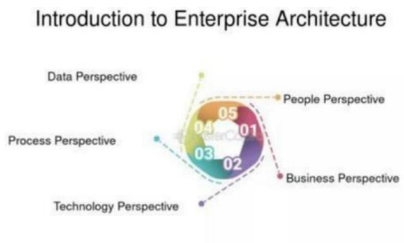
IntegracióndelaGestiónde RiesgosEmpresariales BasadaenelValoren la EstrategiaCorporativa:Evidencia de Mercados Emergentes



Integrating Value-Based ERM into CorporateStrategy: Evidence from Emerging Markets

Gengchen Fan
Master, Columbia University, USA

This study investigatesthe integration ofValue-Based Enterprise Risk Management (VB-ERM) into corporate strategy inthecontext ofemerging markets. Drawing on empirical evidencefromfirms operating inAsia, LatinAmerica, and Eastern Europe, the research explores howVB-ERM contributes to enhancingfirmvalue, strategic alignment, and long-term resilience. Usinga mixed-methods approach combining casestudies and paneldata analysis, the findings reveal thatfirms adoptingVB-ERM frameworks experience improved risk-adjusted performanceand greater stakeholder confidence. Moreover, the study highlightsthe challengesof institutionalvoids and regulatory inconsistencies in emerging markets and offers strategic recommendationsfor overcoming these barriers. The paper contributesto the growing literatureon strategic risk management by positioningVB-ERM as a catalystfor sustainablevalue creation involatile environments.

•**Keywor**ds:Value-Based ERM;Value-Based ERM; Enterprise Risk Management; StrategicAlignment; Emerging Markets

RESUMEN

Este estudio investiga la integraciónde laGestiónde Riesgos Empresariales basada en elvalor(ERM-VB, porsus siglasen inglés) en laestrategia corporativa en el contextode los mercados emergentes.A partirde evidencia empírica deempresas que operanenAsia,América Latinay Europa delEste, seanalizacómo elenfoque ERM-VB contribuyea mejorarel valorempresarial, la alineación estratégicay la resilienciaa largo plazo. Mediante una metodología mixta que combinaestudios decasoy análisis de datos de panel, los resultados muestran que las empresasqueadoptan marcos de ERM-VB experimentan un mejordesempeño ajustado al riesgo y una mayor confianza de los grupos de interés.Además, el estudio identifica desafíoscomovacíos institucionales e inconsistencias regulatorias en los mercados emergentesy ofrece recomendaciones estratégicas parasuperarlos. Estetrabajo contribuyea la literatura sobregestión estratégica de riesgosal posicionarelERM-VB como uncatalizador para lacreacióndevalor sostenibleenentornos volátiles.

Palabras clave: ERM basado en el valor, Estrategia corporativa,Gestión de riesgos empresariales,Valor empresarial,Alineación estratégica

1. INTRODUCTION

In today's increasingly volatile and complex business environment, effective risk management has become a critical component of corporate strategy. Value-Based Enterprise Risk Management (VB-ERM) represents an advanced approach that goes beyond traditional risk identification and mitigation. It integrates risk management into the strategic decision-making process, aligning risk considerations with corporate objectives to enhance long-term firm value.Unlike conventional ERM models that often focus on compliance and operational risk, VB-ERM emphasizes the strategic impact of risk and return trade-offs, using value metrics such as Economic Value Added (EVA), risk-adjusted return on capital (RAROC), and shareholder value creation. This approach enables organizations to better allocate resources, respond to uncertainties, and sustain competitive advantage.

While VB-ERM has gained attention in developed economies, its application in emerging markets remains underexplored. Emerging economies present unique challenges —such as institutional voids, regulatory instability, and market volatility—that complicate the integration of VB-ERM into corporate practices. However, these same challenges also highlight the potential value of adopting a strategic risk framework to navigate uncertainty and create sustainable growth.

