



Factors Influencing Carbon Accounting Adoption: Evidence from Vietnamese Enterprises

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ABSTRACT

Integrating institutional theory and the resource-based view (RBV), this study investigates the concurrent influence of external institutional pressures and internal capabilities on carbon accounting (CARACC) adoption within Vietnam, an emerging market context. We test a model incorporating three institutional pressures (regulatory, stakeholder, and market) and three internal capabilities (leadership commitment, accounting capability, and IT systems), analyzing survey data from 412 Vietnamese enterprises via PLS-SEM. Results reveal that internal capabilities are the predominant drivers of CARACC implementation. Leadership commitment has the biggest effect ($\beta = 0.382, p < 0.001$), followed by IT systems ($\beta = 0.285, p < 0.001$) and accounting capability ($\beta = 0.254, p < 0.001$). While statistically significant, external pressures have a comparatively weaker effect. Crucially, leadership commitment's hypothesized moderating role on the relationship between regulatory pressure and CARACC was unsupported ($\beta = 0.012, p > 0.05$), suggesting adoption remains a passive, compliance-driven response rather than a strategically internalized initiative. This research offers a pioneering integrated framework for CARACC in emerging economies, providing critical insights for managers to prioritize internal capacity-building and for policymakers to design more effective regulatory frameworks to accelerate the green transition.

Keywords: Carbon accounting, Leadership commitment, Accounting capability, Information technology systems.

Introduction

The global climate crisis (Calvin *et al.*, 2023) demands an urgent transition toward a low-carbon circular economy, placing organizations under multidimensional pressures, from international commitments like Vietnam's 2050 net-zero pledge to market mechanisms such as the EU's CBAM. In this context, carbon accounting (CARACC) has evolved from a technical compliance tool into a core strategic governance component for measurement, risk management, and maintaining competitive advantage (Fernandes *et al.*, 2022; AlShammasi *et al.*, 2024; Cantile *et al.*, 2024). Despite this, systematic academic research on CARACC in emerging economies remains scarce. Existing work often focuses on developed economies or general environmental accounting and notably lacks an integrated analytical framework that simultaneously captures the complex interplay between external institutional pressures and the internal, resource-based capabilities of firms. To address this gap, this study proposes and empirically tests an integrated theoretical model based on three primary theoretical pillars: Institutional Theory (elucidating the "why to act" pressures), the Resource-Based View (RBV) (examining the "how to act" capabilities), and Stakeholder Theory (serving as a conduit). The model assesses the concurrent influence of six critical factors on CARACC implementation, comprising three external institutional pressures (regulatory pressure, stakeholder pressure, and market competition) and three internal competencies (leadership commitment, accounting capacity, and information technology systems). Uniquely, this research moves beyond direct effects by testing the moderating role of leadership

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commitment on the relationship between regulatory pressure and CARACC, illuminating the complex interaction between internal will and external pressure. Using survey data from 412 enterprises in Vietnam and PLS-SEM analysis, this study not only contributes to environmental accounting theory in emerging markets but also provides significant governance and policy implications.

Theoretical Foundation

The escalating emission of greenhouse gases, particularly CO₂, is unequivocally identified as the primary driver of global climate change. This reality imposes increasingly urgent demands on businesses from diverse stakeholders for enhanced transparency in emission data and greater accountability in operational practices. Within this context, CARACC systems transcend mere technical tools for measuring and reporting emissions. They emerge as critical strategic frameworks, enabling the integration of emission information into financial accounting systems and facilitating effective participation in both voluntary and mandatory carbon credit markets. This study develops an integrated theoretical framework that integrates three main theoretical pillars in order to clarify the factors that influence the adoption of CARACC and the factors that determine its implementation maturity: institutional theory, which explains why firms must take action; the RBV, which clarifies how and how successfully such actions are carried out; and stakeholder theory, which acts as the transmission mechanism that converts macro-level pressures into particular firm-level demands. This tripartite integration offers a thorough perspective for comprehending how businesses react to and adjust to various constraints, especially in Vietnam's sustainable transition.

