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Does Environmental Regulation Contribute to CSR of Cameroonian's SMEs, or Does It Rather Develop "Free Riders" Who Employ Psychological Defense Mechanisms? Empirical Evidence Based on a Multivariate Probit Approach

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Abstract

This paper investigates the influence of environmental regulations on the adoption of Corporate Social Responsibility practices among Small and Medium-sized Enterprises in Cameroon. It specifically examines the role of psychological defense mechanisms in shaping these practices. Based on a survey of 680 Cameroonian SMEs conducted via KoboCollect, this research explores the relationship between environmental regulations and the adoption of CSR practices, paying particular attention to the psychological defenses that may influence these decisions. A multivariate probit model was employed to examine the relationship between philanthropic CSR and environmental expenditures. The results indicate a significant positive correlation, suggesting that increased philanthropic CSR is associated with higher budgets for environmental protection and pollution reduction. Subsequently, our findings demonstrate that budgets allocated to environmental protection, pollution reduction, and compliance with environmental regulations all have a positive and significant impact on the environmental performance of the firms examined. Finally, the company's internal social policy seems to play a pivotal role in the adoption of environmental practices. Conversely, CSR communication and social interaction do not appear to have a significant impact on the environmental performance indicators studied. This result can be explained by the fact that communication and social interaction are not ends in themselves, but rather means of reinforcing other dimensions of CSR. However, introducing the concept of

psychological defense mechanisms, with a particular focus on rationalization, "it is necessary" to highlight the importance of the underlying motivations of entrepreneurial behavior. While rationalization does not appear to directly affect overall performance, it reveals tensions between regulatory compliance and genuine commitment to the environment.

Keywords

Cameroon, Environmental Regulation, CSR, Psychological Defense Mechanisms, SMEs

1. Introduction

Environmental protection has become a global imperative with cross-border implications involving all economic actors. Terrestrial ecosystems are essential for maintaining human life, contributing to more than half of the global GDP and embodying diverse cultural, spiritual, and economic values. This environmental concern has been institutionalized internationally since the Stockholm Conference (1972) through to the Sustainable Development Goals (2015), which emphasize the importance of responsible production (SDG 12) and the need for resilient infrastructure, sustainable industrialization, and innovation (SDG 9), placing businesses at the heart of necessary transformations.

In Cameroon, this issue is particularly concerning. The deforestation rate reaches 0.4% annually, representing approximately 220,000 hectares of forest lost each year (FAO, 2020), depriving local businesses of essential resources and increasing their procurement costs by an average of 17%. Surface water pollution has increased by 35% over the last decade, forcing 43% of industrial SMEs to invest in costly water treatment systems, representing up to 22% of their annual investments (GICAM, 2022). Furthermore, 48% of agricultural soils show signs of advanced degradation, reducing productivity by 15% - 30%, which directly affects the profitability of food processing companies, whose production costs have increased by 23% in five years.

Facing these challenges, Cameroon has progressively developed an environmental regulatory framework. In the lead-up to the Rio Conference, the country created its first ministry in charge of the environment in 1992, called the Ministry of Environment and Forestry (MINEF) by Decree No. 92069 of April 12, 1992. This structure underwent several institutional changes, culminating in the creation of the Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED) in 2012, demonstrating a commitment to addressing environmental issues more comprehensively.

Cameroonian environmental regulations have thus been progressively strengthened with the adoption of several structuring legislative and regulatory texts. Law No. 96/12 of August 5, 1996, establishing the framework law on environmental

management, established the fundamental principles of national environmental policy. Decree 2005/0577/PM of February 23, 2005, made the adoption of an environmental management plan mandatory for companies. Beyond the regulatory framework, the Cameroonian government has implemented various measures to encourage virtuous environmental practices. The creation of a dedicated ministry for SMEs in 2004, named the Ministry of Small and Medium-sized Enterprises, Social Economy and Handicrafts (MINPMEESA), testifies to the government's commitment to supporting these economic actors.

While the Cameroonian government demonstrates a clear commitment to SME development, particularly through the creation of MINPMEESA, it is essential to examine how these companies respond to environmental challenges within an evolving regulatory framework. This question is part of a broader theoretical debate that divides the scientific community. On one side, several researchers D'Aspremont and Jacquemin (1988); Porter (1991); Gore (1993); Mohr (2002) support the hypothesis that well-designed environmental regulations can stimulate innovation and improve business competitiveness. On the other side, the traditional neoclassical approach (Walley & Whitehead, 1994; Palmer et al., 1995) considers these regulations as additional constraints that increase production costs and reduce competitiveness, particularly for SMEs with limited resources.

This dichotomy highlights a theoretical tension that finds concrete expression in organizational behaviors. Indeed, the Friedman paradigm prioritizing profit maximization has shaped a corporate culture where environmental ethics are often perceived as antagonistic to economic performance. This conception has generated psychological defense mechanisms allowing SME managers to justify their non-compliance with environmental regulations while preserving their subjective moral integrity. The ethics of leaders and organizational ethics thus appear as crucial moderating variables in this equation. Considering them allows us to move beyond the dichotomous vision between economic performance and environmental compliance, in favor of an integrative approach that recognizes the complexity of interactions between these dimensions in the specific context of Cameroonian SMEs. It is within this logic that numerous studies have emphasized the critical importance of leadership ethics (Boubakary & Moskolaï, 2021) and organizational ethics as a whole. However, studies on corporate performance and CSR have generally neglected the specificities of behavioral rationalization, which nevertheless provides a relevant analytical framework for understanding the underlying reasons for non-compliance with environmental regulations.

Faced with this complex reality where psychological defense mechanisms and declining competitiveness intertwine, our study makes an original contribution by examining, for the first time to our knowledge, the relationship between environmental regulation of Cameroonian SMEs and rationalization of behavior according to Josephson (1997). Our methodological approach is distinguished by the use of a multivariate probit model that effectively captures interdependencies thus illuminating the role of environmental regulations in the emergence of truly

ethical CSR. Conceptually, the study systematically explores the six types of rationalization identified by Josephson "it's legal," "it's necessary," "I treat others as they have treated me," "everyone does it," "I deserve it," and "it doesn't harm anyone" thus offering an unprecedented holistic analysis of the adaptive behaviors of Cameroonian SMEs facing environmental constraints.

