames & Hein (2023), who suggest that companies in early stages tend to invest more in Governance.

Finally, the analysis of governance performance was segmented by the companies' sector of activity. The research data indicated that the academia and Educational Services sector was the only one that did not show statistical significance in its correlation with governance performance. In the other sectors, a high percentage of significance was observed, suggesting that governance performance may vary by sector of activity.

Table 7

Association of the Governance Variable with the Other Variables

	PCSE without lifecycle variables	**GLS without lifecycle variables**	**PCSE with life cycle variables**	**GLS with lifecycle variables**
Return on Assets	13.527*	13.431*	10.240	10.151
	(6.616)	(6.592)	(6.857)	(6.835)
Size	5.311***	5.265***	5.242***	5.219***
	(0.405)	(0.405)	(0.409)	(0.409)
Lever	11.706***	11.845***	11.871***	11.971***
	(2.323)	(2.313)	(2.333)	(2.323)
Age	0.039*	0.035	0.038*	0.034
	(0.019)	(0.019)	(0.019)	(0.019)
Brazil	-6.346***	-6.254***	-6.366***	-6.318***
	(1.837)	(1.830)	(1.836)	(1.828)
Chile	-7.066	-8.223	-7.720	-9.120
	(8.658)	(8.655)	(8.647)	(8.650)
Colombia	-0.638	-0.492	-1.032	-0.869
	(2.685)	(2.672)	(2.685)	(2.670)
Mexico	-6.995*	-7.335*	-7.383*	-7.834*
	(3.518)	(3.515)	(3.515)	(3.512)
Peru	0.863	0.620	0.579	0.266
	(2.465)	(2.457)	(2.467)	(2.457)
Basic Materials	-17.831***	-16.423***	-17.889***	-16.248***
	(4.382)	(4.368)	(4.375)	(4.361)
Consumer Cycles	-12.419**	-10.945*	-12.359**	-10.683*
	(4.431)	(4.416)	(4.426)	(4.411)
Non-cyclical consumers	-20.203***	-17.877***	-20.160***	-17.442***
	(4.345)	(4.332)	(4.338)	(4.326)
Energy	-17.705***	-17.128***	-17.714***	-17.196***
	(4.649)	(4.627)	(4.640)	(4.617)
Medical Assistance	-19.818***	-19.222***	-19.487***	-18.848***
	(4.877)	(4.856)	(4.870)	(4.849)
Industrial	-13.089**	-11.550**	-12.901**	-11.174**
	(4.336)	(4.310)	(4.331)	(4.303)
Real Estate Market	-16.065***	-14.716**	-16.063***	-14.571**
	(4.506)	(4.494)	(4.513)	(4.503)
Technology	-17.809***	-16.344***	-18.229***	-16.522***
	(4.548)	(4.534)	(4.547)	(4.534)
Public Utility	-15.629***	-14.630***	-15.880***	-14.699***
	(4.324)	(4.304)	(4.318)	(4.298)
Growth			3.868	3.778
			(2.321)	(2.311)
Maturity			5.331*	5.261*
			(2.230)	(2.222)
Turbulence			3.192	3.243
			(2.547)	(2.541)
Decline			5.218	5.450
			(3.211)	(3.201)
Constant	-53.718**	-54.439**	-56.766***	-58.043***
	(16.847)	(16.834)	(16.953)	(16.947)
Observations	2,206	2,206	2,206	2,206
Number of groups	12	12	12	12
r2	0.121		0.124	
chi2	301.853	295.635	310.250	304.756

In this sense, based on the results obtained, and considering the analyzed sample and the estimated models, it is concluded that ESG practices vary across the stages of the companies' life cycle, highlighting an association between these variables. Furthermore, differences were identified in the performance of the Environmental, Social, and Governance pillars across sectors and countries.

Regarding the COVID-19 pandemic, the event appears to have significantly influenced this relationship, as shown in Table 8.