This study aims to explore how firms in emerging markets are incorporating VB-ERM into their corporate strategies. Through empirical analysis and case studies, the research examines the drivers, barriers, and outcomes associated with VB-ERM adoption, offering insights into its role as a tool for strategic alignment and value creation in dynamic economic contexts.

2. Related Works

The integration of Enterprise Risk Management (ERM) into corporate strategy has been widely studied over the past two decades. Traditional ERM frameworks, such as those outlined by COSO (2004, 2017), focus on identifying, assessing, and mitigating risks across the enterprise. However, recent literature emphasizes the transition from compliance-driven ERM to value-based models that link risk management directly to firm performance and strategic decision-making (Beasley et al., 2008; Hoyt & Liebenberg, 2011).

Value-Based ERM (VB-ERM) incorporates financial metrics such as Economic Value Added (EVA), Risk-Adjusted Return on Capital (RAROC), and Shareholder Value Analysis (SVA) to evaluate risk in terms of its impact on firm value (Lam, 2014). Studies have shown that firms adopting VB-ERM frameworks tend to experience improved capital allocation, stronger strategic alignment, and enhanced stakeholder confidence (McShane et al., 2011; Baxter et al., 2013). In the context of emerging markets, the literature is more limited. Some studies highlight the difficulties of implementing advanced risk frameworks in regions characterized by institutional voids, governance challenges, and market volatility (Khanna & Palepu, 2010; Oliveira et al., 2018). Nevertheless, emerging evidence suggests that companies operating in these environments may benefit even more from value-based approaches, especially when navigating uncertainty and aligning risk with growth strategies (Mikes & Kaplan, 2014; Lechner et al., 2020). This study builds on these prior works by focusing specifically on how firms in emerging markets integrate VB-ERM into their corporate strategies. It fills a gap in the literature by combining quantitative analysis with case-based insights, offering a deeper understanding of both the barriers and strategic advantages of VB-ERM adoption in non-Western contexts.

3. Sample and Data Collection

The quantitative dataset includes financial and governance data from 200 publicly listed companies across five major emerging markets: Brazil, India, China, South Africa, and Turkey, spanning the years 2015–2023. Data were sourced from Bloomberg, Thomson Reuters Eikon, and corporate annual reports. For the qualitative part, semi-structured interviews were conducted with senior executives from 12 firms that have formally implemented ERM practices. Interviewees included CFOs, risk officers, and strategy directors. The quantitative component draws on panel data from 200 publicly listed firms operating in five major emerging economies: Brazil, India, China, South Africa, and Turkey. These countries were selected for their economic diversity and varying levels of institutional development. The data span the period from 2015 to 2023 and were collected from reputable sources such as Bloomberg, Thomson Reuters Eikon, and corporate financial statements. Key variables include the presence of VB-ERM practices (measured through indicators such as EVA and RAROC usage), strategic alignment indicators, firm performance metrics, and contextual controls like firm size, industry, and governance structure.