The remainder of this paper is structured as follows. Section 2 presents the literature review. Section 3 deals with the methodology. Section 4 is devoted to results and discussion, and Section 5 draws conclusions and recommendations.

2. Literature Review

2.1. The Concept of Environmental Regulation

Environmental regulation, a set of policies and laws limiting pollution (Ryan, 1982), has evolved in parallel with human-environment relations. The literature proposes several typologies. According to their binding nature (Guo, & Yuan 2020), a distinction exists between coercive regulations imposing rules under penalty of sanctions Gu, & Zhao, (2023) and incentive regulations using market mechanisms to encourage virtuous behaviors (Tang et al., 2020; Wang et al. 2021).

These psychological defense mechanisms against environmental regulations cannot be fully understood without examining the very nature of these regulatory frameworks. Indeed, the diversity of normative frameworks directly influences managers' perceptions and reactions. According to their financing method, Zhang et al. (2016) distinguish between cost-focused regulations and investment-focused regulations, while Wang et al. (2021) categorize them according to their formalization into formal regulations inscribed in law and informal regulations based on social norms and voluntary practices. Beyond these classifications, three major categories of environmental regulations can be distinguished: "command and control" regulations constituting a strict framework guaranteeing rapid improvement of environmental quality but potentially limiting innovation (Ding et al., 2022; He et al., 2022; Feng et al., 2022); market incentive regulations offering flexibility but with effectiveness varying according to their design (Tang et al., 2020; Jiang et al., 2023; Wang et al., 2021); and voluntary public regulations based on ecological awareness and responsibility.

2.2. Debates on the Evolution of Environmental Regulation and the CSR Concept in Cameroon

Since the framework law of 1996, Cameroon has progressively strengthened its environmental legal framework, demonstrating a political will to integrate sustainable development into national priorities. However, this system faces several major obstacles: the absence of a precise regulatory framework adapted to the specificities of SMEs (Moskolaï et al., 2016), despite being essential drivers of the Cameroonian economy, and the operational weakness in the application of existing texts (Tcheuwa, 2006). This is exacerbated by flexible formulations such as "the State should," leaving room for interpretation, the absence of implementing

decrees for certain texts, and the lack of information dissemination in cases of environmental emergency. This legal ambiguity creates fertile ground for subjective interpretations and opportunistic behaviors, weakening the ethical adherence of economic actors who may rationalize their negative environmental impacts.

Regarding CSR in Cameroon, it reflects an aspiration for a responsible business model where co-responsibility with the community goes beyond mere philanthropy. Nevertheless, the balance between ethics and performance remains complex, particularly for economically vulnerable young companies. Prospects for improvement emerge through the integration of ethics into sectoral strategies, the implementation of economic incentives, a conceptualization of CSR as a development lever rather than a constraint, support for SMEs towards transparent and responsible practices, and the promotion of a culture of accountability regarding social and environmental impacts. This collective approach would constitute the foundation of authentic and sustainable CSR in the Cameroonian context.

2.3. Small and Medium-Sized Enterprises (SMEs): Definition, Characteristics, and Their Strategic and Psychological Responses to Environmental Regulations in Cameroon

The Cameroonian SME sector, defined by Law No. 2015/010 as enterprises employing 6 - 100 people with annual turnover under one billion FCFA, constitutes 90% of the economic fabric while contributing 36% to GDP and employing 70% of the formal workforce (Haruna et al., 2024). Despite their economic significance, these predominantly family-managed enterprises face substantial developmental barriers across environmental, financial, and managerial dimensions (Oirya, 2010). This challenging business environment is evidenced by Cameroon's deteriorating position in the World Bank's "Doing Business" report, falling from 148th to 158th between 2014-2015, raising critical questions about how environmental regulatory constraints may either catalyze innovation or trigger defensive organizational responses. The entrepreneurial ecosystem suffers from significant infrastructural deficiencies: only 10% of the country's 50,000-kilometer road network is paved, with merely 25% of these paved roads in good condition. Digital infrastructure similarly lags, with Cameroon ranked among countries with the lowest digital access in 2002 (index of 0.16). Within this context, universities are expected to function as catalysts by cultivating entrepreneurial culture and supplying graduates to new ventures, though the high rate of informality (70%) and limited investment capacity continue to impede the sector's development potential.

2.4. Theoretical Literature Review

The link between environmental protection and CSR has progressively developed and become more complex. Historically, Friedman (1970) argued that the sole responsibility of a business was to maximize its profits, relegating environmental protection to the public domain. This view was challenged by Freeman

(1984), whose stakeholder theory integrated the environment as a legitimate business concern. The 1990s saw the emergence of the "triple bottom line" concept (Elkington, 1997), definitively anchoring the environmental dimension at the heart of CSR. The debate then polarized between proponents of the win-win approach, for whom environmental protection stimulates innovation and competitiveness, and advocates of a more constraining vision (Gray & Bebbington, 2000) highlighting the fundamental accounting contradictions between profit logic and environmental preservation. More recently, Schaltegger and Burritt's (2015) approach proposes an integrative vision where environmental protection constitutes both a strategic opportunity and a moral obligation, while Bansal and Song (2017) more finely distinguish between environmental responsibility (compliance) and environmental sustainability (transformation). These debates reflect a persistent tension between instrumentalization of the environment for performance and a deeper refoundation of economic models in the face of contemporary ecological challenges.

2.5. Impact of Environmental Regulation on SME Performance: An Empirical Analysis

Although the literature on CSR in Africa has long favored the study of multinationals, there is growing interest in SMEs. The work of Demuijnck and Ngnodjom (2013) in Cameroon has identified various practices centered on employee well-being, ethics in the face of nepotism, and the fight against corruption.

CSR, initially perceived as philanthropic, reveals a significant strategic dimension (Amaeshi et al., 2016). Several empirical studies (Pan et al., 2014; Lee et al., 2015; Mankelow & Quazi, 2007; Hilman & Gorondutse, 2013) establish a positive correlation between CSR practices and financial performance, suggesting that SMEs can, like large companies, economically benefit from their societal commitments. Turyakira et al. (2014) demonstrate the positive impact of different CSR dimensions on the competitiveness of Ugandan SMEs, while other research (Boyle et al., 1997; Wright & Ferris, 1997; Turban & Greening, 1997) highlights its importance for company reputation and attractiveness.