Table 8

ESG variable association with other variables – Pandemic effect

	PCSE with the inclusion of life cycle variables	GLS with the inclusion of life cycle variables
2013	1.283 (2.645)	1.251 (2.839)
2014	1.685 (2.577)	1.661 (2.759)
2015	5.552* (2.786)	5.499 (2.961)
2016	4.555 (2.719)	4.533 (2.883)
2017	3.733 (2.783)	3.709 (2.929)
2018	6.229* (2.867)	6.165* (3.002)
2019	8.928*** (2.633)	8.873** (2.773)
2020	9.499*** (2.520)	9.424*** (2.666)
2021	10.400*** (2.581)	10.327*** (2.720)
2022	11.323*** (2.559)	11.246*** (2.695)
2023	12.619*** (2.727)	12.530*** (2.854)

The data show that until 2017, the coefficients were positive but not statistically significant. From 2018 onward, the relationship became more pronounced and increasingly statistically significant. This pattern may be linked to significant institutional events on the international stage. In particular, during the 2015 Climate Change Conference (COP21), the

Paris Agreement was signed under the United Nations Framework Convention on Climate Change. Under the agreement, signatory countries committed to limiting the global average temperature rise to less than 2°C above pre-industrial levels (United Nations, 2026).

The Paris Agreement is a milestone in the multilateral climate governance regime, as it is the first binding instrument to bring together virtually all nations around common goals of mitigating climate change and adapting to its impacts (United Nations, 2026). This context may help explain the progressive increase in the significance of the coefficients observed from 2018 onwards.

During the pandemic years (2020 and 2021), the coefficients reached their highest levels to date (9.499 and 10.400, respectively, in the PCSE model; both with $p < 0.01$). This trend continued and even intensified in 2022 and 2023, with the highest coefficients in the series (11.323 and 12.619 in the PCSE), maintaining statistical significance ($p < 0.01$).

This behavior suggests that the pandemic acted as a tipping point, reinforcing or accelerating a trend already observable since 2018: companies with greater attention to ESG practices began to benefit (or stand out) more clearly, regardless of their stage in the life cycle. Furthermore, it reflects a greater appreciation of ESG performance by stakeholders and investors during and after the global crisis. This finding points to a structural reconfiguration in the dynamics between ESG, suggesting that events such as the pandemic can catalyze changes in companies' strategic priorities and differentiating factors, regardless of their stage in the life cycle, thus confirming the second hypothesis.

Table 9 shows this data segregated, indicating that environmental and social variables have an even greater influence on this moderation.

Table 9

Association of segregated ESG variables with other variables – Effect of the pandemic

	PCSE with the inclusion of life cycle variables	GLS with the inclusion of life cycle variables	PCSE with the inclusion of life cycle variables	GLS with the inclusion of life cycle variables	PCSE with the inclusion of life cycle variables	GLS with the inclusion of life cycle variables
	Environmental		Social		Governance	
2013	1.522	1.392	0.790	0.773	1.387	1.334
	(3.344)	(3.699)	(3.260)	(3.449)	(2.905)	(3.221)
2014	2.174	2.155	1.229	1.193	1.063	1.031
	(3.279)	(3.612)	(3.111)	(3.292)	(2.859)	(3.173)
2015	8.880*	8.315*	4.485	4.478	1.595	1.626
	(3.448)	(3.759)	(3.365)	(3.535)	(3.139)	(3.434)
2016	8.095*	7.474*	3.260	3.319	1.340	1.398
	(3.366)	(3.657)	(3.276)	(3.432)	(3.116)	(3.400)
2017	7.561*	6.792	2.316	2.385	0.498	0.614
	(3.429)	(3.694)	(3.334)	(3.474)	(3.164)	(3.423)
2018	9.927**	8.973*	5.895	5.957	1.703	1.774
	(3.526)	(3.773)	(3.450)	(3.582)	(3.223)	(3.456)
2019	13.551***	12.772***	9.711**	9.765**	1.844	1.866
	(3.253)	(3.509)	(3.149)	(3.282)	(2.986)	(3.233)
2020	14.676***	13.975***	10.754***	10.775***	1.141	1.109
	(3.086)	(3.349)	(3.010)	(3.150)	(2.854)	(3.110)
2021	15.931***	15.136***	12.047***	12.087***	1.243	1.235
	(3.162)	(3.415)	(3.109)	(3.243)	(2.946)	(3.182)
2022	17.125***	16.354***	13.305***	13.348***	1.048	1.037
	(3.118)	(3.366)	(3.092)	(3.223)	(2.910)	(3.145)
2023	18.708***	17.782***	15.120***	15.161***	1.256	1.260
	(3.331)	(3.562)	(3.291)	(3.414)	(3.111)	(3.324)