The Integrated Theoretical Framework

This research model integrates three theoretical foundations. Institutional Theory (DiMaggio & Powell, 1983) explains why firms adopt carbon accounting (CARACC) to achieve legitimacy, operating through coercive pressures from legal regulations (Delmas & Toffel, 2004), normative pressures from stakeholder expectations (Freeman, 2010; Eccles *et al.*, 2014), and mimetic pressures from emulating competitors (Porter & Linde, 1995; Bansal & Roth, 2000). However, heterogeneous responses to these pressures are more cogently explained by the RBV (Barney, 1991). The RBV clarifies how firms implement CARACC and why effectiveness varies, emphasizing the role of heterogeneous internal resources. These include senior management commitment (Ramus & Steger, 2000; Henri & Journeault, 2010), the professional competence of the accounting department (Burritt *et al.*, 2011; Lodhia, 2015), and advanced information technology infrastructure (Melville, 2010; Chen *et al.*, 2012). Finally, Stakeholder Theory (Freeman, 2010) serves as a bridge, crystallizing abstract normative pressures into tangible demands from key groups. CARACC thus becomes a strategic mechanism for managing these relationships and enhancing reputation (Fombrun & Shanley, 1990; Orlitzky *et al.*, 2003). By integrating these three theories, our model explains the process through which external pressures are processed by differentiated internal capabilities, leading to varying levels of CARACC adoption.



Research Hypotheses and Conceptual Model

Research Hypothesis

Building on the theoretical framework presented earlier, this research introduces a series of hypotheses aimed at empirically examining the connections between the various factors and the degree of carbon accounting implementation in businesses.

Direct Impact Hypothesis

Based on institutional theory (DiMaggio & Powell, 1983), organizations face pressures to conform to institutional expectations to achieve and maintain legitimacy. Among these, coercive mechanisms are most clearly manifested through regulatory requirements in environmental governance (Duraimurugan *et al.*, 2022; Kinareikina & Silivanova, 2023; Omokunle, 2024). This multifaceted pressure impacts corporate behavior via four interrelated mechanisms. The increasing stringency of legal frameworks (Delmas & Toffel, 2004) compels firms to adopt carbon measurement and reporting systems as a mandatory compliance action (Jensen *et al.*, 2022; Wei *et al.*, 2023; Cunha *et al.*, 2024). The success of regulations hinges on effective monitoring mechanisms (Short & Toffel, 2010), which convert symbolic self-regulation into obligatory practices, necessitating formal and reliable carbon accounting (CARACC) systems.

Firms also proactively anticipate future carbon policies (Kolk & Pinkse, 2005), rendering CARACC a strategic tool for managing regulatory risk. Finally, the financial implications of compliance, including technology investments and carbon credits (Christmann & Taylor, 2001), impose economic pressures that require precise accounting systems for resource optimization. The intersection of these four factors constitutes a robust coercive force, making CARACC adoption essential. Therefore, we propose Hypothesis H1: Regulatory pressure positively influences the adoption of carbon accounting in enterprises.

Beyond coercive pressures, organizational legitimacy (DiMaggio & Powell, 1983) is also shaped by normative and mimetic pressures emerging from a network of stakeholders. Stakeholder pressure signifies a convergence of diverse demands. Externally, investors drive transparency through responsible investment (Eccles *et al.*, 2014); concurrently, global consumers and supply chain partners exert significant market pressure, demanding adherence to green standards (Darnall *et al.*, 2010). Internally, employees increasingly value sustainability, making progressive environmental policies a strategy for talent attraction (Renwick *et al.*, 2013). Local communities and NGOs also play a monitoring role, influencing corporate reputation (Henriques & Sadorsky, 1999). To navigate this complex web, CARACC emerges as a vital tool for ensuring transparency, managing risk, and meeting diverse expectations. Thus, Hypothesis H2 is proposed: Stakeholder pressure positively influences the adoption of carbon accounting practices in businesses. In a fluctuating institutional landscape, mimetic mechanisms (DiMaggio & Powell, 1983) compel firms to adapt to competitive dynamics to preserve legitimacy. When faced with uncertainty regarding the benefits and implementation strategies of CARACC, a relatively nascent field in Vietnam, mimetic pressure becomes critical. As pioneering firms successfully adopt CARACC, they establish a new standard for others to emulate (Kolk & Pinkse, 2005). Furthermore, from the perspective of Porter and Linde (1995), environmental pressures can foster innovation and sustainable competitive advantages. CARACC adoption is not merely defensive but a strategic initiative to capture market opportunities, such as demand for low-carbon products (Ambec *et al.*, 2013), technological improvements (Hart, 1995), enhanced reputation (Orlitzky *et al.*, 2003), and cost reductions (King & Lenox, 2001). Consequently, we propose Hypothesis H3: Market trends and competitive pressures positively influence the adoption of carbon accounting in Vietnamese enterprises.