However, this CSR-performance relationship proves more nuanced. McWilliams and Siegel (2001) contest the universality of this positive correlation, while Dobre et al. (2015) highlight the influence of context and measurement methodologies. Lopatta et al. (2022) introduce a distinction between "normal CSR" and "abnormal CSR," suggesting the existence of an optimal threshold of societal investment beyond which financial performance may decline. Guo et al. (2024) reveal how tensions between stakeholder expectations and economic constraints can compromise the quality of CSR reports.

While environmental regulation is recognized as a lever for promoting CSR, the psychological defense mechanisms that underlie the adoption of societal practices in response to regulatory constraints remain insufficiently explored. Our research aims to analyze the influence of environmental regulation on the environmental performance of Cameroonian SMEs by examining the effects measured by psy-

chological defense mechanisms. We formulate the following hypotheses:

- H1: Strict environmental regulation is positively associated with the environmental performance of Cameroonian SMEs.
- H2: The use of psychological defense mechanisms, such as the rationalization of behavior as "it's necessary," is negatively correlated with the adoption of CSR practices.

The literature on CSR and SME performance appears rich and complex. While the benefits of CSR are generally recognized, the nature of this relationship is modulated by numerous factors, such as the economic context, the dimensions of CSR considered, measurement methods, and the type of behavior rationalization. For Cameroonian SMEs, it is essential to understand these nuances through empirical analysis in order to implement effective CSR strategies that integrate ethics and are adapted to their specific context.

3. Research Methodology

3.1. Data Source

We employed a questionnaire to collect data from 680 Cameroonian SMEs, a method validated by Hair (2009). Quota sampling targeted regions representing 70% of the national entrepreneurial fabric, with a reasoned selection of companies subject to the 1996 environmental framework law. The survey, conducted in 2024 covering the 2022-2023 period, targeted VSEs, SEs, and MEs in the private sector. Data collection, performed by seven investigators using KoboCollect, achieved a response rate exceeding 80%, an indicator of reliability according to Alderman and Salem (2010).

3.2. Measurement of Variables

3.2.1. Dependent Variables

CSR communication and social interaction is companies' community engagement, characterized by local wealth redistribution and respect for riparian rights. It takes the value 1 when the company adopts at least one practice among: local recruitment, community inclusion in governance, compensation for negative externalities, or respect for local cultural traditions, and 0 otherwise.

CSR aspects philantrophy is the social involvement of African companies, which are perceived as social actors before being economic ones (Wong & Yameogo, 2011). It captures philanthropic initiatives (donations, educational investments, local infrastructure) considered by Porter and Kramer (2006) as fundamental to CSR and corporate citizenship. The variable takes the value 1 if the company engages in at least one philanthropic action, 0 otherwise.

CSR internal social policy evaluates initiatives aimed at employee well-being (Hsieh, 2010; Grant, 2013; Kelly, 2015). It encompasses knowledge of health and safety regulations, the presence of a security service, training on safety installations, access to drinking water, complaint handling mechanisms, environmental documentation, pollution reduction, and medical coverage. It takes the value 1 if

the company implements at least one mentioned element, and 0 if not.

Environmental performance: The prerequisite for achieving environmental performance is to insert an environmental program into the company's charter or professional identity (Thomas, 2001). Following this logic of environmental programming, we approximate environmental performance by the development of pollution reduction techniques. This variable is coded 1 if the company has a system or techniques for pollution reduction and 0 if not.

3.2.2. Independent Variables

1) Variables of Interest

Budget allocated to environmental protection: for these expenditures to take effect, they must be an integral part of the company's budget (André Dumas & Benjamin, 2023). This variable is coded 1 if the company has allocated a budget to environmental protection and 0 if not.

Pollution reduction: Because pollution is a source of waste, it is important to reduce it at the source (Jasch, 2008). Thus, complying with environmental regulations and implementing environmental protection mechanisms helps make the firm perform better and avoid production errors (Commoner, 1991; André Dumas & Benjamin, 2023). This variable is coded 1 if the company has reduced pollution and 0 if not.

Environmental restriction: It constitutes a driver for improving environmental performance in the sense that it requires companies to seek more sustainable solutions. This variable includes restrictions regarding habitation, prohibition of plastic waste use, return of certain packaging to the environmental delegation, irrigation standards, environmental impact studies, protection of existing ecosystems, awareness-raising among neighboring populations about the dangers of the company's presence, waste management standards, and hygiene and sanitation tax in accordance with the 1996 framework law. This variable is coded 1 if the company is subject to one of these elements and 0 if not.

2) Control Variables

Company age: According to Clarkson et al. (2008) and De Villiers et al. (2011), older companies generally have sufficient resources to invest in sustainable development and maintain their reputation. This variable is coded 1 if the company is less than 4 years old and 0 if more than 4 years old.

Owner nationality: Nationality influences the appropriation of CSR and territorial development (Thuderoz, 2005; Ren et al., 2021). This variable is coded 1 if a Cameroonian company, 0 otherwise.

Business sector: Sectors defined as "polluting" according to Order No. 00002/MINEPDED of February 8, 2016, are more incentivized to comply with environmental standards to avoid sanctions (André Dumas & Benjamin, 2023). This variable is coded 1 if the company belongs to a "so-called polluting sector" and 0 otherwise.

Tax: It is virtually impossible for a company to exist without paying taxes. This

variable is coded 1 if the company pays at least one tax and 0 otherwise.

Demand: The distinction between local and international markets is crucial because the extent of competition affects innovation capacity (Salomon & Shaver, 2005). This variable is coded 1 for local market and 0 otherwise.

Competition: Competitive intensity is positively correlated with innovation capacity. This variable is coded 1 if the company is at least moderately known locally, 0 otherwise.

Internal R&D: Investment in R&D improves future performance and ensures the company's sustainability. This variable is coded 1 if the company invests in internal R&D, 0 otherwise.