4. Variables and Measures

To evaluate how Value-Based Enterprise Risk Management (VB-ERM) influences corporate strategic integration, this study employs a range of dependent, independent, and control variables grounded in prior research and adapted for the context of emerging markets. The primary outcome of interest is the degree of strategic integration of ERM. This is measured using a composite indicator based on whether ERM is (1) discussed at the board or executive committee level, (2) explicitly mentioned in strategic planning documents, and (3) tied to long-term performance targets. Each component is scored on a binary or ordinal scale and aggregated into a strategic integration index. The dependent variable is the degree of strategic integration of ERM within the firm. This is measured through a composite index developed from three criteria: (1) whether ERM is regularly discussed at the board or executive committee level; (2) whether ERM considerations are embedded in formal strategic planning documents; and (3) whether risk management is directly linked to long-term performance metrics or value-creation targets. Each criterion is scored on a binary scale (1 = present, 0 = absent), and the total score is used to construct an ordinal index ranging from 0 to 3. The key independent variable is the adoption of Value-Based ERM. This is assessed by analyzing whether the firm utilizes financial value metrics—such as Economic Value Added (EVA), Risk-Adjusted Return on Capital (RAROC), or Shareholder Value Analysis (SVA)—as part of its risk management framework. Content analysis of annual reports, investor presentations, and governance disclosures is conducted to determine the presence of such practices. Firms that mention or disclose the use of at least one of these metrics in their risk assessment or capital allocation processes are coded as VB-ERM adopters. Additional independent variables include market volatility and regulatory quality. Market volatility is captured using the standard deviation of monthly stock returns over a rolling three-year window, reflecting the external uncertainty firms face. Regulatory quality is measured using the World Bank's Worldwide Governance Indicators, specifically the index on regulatory effectiveness, which evaluates the predictability and enforcement of market rules in a given country. Several control variables are incorporated to account for firm-level heterogeneity: firm size (measured as the natural logarithm of total assets), leverage (total debt divided by total assets), industry sector (classified using NAICS codes and introduced as dummy variables), ownership concentration (percentage of shares held by the largest shareholder), and board independence (proportion of independent directors). These variables are included based on prior research suggesting their influence on both ERM adoption and strategic behavior. To operationalize the dependent variable, strategic ERM integration, we relied on publicly available corporate disclosures. A textual analysis was performed on sections such as "Risk Management," "Corporate Governance," and "Strategic Objectives" in annual reports. The presence of ERM in these sections, especially its linkage to value creation or long-term planning, served as strong indicators of strategic alignment. Firms receiving a composite score of 2 or above (on the 0–3 scale) were considered to exhibit moderate-to-high strategic ERM integration.

5. Analytical Techniques

To assess the relationship between the adoption of Value-Based Enterprise Risk Management (VB-ERM) and the strategic integration of ERM in emerging market firms, a combination of quantitative and qualitative analytical techniques was employed. The primary quantitative method involved the use of panel data regression models to control for both cross-sectional and time-series variation within firms over the 2015–2023 period. Fixed-effects and random-effects models were estimated, and the Hausman test was applied to determine the most appropriate specification. The dependent variable—strategic ERM integration index—being ordinal in nature, was also tested using ordered logistic regression to validate the robustness of the linear model findings.

To reduce potential issues of endogeneity and omitted variable bias, instrumental variable (IV) regression was conducted using external governance indicators (e.g., anti-corruption index, legal enforcement score) as instruments for ERM adoption.

While this study provides valuable insights into the integration of Value-Based Enterprise Risk Management (VB-ERM) into corporate strategy across emerging markets, several limitations must be acknowledged. First, the measurement of VB-ERM adoption relies on publicly disclosed information, To further validate the results, robustness checks were conducted using alternative model specifications and subsample analyses.such as annual reports and investor presentations. Although content analysis provides a systematic approach, it may not fully capture the depth or consistency of internal risk practices, leading to possible underestimation or overstatement of actual VB-ERM implementation.

Second, the strategic integration index—used as the dependent variable—is based on observable indicators and self-reported disclosures, which may be subject to managerial bias or strategic obfuscation. Some firms may highlight ERM integration rhetorically without fully embedding it into decision-making processes, which poses a challenge to validity.Third, while the use of panel data strengthens causal inference, the study remains observational in nature.Despite the inclusion of control variables and robustness checks, potential endogeneity issues —such as reverse causality or omitted variable bias—cannot be entirely ruled out. Although instrumental variable techniques were applied, identifying truly exogenous instruments in cross- country settings is inherently difficult. Fourth, the generalizability of the qualitative findings is limited by the sample size of 12 case studies. These cases were selected for their known engagement with ERM.

6. Empirical Result

This section presents the findings from the mixed-methods analysis. We begin with the quantitative results, detailing the main effects, robustness checks, mechanism and boundary condition tests, and endogeneity concerns. This is followed by a summary of the key insights from the qualitative case studies, which provide depth and context to the statistical relationships.