The results reveal that the environmental variable shows high and statistically significant coefficients from 2015 onwards, with a sharp increase during the pandemic years. In 2020, for example, the coefficient reached 14.676 ($p < 0.01$) in the PCSE model, growing to 18.708 ($p < 0.01$) in 2023. These results indicate that companies with better environmental performance have developed an even stronger association with the other variables in the model, reflecting a growing appreciation of environmental practices as a response to the crisis context.

The social variable follows a similar trend, albeit with slightly lower coefficients. From 2018 onwards, the coefficients begin to show robust statistical significance, with high values in 2020 (10.754, $p < 0.01$) and continuous growth until 2023 (15.120, $p < 0.01$), indicating a

greater demand from society for corporate social responsibility, driven by the social vulnerabilities exposed and aggravated by the pandemic.

Moreira et al. (2023) also emphasize environmental and social variables in analyzing the association between ESG and life cycle stages among Brazilian companies from 2010 to 2020 (pre-pandemic). The authors indicate that companies in the nascent and turbulent stages show lower levels of ESG practices, particularly in the environmental and social pillars, compared to companies in the mature stage. This research expands this debate by considering the pandemic and post-pandemic period (2020–2023). The findings indicate that, from 2020 onwards, there is a significant strengthening of the association between the environmental and social pillars and ESG performance, regardless of the life cycle stage.

In contrast, the governance component presented more modest coefficients and, for the most part, none that were statistically significant throughout the series. Even during the critical years of the pandemic (2020–2023), the coefficients remained around 1.1 to 1.2, without statistical significance ($p > 0.1$). Thus, in the analyzed context, governance aspects were not the primary vectors of association with companies' life cycles during and after the pandemic.

These results allow us to conclude that the increased association between ESG and the other variables in the model during the pandemic period is mainly explained by the Environmental and social pillars, which have come to play a central role in companies' strategic decisions and in stakeholders' perception of value. The global health crisis may have acted as a catalyst for awareness and demand for sustainable and socially responsible corporate practices – reinforcing the relevance of these pillars in reshaping business priorities in contexts of uncertainty.

Therefore, while Moreira et al. (2023) highlight a heterogeneity in the level of ESG practices according to the life stage of companies, this study points out that, since the pandemic, the environmental and social pillars have gained more transversal prominence, possibly

reducing the difference between young and mature companies regarding the adoption of these practices, or at least increasing institutional pressure for even companies in early stages to prioritize these dimensions.

5 FINAL CONSIDERATIONS

The results indicated that ESG performance is significantly associated with the maturity stage, suggesting that companies at this stage are more likely to adopt and implement ESG-related practices, as they tend to have greater cash availability.

The results also revealed that the association between ESG performance and the model's explanatory variables became stronger from 2018 onwards, particularly during and after the COVID-19 pandemic. Year-on-year analysis showed a continuous increase in the estimated coefficients, suggesting that, in the context of the pandemic, ESG practices gained greater relevance in business dynamics. This trend was even more pronounced when the environmental and social dimensions were analyzed separately, demonstrating that these pillars most strongly drive the identified relationship, thus confirming the second hypothesis that the COVID-19 pandemic moderated the relationship between ESG performance and ESG during this period.