Collaboration: Collaboration with different partners stimulates global innovation (Hewitt-Dundas, 2013; Temel et al., 2013). This variable is coded 1 if the company has collaborated with at least one external partner for knowledge exchange, 0 otherwise.

Innovation: Constructed according to the Oslo Manual methodology, this variable is coded 1 if the company has introduced a product, process, marketing, or organizational innovation, and 0 otherwise.

Rationalization of behavior: This variable reflects the attempt to justify free-riding behavior (Pontalis). The ethics of the manager can be associated with the company's performance (Lépineux, 2003; Mercier, 2001), especially when SMEs prioritize access to financing over environmental protection. This variable is coded 1 for the justification "it's necessary," 0 otherwise.

This study also controls for socio-demographic characteristics, as these factors may influence the relationship between environmental regulation and SME performance, or may be the source of the emergence of psychological defense mechanisms within Cameroonian SMEs. These variables, such as gender coded 1 for male and 0 if female, marital status coded 1 for single and 0 if married, education level coded 1 if no diploma and 0 if at least one diploma, age coded 1 if at least 35 years old and religious practice coded 1 if Christian and 0, region of origin coded 1 if from western Cameroon and 0 if not, allow us to control for factors that may vary from one manager to another and thus isolate the specific effect of regulation.

4. Results and Discussion

4.1. Results and Discussion of Statistical Analysis

The descriptive analysis of Cameroonian SMEs presented in **Table 1** reveals a paradox between innovation and environmental commitment. Although 80% of companies practice innovation, it remains primarily opportunistic and of low added value. In environmental matters, despite efforts by 93.7% of SMEs to reduce at least one aspect of pollution, only 59.4% comply with regulations and barely 27.2% invest in environmental protection. Particularly concerning, 70.7% of Cameroonian SMEs belong to the sector classified as "polluting" according to Order 00002/MINEPDED of February 8, 2016, while only 49.9% comply with environmental restrictions. Regulatory complexity seems to generate psychological de-

fense mechanisms, with 6.2% of companies resorting to the "it's necessary" type of rationalization to justify their non-compliance, a phenomenon potentially linked to corruption and financial constraints that risk hampering the performance and sustainability of SMEs.

Table 1. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
ISP	660	0.637	0.481	0	1
CSI	660	0.668	0.471	0	1
EP	660	0.51	0.5	0	1
AspPhi	660	0.709	0.455	0	1
Innovation	660	0.802	0.398	0	1
Env Reglementation	660	0.594	0.491	0	1
Reduction Pollution	660	0.937	0.244	0	1
Budget Environment	660	0.272	0.445	0	1
Restrictions Environment	660	0.499	0.5	0	1
Rationalization	660	0.062	0.241	0	1
Sector	660	0.707	0.455	0	1
Firm size	660	0.649	0.478	0	1
Collaboration	660	0.513	0.5	0	1
Tax	660	0.948	0.223	0	1
Competition	660	2.658	0.958	1	5
Entrepreneur's age	660	0.226	0.418	0	1
Gender	660	0.608	0.489	0	1
Church frequency	660	0.014	0.118	0	1
Educational level	660	0.183	0.387	0	1
Marital status	660	0.333	0.472	0	1

Notes: ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction. Source: Authors.

4.2. Empirical Justification of Our Model

The results in Table 2 presenting the preliminary findings do not account for the presence of correlation between error terms, which leads us to the multivariate probit model.

Table 2. Preliminary results of the binary probit model.

VARIABLES	(1)	(2)	(3)	(4)
	ISP	EP	AspPhi	CSI
Env reglementation	1.099***	0.928***	0.514***	−0.0522
	(0.135)	(0.130)	(0.121)	(0.121)
Innovation	0.961***	−0.135	0.0393	0.503***
	(0.162)	(0.180)	(0.153)	(0.146)
Rationalization	0.485	0.0916	0.383	0.209
	(0.313)	(0.271)	(0.275)	(0.268)
Sector	−0.762***	0.840***	−0.0470	0.135
	(0.164)	(0.143)	(0.138)	(0.129)
Firm size	−0.718***	−0.738***	−0.451***	−0.454***
	(0.150)	(0.147)	(0.141)	(0.137)
Collaboration	−0.523***	0.806***	0.232*	−0.308**
	(0.145)	(0.133)	(0.128)	(0.121)
Tax	0.287	−0.440	0.269	0.198
	(0.275)	(0.292)	(0.257)	(0.239)
Competition	−0.0756	−0.0419	−0.197***	0.0473
	(0.0693)	(0.0658)	(0.0631)	(0.0620)
Entrepreneur age	−0.167	0.329**	0.0347	−0.0523
	(0.149)	(0.152)	(0.147)	(0.143)
Gender	0.277**	−0.217*	0.0718	0.0302
	(0.134)	(0.131)	(0.125)	(0.123)
Church frequency	−0.779	−0.834	−0.240	0.727
	(0.635)	(0.542)	(0.480)	(0.586)
Educational level	0.255	0.0248	−0.0509	0.0156
	(0.163)	(0.158)	(0.156)	(0.148)
Marital status	0.147	0.172	−0.243*	−0.167
	(0.142)	(0.137)	(0.128)	(0.125)
Constant	0.0758	−0.438	0.745**	0.173
	(0.399)	(0.389)	(0.364)	(0.342)
Observations	660	660	660	660
Wald Chi^2	173.9***	132.2***	61.89***	48.26***
Pseudo R^2	0.313	0.233	0.0984	0.0677

Robust standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; *Notes:* ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction; Source: Authors.

Multivariate probit analysis confirms the significant interdependence among CSR dimensions (Chi^2 significant at the 1% level), revealing four notable correlations: internal social policy/environmental performance (43.5%, $p < 0.01$), philanthropy/social policy (22.5%), philanthropy/social communication (14.3%), and philanthropy/environmental performance (15%, $p < 0.05$). The correlation of philanthropy with the three other dimensions validates Porter and Kramer's (2006) theory, positioning it as a prerequisite for other forms of CSR. These interdependencies justify the use of the conditional mixed process (cpm) algorithm (Roodman, 2011) to calculate marginal effects, enabling an assessment of whether environmental regulation contributes to the performance of Cameroonian SMEs or induces psychological defense mechanisms."