While institutional theory explains why a firm might adopt CARACC, it does not sufficiently clarify how or if it can be successfully executed. The ability to respond to external demands fundamentally depends on internal resources and capabilities. The RBV (Barney, 1991) posits that sustainable competitive advantage stems from resources that are valuable, rare, inimitable, and non-substitutable. In CARACC implementation, senior leadership commitment emerges as a strategic intangible resource. This resource is valuable as it directs the organization, overcomes internal resistance, and allocates resources effectively toward environmental goals (Wijethilake, 2017). This commitment is difficult to imitate, as it is tied to personal values and specific cultural contexts. Foundational studies consistently affirm the essential role of management support for environmental initiatives (Berry & Rondinelli, 1998; Egri & Herman, 2000; Ramus & Steger, 2000; Daily & Huang, 2001; Henri & Journeault, 2010). We therefore propose Hypothesis H4: Senior leadership commitment positively impacts the implementation of carbon accounting in Vietnamese enterprises.

From the RBV perspective (Barney, 1991), specialized accounting capability (ACCAPA) acts as the essential technical foundation for CARACC. This capability transcends routine operations, requiring complex skills in emissions measurement, carbon credit valuation, and the integration of non-financial data into reporting systems (Burritt *et al.*, 2011; Schaltegger & Csutora, 2012). This capability is supported by knowledge of environmental accounting standards (Ferreira *et al.*, 2010), institutionalized through internal processes (Schaltegger *et al.*, 2006), and maintained by consistent training (Lodhia, 2015). Its strategic value lies in transforming carbon data into actionable insights through integration with financial reporting (Gale, 2006) and effective interdepartmental coordination to ensure data integrity (Jasch, 2003; Qian *et al.*, 2011). The absence of any component jeopardizes implementation efforts (Ferreira *et al.*, 2010). Thus, Hypothesis H5 is introduced: Accounting capability (ACCAPA) positively influences the implementation of CARACC.

Concurrently, CARACC implementation requires processing vast, diverse data sets (e.g., energy invoices, production logs, shipping records). Consequently, information technology (IT) capability is a core competency. The role of IT in generating business value (Melville, 2010) and "Green IT" (Dao *et al.*, 2011) highlights its importance. CARACC



necessitates a robust IT infrastructure to automate data collection, reducing human error. The integration of carbon data into existing systems or specialized software is essential for reliable emissions information (Teuteberg & Marx-Gómez, 2010; Lodhia, 2015). IT systems' analytical and simulation functions also enable forecasting of emission reduction scenarios (Chen *et al.*, 2012). Without sufficient IT capability, CARACC implementation will be fragmented, costly, and inaccurate. We thus propose Hypothesis H6: Information technology system capability positively influences the implementation of carbon accounting in Vietnamese enterprises.

Moderating Hypothesis (The Transformative Mechanism of the Dynamic Capability of Leadership Commitment)

Beyond direct effects, external and internal factors often interact. Drawing on Dynamic Capabilities Theory (Teece, 2007), organizational capability manifests in the ability to sense opportunities and threats, seize those opportunities, and reconfigure resources. In this model, leadership commitment is not merely a static resource (as in H4) but a dynamic capability. Highly committed leaders possess a superior ability to sense the strategic importance of carbon regulations, seize opportunities for action, and reconfigure resources (e.g., accounting personnel, IT) to build superior CARACC systems, moving beyond minimal compliance. In other words, leadership commitment may amplify the positive impact of regulatory pressure. This leads to our moderating hypothesis, H7: Leadership commitment plays a positive moderating role, amplifying the influence of regulatory pressure on the extent of CARACC implementation. Testing H7 is crucial in Vietnam, where a nascent institutional environment might only create a minimal "compliance floor" effect. The research model, integrating seven hypotheses, presents a framework combining institutional theory and the RBV, consistent with Hart's (1995) arguments and the meta-analytic findings of Orlitzky *et al.* (2003).

Measurement Scales and Research Model

Drawing on core theoretical frameworks such as stakeholder theory, institutional theory, and RBV, as well as previous empirical research, this study presents the following theoretical model of the factors influencing corporate carbon accounting procedures (**Figure 1**).

The dependent variable is CARACC, which reflects the extent to which an organization formally and comprehensively implements carbon information processes. This construct is measured through five specifically developed indicators. The items are based on core guidelines from the GHG Protocol and ISO 14064-1:2018 and refined with insights from Kolk *et al.* (2008), Schaltegger and Csutora (2012), Luo and Tang (2014), Simnett *et al.* (2009), Peters and Romi (2014), Burritt *et al.* (2011), and Larrinaga-Gonzalez and Bebbington (2001). This scale encompasses quantification, reporting, assurance, and system integration. The model includes six independent variables.