In the birth, growth, turbulence, and decline stages, the influence of ESG tends to be lower, as companies often lack the resources for such investments. This is because, in the birth and growth stages, they are more focused on expanding the organization itself, and ESG may not be a priority at that time. In the turbulence and decline stages, financial resources are more limited, which may lead to less investment in ESG. Thus, the first hypothesis of this research is confirmed, demonstrating that there is a differentiation in ESG performance between the stages.

Regarding the verification of the relationship between ESG performance and the company's life cycle, segmented by pillar, the results showed that companies in the maturity

stage tend to have higher performance in practices related to the Environmental pillar, whereas in the social pillar, the relationship was inversely proportional to the decline stage. In other words, companies in the decline stage may demonstrate lower Social performance. For the Governance pillar, the stages of the companies' life cycles were not statistically significant.

Performance in the social sector showed a slight but significant influence in the health, industrial, real estate, and utilities/public services sectors. The governance pillar was not significant only in the academic sector; in other sectors, such as basic materials, cyclical and non-cyclical consumer goods, energy, health, industrial, real estate, technology, and utilities/public services, the association proved significant, demonstrating a propensity for better governance performance in these sectors.

In this sense, this research contributes to the debate on the implementation of sustainable practices in companies and their implications for business management. The results provide a clearer understanding of the factors influencing the adoption of ESG strategies, such as the company's life-cycle stage and the institutional environment. These elements can guide companies in adjusting their approaches to sustainability, aligning their practices with the specific conditions and challenges of their sector and region, thereby improving the efficiency of implementing such strategies.

Limitations of this research include the adopted time frame of 2012 to 2023, which may reflect the influence of economic and social events from that period. Therefore, future studies could conduct more detailed longitudinal analyses, considering specific events such as financial crises, regulatory changes, and technological advancements, to better understand the temporal effects on the relationship between ESG and the company's life cycle.

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O Desempenho Environmental Social And Governance (ESG) Varia De Acordo Com o Ciclo de vida da empresa?

RESUMO

***Objetivo**: verificar a relação entre o desempenho ESG e o ciclo de vida das empresas de diferentes países durante o período da pandemia da COVID-19.*

***Método:** a amostra compreende 2.206 observações de empresas latino-americanas entre 2012 e 2023, com dados coletados na plataforma LSEG® e tratados mediante estatística descritiva e modelos de regressão Generalized Least Squares (GLS) e Panel-Corrected Standard Errors (PCSE).*

***Originalidade/Relevância:** O estudo se diferencia ao analisar a relação entre desempenho ESG e os estágios do ciclo de vida das empresas em um contexto de choque exógeno, representado pela pandemia da COVID-19. Além disso, desagrega o ESG em seus pilares ambiental, social e de governança e utiliza uma amostra multicountry de empresas latino-americanas, ampliando as evidências empiricas em um contexto ainda pouco explorado.*

***Resultados:** O desempenho ESG apresentou associação significativa com os ECV, sobretudo na fase de maturidade, que registrou o melhor desempenho ESG. Entre os pilares, o Environmental mostrou relação positiva com a maturidade e diferenças entre países, indicando melhor desempenho nesse estágio. O Social apresentou relação inversa na fase de declínio, indicando desempenho inferior das empresas, enquanto o Governance não apresentou associação estatisticamente significativa com os ECV. Durante a pandemia de COVID-19, houve aumento expressivo da relação entre desempenho ESG e ECV, especialmente nos pilares "E" e "S".*

***Contribuições Teóricas/Metodológicas**: o estudo evidencia que o desempenho ESG varia conforme o ECV empresarial, permitindo o entendimento sobre como as práticas ESG se dão em diferentes fases da empresa no contexto da América Latina.*

***Palavras-chave**: ESG, Ciclo de Vida, Pandemia COVID-19.*

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