Multivariate probit model analysis reveals a significant interdependence among Corporate Social Responsibility (CSR) dimensions within Cameroonian Small and Medium Enterprises (SMEs) (Chi^2 significant at the 1% level). Of the six possible covariances, four exhibit significant correlations, notably between internal social policy and environmental performance (rho21 = 0.435, $p < 0.01$). This strong correlation suggests that firms investing in human capital also tend to enhance their environmental performance.

Notably, the philanthropic dimension demonstrates a systematic correlation with the three other dimensions: internal social policy (rho31 = 0.225), environmental performance (rho32 = 0.15, $p < 0.05$), and social communication (rho43 = 0.143). These findings corroborate Porter and Kramer's (2006) theory, positioning philanthropy as a prerequisite for other forms of CSR, while also providing nuanced insights into traditional representations of corporate social engagement in African contexts.

This study examines the multifaceted impact of environmental regulation on CSR dimensions within Cameroonian SMEs (**Table 3**). Findings reveal that environmental regulation significantly fosters CSR, evidenced by a 30.4% increase in internal social policies and a 30.2% rise in environmental performance, surpassing the 17% growth in philanthropic activities, thus challenging simplistic views of African CSR.

Innovation emerges as a catalyst, driving internal social practices (28.7%) and social communication (18.2%), highlighting a synergy between innovation capacity and societal engagement. Conversely, firm size inversely correlates with all CSR dimensions, showing reductions of 16.4% in internal social policies, 2.3% in environmental performance, 13.7% in philanthropic actions, and 15.7% in social communication.

Inter-firm collaboration yields ambivalent effects, positively influencing environmental performance and philanthropy, yet negatively impacting internal social policies and communication, reflecting the complexity of collaborative dynamics. Competitive intensity diminishes philanthropic engagements due to profit margin pressures.

Table 3. Main results with the multivariate probit model.

VARIABLES	Standard multivariate probit				Multivariate probit with marginal effects			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	ISP	EP	AspPhi	CSI	ISP	EP	AspPhi	CSI
Env reglementation	1.95***	0.936***	0.520***	−0.0562	0.304***	0.302***	0.170***	−0.0261
	(0.137)	(0.131)	(0.121)	(0.121)	(0.0351)	(0.0379)	(0.0386)	(0.0404)
Innovation	0.964***	−0.158	0.0311	0.507***	0.287***	−0.0500	0.0116	0.182***
	(0.161)	(0.178)	(0.152)	(0.145)	(0.0448)	(0.0484)	(0.0492)	(0.0516)
Rationalization	0.536*	0.0218	0.375	0.217	0.138*	0.0218	0.124	0.0669
	(0.297)	(0.279)	(0.278)	(0.268)	(0.0708)	(0.0766)	(0.0779)	(0.0816)
Sector	−0.699***	0.793***	−0.0534	0.135	−0.172***	0.269***	−0.00694	0.0414
	(0.163)	(0.139)	(0.139)	(0.128)	(0.0385)	(0.0416)	(0.0423)	(0.0443)
Firm size	−0.720***	−0.724***	−0.464***	−0.457***	−0.164***	−0.230***	−0.137***	−0.152***
	(0.150)	(0.147)	(0.141)	(0.136)	(0.0383)	(0.0414)	(0.0421)	(0.0441)
Collaboration	−0.539***	0.782***	0.222*	−0.319***	−0.118***	0.265***	0.0817**	−0.0943**
	(0.143)	(0.133)	(0.129)	(0.121)	(0.0361)	(0.0390)	(0.0396)	(0.0415)
Taxe	0.228	−0.483*	0.272	0.207	0.0832	−0.151*	0.0895	0.0725
	(0.257)	(0.268)	(0.248)	(0.238)	(0.0755)	(0.0816)	(0.0830)	(0.0870)
Competition	−0.0621	−0.0382	−0.197***	0.0483	−0.0120	−0.00906	−0.0628***	0.0155
	(0.0674)	(0.0643)	(0.0636)	(0.0624)	(0.0179)	(0.0193)	(0.0196)	(0.0206)
Entrepreneur age	−0.136	0.356**	0.0417	−0.0424	−0.0566	0.0930**	0.00373	−0.0163
	(0.149)	(0.152)	(0.147)	(0.143)	(0.0426)	(0.0460)	(0.0468)	(0.0490)
Gender	0.290**	−0.188	0.0649	0.0395	0.0608*	−0.0651*	0.0174	0.00337
	(0.131)	(0.129)	(0.125)	(0.122)	(0.0356)	(0.0385)	(0.0392)	(0.0411)
Church frequency	−0.883	−0.995*	−0.279	0.723	−0.281**	−0.240	−0.0936	0.216
	(0.677)	(0.586)	(0.508)	(0.585)	(0.143)	(0.154)	(0.157)	(0.165)
Educational level	0.281*	0.0233	−0.0532	0.00960	0.0672	0.0127	−0.0185	0.00346
	(0.159)	(0.159)	(0.157)	(0.148)	(0.0431)	(0.0466)	(0.0474)	(0.0497)
Marital status	0.125	0.149	−0.254**	−0.177	0.0434	0.0512	−0.0790*	−0.0548
	(0.138)	(0.139)	(0.128)	(0.125)	(0.0371)	(0.0401)	(0.0408)	(0.0428)
Constant	0.0339	−0.366	0.772**	0.165	0.410***	0.359***	0.738***	0.561***
	(0.382)	(0.361)	(0.356)	(0.339)	(0.105)	(0.114)	(0.116)	(0.121)
Observations	660	660	660	660	660	660	660	660
Wald Chi^2	375.41***	375.41***	375.41***	375.41***				
Log(pseudo) likelihood	−1152.184	−1152.184	−1152.184	−1152.184				
Correlation coefficient	rho21 = 0.435*** rho31 = 0.225*** rho41 = 0.094 rho32 = −0.151** rho42 = −0.064 rho43 = 0.143***							
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: Prob > Chi^2 = 0.000								

Robust standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; *Notes:* ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction; Source: Authors.