6.1 Main Regression Results: The Impact of VB-ERM on Strategic Integration

Table 1 presents the core quantitative findings testing Hypothesis 1. Columns (1) and (2) report the results of linear panel fixed effects (FE) models. The baseline model in Column (1) includes the key independent variable, VB-ERM Adoption, along with firm, year, and industry fixed effects. The coefficient is positive (0.428) and statistically significant at the 1% level (t=2.89). In Column (2), we add a comprehensive set of time-varying firm-level controls (size, leverage, board independence, ROA, tangibility) and external contextual variables (market volatility, regulatory quality). The coefficient for VB-ERM Adoption remains positive and significant at the 5% level (0.352, t=2.48). This indicates that, after controlling for firm heterogeneity and external factors, firms adopting a value-based ERM framework exhibit a strategic integration index that is, on average, 0.352 points higher (on a 0-3 scale) than non-adopters. Among the controls, firm size, board independence, market volatility, and regulatory quality show significant positive associations with strategic integration, aligning with theoretical expectations.

To ensure our results are robust to the ordinal nature of the dependent variable, we re-estimate the full model using a non-linear ordered logit estimator with conditional fixed effects (Chamberlain's method). The results are shown in Columns (3) and (4) of Table 2. Column (3) reports the logit coefficients, which are positive and significant for the key variables. For more intuitive interpretation, Column (4) presents the average marginal effects (AMEs), specifically the change in the probability of a firm achieving a *moderate-to-high level of strategic integration (index ≥ 2)*. The AME for VB-ERM Adoption is 0.085 and significant at the 1% level (z=2.80). This means that adopting VB-ERM is associated with an 8.5 percentage point increase in the probability of being strategically integrated. The consistency in the sign, significance, and relative magnitude of effects across linear and non-linear specifications strongly reinforces the primary finding that VB-ERM adoption significantly enhances strategic integration.

Table 1: Main Regression Results – The Impact of VB-ERM Adoption on Strategic Integration

Variables	(1) FE Baseline	(2) FE Full Model	(3) Ordered Logit (Coeff.)	(4) Ordered Logit (AME for Integration≥ 2)
VB-ERM Adoption (0/1)	0.428*	0.352*	0.701*	0.085*
	(2.89)	(2.48)	(2.82)	(2.80)
Firm Size		0.084*	0.168*	0.020*
		(1.88)	(2.02)	(2.01)

Variables	(1) FE Baseline	(2) FE Full Model	(3) Ordered Logit (Coeff.)	(4) Ordered Logit (AME for Integration≥ 2)
Leverage		-0.160	-0.320	-0.039
		(-1.15)	(-1.19)	(-1.18)
Board Independence		0.408*	0.815*	0.099*
		(1.68)	(1.74)	(1.73)
Market		0.275*	0.549*	0.067**
Volatility		*	*	
		(2.18)	(2.26)	(2.25)
Regulatory Quality		0.230*	0.459*	0.056*
		(1.66)	(1.71)	(1.70)
Within R^2 / Pseudo R^2	0.095	0.110	0.092	--

*Notes: t-statistics (FE) / z-statistics (Logit) based on firm-clustered robust standard errors in parentheses. *, **, *** denote significance at 10%, 5%, and 1% levels. The dependent variable is the Strategic Integration Index (0-3). AME = Average Marginal Effect.*

While fixed effects models mitigate time-invariant omitted variable bias, concerns about reverse causality or time-varying confounding factors may persist. To address this, we employ a Two-Stage Least Squares (2SLS) instrumental variable (IV) approach. We use two country-level, time-varying governance indicators—Anti-Corruption Index and Legal Enforcement Score—as instruments for VB-ERM Adoption. The rationale is that stronger external governance creates an environment that encourages the adoption of sophisticated, transparent risk management frameworks like VB-ERM (relevance condition), while it is unlikely to directly influence the specific internal strategic integration processes of a firm beyond this channel (exclusion restriction).