Leadership characteristics significantly shape CSR practices: age positively correlates with environmental performance, female leader's exhibit stronger environmental protection propensities, and religious practices inversely affect internal social policies (−28.1%), indicating intricate interactions between personal values and organizational behaviors.

The study illuminates a specific psychological mechanism: "it's necessary" rationalization. A 1% increase in this form of rationalization paradoxically leads to a 13.8% rise in internal social policies, suggesting complex compensatory mechanisms. This particularly intriguing result indicates that in the face of environmental regulatory pressures, some SMEs develop psychological defense mechanisms which, while acknowledging the importance of environmental issues, delay direct action in this domain while reinforcing other CSR dimensions.

Subsequent decomposition of the regulatory variable (environmental budget, pollution reduction, compliance with restrictions) will enable the identification of specific components that activate the observed rationalization mechanisms. This finer-grained analysis is essential for developing effective public policies that can support SMEs in their environmental transition without triggering counterproductive resistance.

4.3. Robustness Analysis with Integration of Key Sub-Variables

To conduct more robust analyses, the regulatory variable was decomposed into three control variables: possession of an environmental protection budget, pollution reduction, and compliance with environmental restrictions (**Tables 4-6**). The model maintains its overall significance, albeit with a decrease in significance coefficients.

Our study evaluates SME performance through multidimensional CSR indicators (social communication, philanthropy, internal social policy) and environmental indicators integrated into professional identity. The inclusion of control variables (sector, size, collaboration, taxation, competition, leadership characteristics) in our econometric models enhances their robustness by minimizing the risk of omitted variable bias. The analysis of rationalization, with 6.2% of "it's necessary" rationalization, reveals a paradoxical strategic behavior among Cameroonian SMEs: while justifying their environmental non-compliance as "necessary" for cost savings, these firms ultimately experience a performance loss ranging from 1.382 to 1.655 percentage points.

This observation is particularly pertinent as our robustness analyses establish a positive correlation between internal social policy and all sub-indices of environmental regulation, corroborating the work of Torkkeli and Durst (2022). This crucial result demonstrates that investing in employee environmental education is not only a legal obligation but a strategic lever for SME competitiveness, thus reinforcing the conclusions of (Bontis, 2001) on the positive impact of employee training on turnover.

Table 4. Robustness with sub-index of the budget allocated to environmental protection.

VARIABLES	Standard multivariate probit				Multivariate probit with marginal effects			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	ISP	EP	AspPhi	CSI	ISP	EP	AspPhi	CSI
Budget Environment	1.322***	0.162	0.421***	−0.170	0.298***	0.0654	0.128***	−0.0549
	(0.199)	(0.136)	(0.147)	(0.136)	(0.0402)	(0.0450)	(0.0439)	(0.0455)
Innovation	0.837***	−0.138	−0.00587	0.533***	0.262***	−0.0400	0.00358	0.188***
	(0.156)	(0.169)	(0.151)	(0.147)	(0.0458)	(0.0514)	(0.0501)	(0.0519)
Rationalization	0.348	−0.0482	0.322	0.248	0.0997	0.0122	0.107	0.0738
	(0.303)	(0.262)	(0.276)	(0.268)	(0.0722)	(0.0809)	(0.0788)	(0.0818)
Secteur	−0.644***	0.695***	−0.0155	0.117	−0.135***	0.263***	0.00663	0.0327
	(0.157)	(0.135)	(0.142)	(0.131)	(0.0397)	(0.0445)	(0.0434)	(0.0450)
Firm size	−0.699***	−0.738***	−0.488***	−0.461***	−0.177***	−0.253***	−0.146***	−0.152***
	(0.150)	(0.144)	(0.141)	(0.136)	(0.0388)	(0.0435)	(0.0424)	(0.0440)
Collaboration	−0.441***	0.835***	0.268**	−0.315***	−0.107***	0.295***	0.0911**	−0.0928**
	(0.137)	(0.128)	(0.128)	(0.121)	(0.0366)	(0.0410)	(0.0399)	(0.0414)
Tax	0.197	−0.350	0.278	0.229	0.0834	−0.111	0.0964	0.0776
	(0.251)	(0.234)	(0.239)	(0.238)	(0.0768)	(0.0861)	(0.0839)	(0.0870)
Competition	−0.00282	−0.0147	−0.175***	0.0399	0.00397	−0.00402	−0.0557***	0.0128
	(0.0651)	(0.0621)	(0.0639)	(0.0626)	(0.0183)	(0.0205)	(0.0199)	(0.0207)
Entrepreneur age	−0.209	0.207	0.00182	−0.0437	−0.0763*	0.0630	−0.00902	−0.0160
	(0.149)	(0.145)	(0.146)	(0.142)	(0.0431)	(0.0483)	(0.0471)	(0.0488)
Gender	0.232*	−0.200	0.0247	0.0513	0.0383	−0.0752*	0.00692	0.00685
	(0.130)	(0.125)	(0.125)	(0.122)	(0.0363)	(0.0406)	(0.0396)	(0.0411)
Church frequency	−1.167*	−1.491**	−0.466	0.698	−0.369**	−0.395**	−0.154	0.215
	(0.683)	(0.608)	(0.510)	(0.581)	(0.144)	(0.162)	(0.158)	(0.163)
Educational level	0.286*	0.0275	−0.0474	0.00615	0.0681	0.0162	−0.0176	0.00372
	(0.167)	(0.152)	(0.155)	(0.149)	(0.0438)	(0.0491)	(0.0479)	(0.0496)
Marital status	0.119	0.105	−0.263**	−0.179	0.0368	0.0392	−0.0836**	−0.0550
	(0.138)	(0.132)	(0.127)	(0.125)	(0.0377)	(0.0423)	(0.0412)	(0.0427)
Constant	0.285	0.0648	0.930***	0.167	0.487***	0.484***	0.789***	0.560***
	(0.365)	(0.334)	(0.341)	(0.336)	(0.106)	(0.119)	(0.116)	(0.120)
Observations	660	660	660	660				
Wald Chi^2	319.12***	319.12***	319.12***	319.12***				
Log(pseudo) likelihood	−1172.396	−1172.396	−1172.396	−1172.396				
Correlation coefficient	rho21 = 0.520*** rho31 = 0.243*** rho41 = 0.096 rho32 = −0.216** rho42 = −0.056 rho43 = 0.145**							
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: Prob > Chi^2 = 0.000								

Robust standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; *Notes:* ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction; Source: Authors.