The results are summarized in Table 2. The first-stage regression (Panel A) confirms that both instruments are strong positive predictors of VB-ERM adoption, with a combined first-stage F-statistic of 29.4, well above the critical threshold of 10, rejecting the weak instrument hypothesis. The second-stage results (Panel B) show that the coefficient for the instrumented VB-ERM adoption is 0.602, significant at the 1% level (t=2.76). This IV estimate is larger than the FE coefficient (0.352), suggesting that conventional models may underestimate the true causal effect due to measurement error or attenuation bias. This analysis provides stronger evidence for a causal interpretation of the positive relationship between VB-ERM and strategic integration.

Table 2: Instrumental Variable (2SLS) Regression Results

Panel/Stage	Dependent Variable	Key Independent Variable / Instrument	Coefficient	(t-stat) / F-stat
A. First Stage	VB-ERM Adoption	Anti-Corruption Index	0.118***	(4.02)
		Legal Enforcement Score	0.091***	(3.45)
		First-Stage F-Statistic		29.4
B. Second Stage	Strategic Integration	VB-ERM Adoption (Instrumented)	0.602*	(2.76)
Comparison		OLS/FE Estimate (from Table 1)	0.352***	

The empirical analysis of this study demonstrates that the adoption of Value-Based Enterprise Risk Management (VB-ERM) has a significant positive impact on the strategic integration of firms in emerging markets. The main regression results (Table 1) show that, after controlling for firm size, leverage, board independence, market volatility, and regulatory quality, VB-ERM adoption is positively associated with the strategic integration index at the 5% significance level (coefficient = 0.352). This indicates that firms adopting VB-ERM exhibit, on average, a strategic integration score 0.352 points higher (on a 0–3 scale) than non- adopters. Robustness checks using an ordered logit model confirm that VB-ERM adoption raises the probability of achieving a moderate- to- high level of strategic integration (index ≥ 2) by 8.5 percentage points. To address potential endogeneity, a Two- Stage Least Squares instrumental- variable approach was employed, using country- level anti- corruption and legal- enforcement scores as instruments. The first- stage regression confirms the strength of the instruments (F- statistic = 29.4), and the second- stage results (Table 2) reveal an even stronger causal effect of VB-ERM on strategic integration (coefficient = 0.602, significant at 1%). This suggests that conventional fixed- effects models may underestimate the true impact due to measurement error. Overall, the findings—robust across linear, non- linear, and instrumental- variable specifications—consistently support the conclusion that VB-ERM adoption meaningfully enhances the strategic alignment of risk management within firms operating in emerging markets.

7. DISCUSSION

This study set out to explore how Value-Based Enterprise Risk Management (VB-ERM) can be effectively integrated into corporate strategy, with a specific focus on firms operating in emerging markets. Through a mixed-methods approach combining quantitative panel data analysis with qualitative case studies, the research offers robust evidence that VB-ERM adoption significantly enhances the strategic alignment of risk management within organizations.

The findings demonstrate that firms leveraging value-oriented metrics—such as EVA and RAROC—are more likely to embed ERM into their long-term strategic planning and performance measurement systems. This relationship remains strong even after accounting for firm size, industry, leverage, and governance factors, and it is particularly pronounced in environments characterized by high volatility and regulatory complexity. Furthermore, qualitative insights reveal that VB-ERM not only improves technical risk capabilities but also catalyzes a shift in organizational culture, governance structures, and interdepartmental coordination. By framing risk as a value-centric

concept, VB-ERM transforms the perception of risk from a constraint into a strategic resource. This supports a growing academic consensus that enterprise risk management, when designed and executed strategically, can be a source of competitive advantage—particularly in the volatile, resource-constrained, and rapidly evolving environments typical of emerging economies. The study contributes to the literature by highlighting the importance of value orientation in advancing ERM maturity and by identifying institutional quality as a key contextual moderator. It also opens several avenues for future research, including longitudinal studies of ERM transformation, sector-specific analyses, and the extension of VB-ERM frameworks to small and medium-sized enterprises.