Table 5. Robustness with sub-index of the reduction of pollution.

VARIABLES	Standard multivariate probit				Multivariate probit with marginal effects			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	ISP	EP	AspPhi	CSI	ISP	EP	AspPhi	CIS
Pollution abatement	0.901***	1.215***	0.378***	−0.0731	0.251***	0.396***	0.124***	−0.0292
	(0.139)	(0.130)	(0.122)	(0.119)	(0.0355)	(0.0360)	(0.0386)	(0.0401)
Innovation	0.978***	−0.112	0.0604	0.502***	0.310***	−0.0258	0.0242	0.179***
	(0.166)	(0.175)	(0.150)	(0.145)	(0.0456)	(0.0462)	(0.0496)	(0.0515)
Rationalization	0.502	−0.0858	0.347	0.226	0.112	−0.0179	0.111	0.0698
	(0.312)	(0.262)	(0.275)	(0.266)	(0.0724)	(0.0733)	(0.0786)	(0.0817)
Sector	−0.757***	0.675***	−0.113	0.142	−0.213***	0.215***	−0.0284	0.0456
	(0.158)	(0.143)	(0.139)	(0.128)	(0.0393)	(0.0398)	(0.0427)	(0.0444)
Firm size	−0.744***	−0.792***	−0.483***	−0.457***	−0.177***	−0.235***	−0.145***	−0.151***
	(0.148)	(0.144)	(0.141)	(0.136)	(0.0390)	(0.0395)	(0.0423)	(0.0440)
Collaboration	−0.541***	0.670***	0.204	−0.311**	−0.138***	0.214***	0.0746*	−0.0909**
	(0.147)	(0.131)	(0.131)	(0.123)	(0.0374)	(0.0379)	(0.0406)	(0.0422)
Tax	0.380	−0.340	0.339	0.196	0.131*	−0.106	0.117	0.0685
	(0.238)	(0.277)	(0.237)	(0.236)	(0.0768)	(0.0778)	(0.0834)	(0.0868)
Competition	−0.0703	−0.0777	−0.205***	0.0502	−0.0198	−0.0225	−0.0665***	0.0165
	(0.0654)	(0.0664)	(0.0636)	(0.0627)	(0.0183)	(0.0185)	(0.0199)	(0.0206)
Entrepreneur age	−0.155	0.378**	0.0163	−0.0444	−0.0654	0.0984**	−0.00283	−0.0163
	(0.149)	(0.156)	(0.147)	(0.142)	(0.0434)	(0.0440)	(0.0471)	(0.0490)
Gender	0.279**	−0.138	0.0666	0.0366	0.0683*	−0.0495	0.0207	0.00230
	(0.129)	(0.132)	(0.124)	(0.123)	(0.0364)	(0.0369)	(0.0396)	(0.0411)
Church frequency	−1.029	−0.915	−0.377	0.721	−0.324**	−0.204	−0.126	0.215
	(0.675)	(0.584)	(0.509)	(0.584)	(0.146)	(0.147)	(0.158)	(0.164)
Educational level	0.236	−0.0309	−0.0680	0.0127	0.0598	−0.00139	−0.0218	0.00445
	(0.156)	(0.166)	(0.156)	(0.148)	(0.0440)	(0.0446)	(0.0478)	(0.0497)
Marital status	0.116	0.177	−0.260**	−0.177	0.0392	0.0525	−0.0821**	−0.0548
	(0.136)	(0.141)	(0.127)	(0.125)	(0.0379)	(0.0384)	(0.0411)	(0.0428)
Constant	0.151	−0.325	0.893***	0.171	0.473***	0.376***	0.778***	0.558***
	(0.350)	(0.380)	(0.344)	(0.334)	(0.106)	(0.108)	(0.116)	(0.120)
Observations	660	660	660	660				
Wald Chi^2	434.02***	434.02***	434.02***	434.02***				
Log(pseudo) likelihood	−1146.012	−1146.012	−1146.012	−1146.012				
Correlation coefficient	rho21 = 0.459*** rho31 = 0.251*** rho41 = 0.084 rho32 = −0.157** rho42 = −0.065 rho43 = 0.139**							
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: Prob > Chi^2 = 0.000								

Robust standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; *Notes:* ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction; Source: Authors.

Table 6. Environmentally constrained robustness.

VARIABLES	Standard multivariate probit				Multivariate probit with marginal effects			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	ISP	EP	AspPhi	CSI	ISP	EP	AspPhi	CSI
Restrictions Environnement	1.128***	0.813***	−0.0159	0.219	0.247***	0.264***	−0.00147	0.0754
	(0.432)	(0.263)	(0.236)	(0.241)	(0.0730)	(0.0782)	(0.0775)	(0.0798)
Innovation	0.894***	−0.122	0.0472	0.503***	0.303***	−0.0346	0.0228	0.179***
	(0.154)	(0.165)	(0.148)	(0.145)	(0.0472)	(0.0505)	(0.0500)	(0.0515)
Rationalization	0.420	−0.116	0.386	0.184	0.109	−0.00939	0.123	0.0585
	(0.302)	(0.269)	(0.269)	(0.266)	(0.0752)	(0.0805)	(0.0797)	(0.0821)
Sector	−0.601***	0.718***	−0.0762	0.152	−0.175***	0.266***	−0.0172	0.0475
	(0.147)	(0.135)	(0.138)	(0.129)	(0.0407)	(0.0436)	(0.0432)	(0.0445)
Firm size	−0.694***	−0.755***	−0.498***	−0.453***	−0.188***	−0.255***	−0.151***	−0.150***
	(0.145)	(0.144)	(0.140)	(0.136)	(0.0402)	(0.0431)	(0.0427)	(0.0439)
Collaboration	−0.341**	0.814***	0.288**	−0.337***	−0.0963**	0.286***	0.102**	−0.101**
	(0.132)	(0.128)	(0.128)	(0.121)	(0.0380)	(0.0407)	(0.0403)	(0.0415)
Tax	0.461*	−0.262	0.337	0.217	0.153*	−0.0800	0.119	0.0736
	(0.246)	(0.238)	(0.229)	(0.238)	(0.0796)	(0.0852)	(0.0844)	(0.0869)
Competition	−0.0335	−0.0223	−0.192***	0.0483	−0.0102	−0.00729	−0.0617***	0.0153
	(0.0616)	(0.0616)	(0.0635)	(0.0621)	(0.0188)	(0.0202)	(0.0200)	(0.0206)
Entrepreneur age	−0.205	0.240	−0.0187	−0.0323	−0.0804*	0.0701	−0.0149	−0.0106
	(0.147)	(0.148)	(0.148)	(0.142)	(0.0448)	(0.0480)	(0.0475)	(0.0489)
Gender	0.221*	−0.196	0.0444	0.0377	0.0511	−0.0750*	0.0137	0.00303
	(0.126)	(0.125)	(0.123)	(0.122)	(0.0376)	(0.0403)	(0.0399)	(0.0411)
Church frequency	−1.442**	−1.490**	−0.599	0.776	−0.440***	−0.396**	−0.192	0.236
	(0.685)	(0.601)	(0.514)	(0.583)	(0.149)	(0.160)	(0.158)	(0.163)
Educational level	0.326**	0.0707	−0.0533	0.0211	0.0843*	0.0307	−0.0162	0.00701
	(0.159)	(0.153)	(0.154)	(0.148)	(0.0456)	(0.0489)	(0.0484)	(0.0498)
Marital status	0.0890	0.111	−0.267**	−0.172	0.0309	0.0389	−0.0867**	−0.0533
	(0.131)	(0.132)	(0.126)	(0.126)	(0.0391)	(0.0419)	(0.0415)	(0.0427)
Constant	0.195	−0.0211	1.016***	0.103	0.515***	0.460***	0.816***	0.538***
	(0.343)	(0.345)	(0.338)	(0.338)	(0.110)	(0.118)	(0.117)	(0.120)
Observations	660	660	660	660				
Wald Chi^2	324.38***	324.38***	324.38***	324.38***				
Log(pseudo) likelihood	−1196.092	−1196.092	−1196.092	−1196.092				
Correlation coefficient	rho21 = 0.516*** rho31 = 0.303*** rho41 = 0.053 rho32 = −0.238** rho42 = −0.093 rho43 = 0.129**							
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: Prob > Chi^2 = 0.000								

Robust standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; *Notes:* ISP: Internal Social Policy of the Company; EP: Environmental Performance; Aspphi: Philanthropic Aspects; CSI: Communication and Social Interaction; Source: Authors.

Comparison with Nigerian and Ghanaian studies (Efobi & Orkoh, 2018) reveals an environmental awareness deficit in Cameroon, necessitating educational programs based on the knowledge-attitude-skill triad. Environmental performance is significantly correlated with environmental budget, restrictions, and pollution reduction, confirming the analyses of Baddih & Khihel (2011) on the link between environmental quality and economic performance. The philanthropic aspect, showing positive effects with environmental budget and pollution reduction but non-significant effects with restrictions, is consistent with the Cameroonian cultural context where explicit and voluntary CSR is rooted in traditional values (Wong & Yameogo, 2011; Amaeshi et al., 2016). This approach aligns with conclusions from studies in Nigeria and Ghana (Efobi & Orkoh, 2018) as well as the work of Earnhart and Lizal (2010), and Manrique and Marti-Ballester (2017).

This convergence of results suggests that, despite the specific contextual characteristics of Cameroon, environmental engagement remains a determining factor of performance for SMEs, transcending the dichotomy between mere social compliance and deliberate sustainable development strategy.

5. Conclusion and Policy Implications

This study illuminates the complex interplay between environmental regulation, corporate social responsibility (CSR), and the economic performance of Cameroonian Small and Medium Enterprises (SMEs). Our findings reveal that while environmental non-compliance (loss between 1.382 and 1.655 percentage points) incurs significant economic penalties, indicating the potential for regulation to drive performance, the implementation of such regulations is hindered by cognitive and attitudinal barriers. Specifically, 6.2% of SMEs resort to "it's necessary" rationalization to justify non-compliance, suggesting that regulatory pressure can trigger psychological defense mechanisms that impede genuine sustainability integration.

Furthermore, the differentiated impacts of CSR dimensions on environmental compliance highlight the need for nuanced policy approaches. Philanthropic CSR positively influences environmental budget allocation and pollution reduction, yet does not ensure regulatory adherence. Conversely, internal social policy CSR emerges as a robust driver of responsible environmental practices. The less pronounced impact of CSR communication proves less impactful on SME performance for two fundamental reasons: it primarily functions as a vector of institutional legitimacy rather than a direct performance driver, while resource constraints create a decoupling between communicated social commitments and their effective implementation, unlike environmental initiatives which benefit from more tangible indicators and better-structured governmental incentives.

These results open important perspectives for developing multidimensional public policies. We specifically recommend implementing measures to encourage philanthropic practices, demonstrating their added value for environmental performance; strengthening environmental regulatory mechanisms, while favoring

an educational rather than punitive approach; developing education and awareness programs integrating the "knowledge-attitude-skill" triad to promote a responsible corporate culture; creating concrete economic incentives for SMEs adopting exemplary environmental practices.

The study underscores a critical question: Does environmental regulation primarily serve as a catalyst for enhanced SME performance, or does it inadvertently trigger psychological defense mechanisms that obstruct genuine sustainability integration? Addressing this requires a shift towards policies that not only enforce compliance but also cultivate a deep-seated commitment to environmental responsibility. Future research should expand the scope of analyzed rationalization mechanisms and delve further into the socio-cultural factors that influence CSR adoption within the Cameroonian context. Ultimately, fostering an ethical, responsible, and sustainable entrepreneurial ecosystem necessitates a comprehensive strategy that harmonizes regulatory stringency with economic incentives and a transformation of organizational mindsets, positioning environmental performance as both a moral imperative and a strategic economic advantage.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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