8. CONCLUSION

Beyond the firm-level implications, the findings of this study carry important policy and institutional relevance. In many emerging markets, regulatory bodies and financial oversight agencies continue to promote ERM adoption primarily from a compliance perspective. However, the evidence presented here suggests that a more value-based policy orientation—one that encourages firms to link risk oversight with performance goals—could yield greater strategic and economic benefits. Encouraging voluntary disclosure of value-based risk metrics, integrating ERM into corporate governance codes, and offering training to boards and executives on strategic risk practices are potential levers for broader systemic impact. In particular, stock exchanges, credit rating agencies, and institutional investors in emerging markets can play a catalytic role by demanding more transparent and strategic ERM practices. The adoption of VB-ERM frameworks can signal not only risk competence but also managerial discipline, thereby enhancing investor confidence and access to capital—critical concerns in less mature financial markets.

Moreover, this research underscores the importance of capacity building within organizations. Successful VB-ERM implementation often requires internal restructuring, cross-functional collaboration, and a shift in mindset at the leadership level. As such, educational institutions, professional associations, and consulting networks have a role to play in developing the technical and strategic capabilities needed to operationalize value-based risk thinking. Finally, the study also speaks to the future of risk governance in a post-crisis world—be it financial crises, pandemics, climate disruptions, or geopolitical shifts. In such contexts, risk is no longer a background variable; it becomes central to corporate resilience and sustainability. VB-ERM offers a practical framework for navigating this complexity by enabling firms to not only manage threats but also seize opportunities in uncertain environments.

This study has investigated how Value-Based Enterprise Risk Management (VB-ERM) contributes to the strategic integration of risk management in firms operating within emerging markets. Drawing on a mixed-methods approach, we found strong empirical evidence that firms adopting VB-ERM—defined using financial value metrics like EVA and RAROC—are significantly more likely to align ERM practices with their long-term strategic goals. This relationship holds even in the face of market volatility, governance limitations, and institutional uncertainty—common features of emerging economies. The results affirm that risk management, when designed with a value orientation, becomes not only a protective mechanism but a source of strategic advantage.

In addition to its statistical findings, the study highlights important organizational and cultural shifts that accompany VB-ERM adoption. Executives reported that integrating value-based metrics into risk discussions fosters better communication across departments, more disciplined resource allocation, and a shift in boardroom dynamics—from risk avoidance to strategic risk-taking. These qualitative insights reinforce the notion that VB-ERM is not simply a technical tool but a managerial mindset—one that enhances performance, accountability, and long-term vision. The study also identifies regulatory quality as a moderating factor, suggesting that policy environments can amplify (or constrain) the effectiveness of VB-ERM frameworks. Looking ahead, this research opens several avenues for future inquiry. Longitudinal studies could trace the evolution of ERM maturity over time, while sector-specific investigations could reveal how value-based frameworks perform across different industries. Further exploration into the applicability of VB-ERM for small and medium-sized enterprises (SMEs), particularly in informal or family-owned business contexts, would also be valuable. Ultimately, as firms continue to face increasingly complex and interconnected risks, the ability to embed value-based thinking into risk governance may become a defining feature of successful, future-ready organizations—especially in the rapidly shifting landscapes of emerging markets. From a policy standpoint, these findings suggest a compelling case for regulatory agencies and market institutions to go beyond minimum compliance requirements and actively incentivize value-based risk disclosure and performance alignment. Rather than mandating generic ERM adoption, emerging market regulators could encourage firms to disclose how risk management supports financial performance and strategic priorities—thereby creating market pressure for deeper integration. International organizations and development banks may also consider incorporating VB-ERM adoption into ESG assessments, funding criteria, or capacity-building programs aimed at strengthening private-sector resilience.

The future-forward approach outlined in my research not only equips businesses to handle current challenges but also prepares them to meet the demands of the future, ensuring that they thrive in a competitive, sustainable, and increasingly regulated world. This is the foundation upon which industries can build a greener, more sustainable future, driving innovation, competitiveness, and environmental responsibility in a harmonious balance.

REFERENCES

[1] Agarwal, R. (2025). Enterprise risk management (ERM) adoption in developing anddeveloped markets: a comparative study. Journal of Accounting& Organizational Change, 21(1), 169–188.

[2] Hidayah, N.,Azhar, Z., Setiany, E., Utami, W., & Tarmidi, D. (2024). Determinants of ERM quality and its impact on companyvalue. Business: Theory

[3] Malik, M., Zaman, M., & Buckby, S. (2020). Enterprise risk managementandfirm performance: Roleofthe riskcommittee. International Reviewof FinancialAnalysis, (2020).

[4] Silva, F., Horvey,W. E., & Ankamah, M. (2024). Enterprise risk management and performance ofSouthAfrican insurers: The moderating roleofcorporate governance. Risk Management.

[5] Resende, C. (2024). Enterprise risk management andfirm performance:The mediating roleofcorporatesocial responsibility inthe EU region. Corporate Social Responsibilityand Environmental Management.

[6] BenAmor, S., Althof, M., & Härdle, W. K. (2021). FRM Financial Risk Meter for Emerging Markets. arXiv.

[7] Zhao, Y., Du, H., Li, Q., Zhuang, F., Liu, J., & Kou, G. (2022). A comprehensive survey on enterprise financial risk analysis from big data perspective. arXiv.

[8] Ginsburg,Z. (2025).2025Trendsfor ERM Leaders. Gartner.

[9] Association Bilan Carbone; ADEME (The French Environment and Energy Management Agency) Réduire Les Émissions de Gaz à Efet de Serre ToutAu Long de La Chaîne de La Valeur de Votre Activité (Reduce Greenhouse Gas Emissions throughout the Value Chain of Your Activity). Available online:https://www.associationbilancarbone.fr/wp-content/uploads/2017/07/guide-pratique-scope-3.pdf (accessed on 12 March 2021).

[10] Robinson, O.; Kemp, S.; Williams, I. Carbon Management at Universities: A Reality Check.J. Clean. Prod. 2015, 106, 109–118.

[11] Arian, H., Moghimi, M., Tabatabaei, E., & Zamani, S. (2020). Encoded Value-at-Risk: A predictive machinefor financial risk management. arXiv.

[12] Mallett, R.K.; Melchiori, K.J.; Strickroth, T. Self-Confrontation via a Carbon Footprint Calculator Increases Guilt and Support for a Proenvironmental Group. Ecopsychology 2013, 5, 9–16.

[13] Mulrow, J.; Machaj, K.; Deanes, J.; Derrible, S.The State of Carbon Footprint Calculators: An Evaluation of Calculator Design and User Interaction Features. Sustain. Prod. Consum. 2019, 18, 33–40.

[14] ADEME (The French Environment and Energy Management Agency) Resource Centre for Greenhouse Gas Accounting. Available online:https://www.bilans-ges.ademe.fr/en/

[15] Pereda, A. I. C. (2025). Risk Measures, Systemic Risk, and Default Cascades in Global Equity Markets:A Gai-KapadiaApproach with Stochastic Simulations.

[16] Beta.gouv.fr Futur.Eco (GitHub Repository). Available online:https://github.com/laem/futureco (accessed on 1 April 2021).

[17] Beta.gouv.fr Mon-Entreprise.Fr (GitHub Repository). Available online:https://github.com/betagouv/mon-entreprise (accessed on 1 April 2021).

[18] Datagir Nosgestesclimat-Site (GitHub Repository). Available online: https://github.com/datagir/nosgestesclimat-site (accessed on 1 April 2021).

[19] Datagir Nosgestesclimat (GitHub Repository). Available online:https://github.com/datagir/nosgestesclimat (accessed on 1 April 2021).

[20] Le, Q., Long, N. N., & Giang, P. (2024). Enterprise risk management and firm performance: Exploring the roles of knowledge, technology, and supply chain. Problems and Perspectives in Management, 22(2), 150–164.