First, LEADCM measures top management's demonstrated dedication to carbon management. Its four indicators are adapted from Ramus and Steger (2000), Egri and Herman (2000), Daily and Huang (2001), Wijethilake (2017), Henri and Journeault (2010), and Berry and Rondinelli (1998). Second, ACCAPA reflects departmental capabilities. Its five-item scale is modified from Ferreira *et al.* (2010), Burritt *et al.* (2011), Schaltegger *et al.* (2006), Lodhia (2015), Gale (2006), Jasch (2003), and Qian *et al.* (2011). Third, ITSYS is evaluated based on research by Melville (2010), Dao *et al.* (2011), Fettke and Loos (2003), Teuteberg and Marx-Gómez (2010), and Chen *et al.* (2012). Fourth, REGPR gauges the influence of environmental policies, with indicators derived from Delmas and Toffel (2004), Short and Toffel (2010), Kolk and Pinkse (2005), and Christmann and Taylor (2001). Fifth, STKPR captures external expectations based on the work of Eccles *et al.* (2014), Darnall *et al.* (2010), Renwick *et al.* (2013), and Henriques and Sadorsky (1999). Finally, MARCMP represents competitive forces. Its indicators are synthesized from Porter and Linde (1995), Ambec *et al.* (2013), Bansal and Roth (2000), Hart (1995), Orlitzky *et al.* (2003), King and Lenox (2001), Russo and Fouts (1997), and Lee *et al.* (2016).

All indicators across these constructs are measured using a five-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").



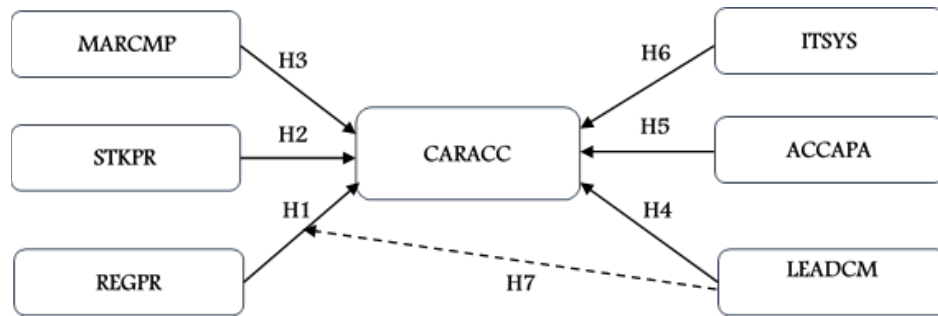


Figure 1. Proposed model and hypotheses

Materials and Methods

This study employs a quantitative approach, utilizing Structural Equation Modeling (SEM) to test the proposed hypotheses. Specifically, Partial Least Squares Structural Equation Modeling (PLS-SEM) was selected as the primary analytical tool. This method is particularly suited to the research objectives for two key reasons: (1) PLS-SEM performs effectively with data that does not assume multivariate normality, a characteristic common in social science survey data, and (2) it is capable of handling complex models with numerous latent and observed variables, optimizing for prediction and explanation of the dependent variable's variance—characteristics fully compatible with the study's integrated theoretical framework.

Data Collection Procedure and Sampling

A quantitative questionnaire survey using a multi-stage sampling technique was used to gather primary data from businesses in Vietnam. First, we stratified the sample according to size (big, medium, and small) and industries that were strongly linked to carbon emissions, such as energy and manufacturing. A combined purposive and convenience non-probability sampling technique was used because it was difficult to get an extensive sampling frame. Chief Executive Officers, Chief Financial Officers, or Chief Accountants were the target audience for the questionnaire, which was disseminated online and via business association networks. The minimum necessary sample size, according to the formula (Cochran, 1977), was 384 (95% confidence level, 5% margin of error). 442 responses in all were collected; 412 valid replies (a 93% rate) were kept for the final analysis (N=412) following screening.

Table 1. Demographic characteristics of respondents (N=412)

Demographics	Percentage (%)	Demographics	Percentage (%)
Position		Business Sector	
Chief Executive Officer	42.5	Industrial Production	25.0
Chief Accountant	57.5	Energy	15.2
Work Experience		Construction & Building Materials	16.0
< 5 years	22.1	Transportation & Logistics	14.8
5 – < 10 years	43.2	Agriculture & Food	10.0
≥ 10 years	34.7	Service & Commerce	4.9
Enterprise Size		Finance	5.1
Small (10 – <50 employees)	22.9	Information Technology	5.1
Medium (50 – <250 employees)	35.4	Other	3.9
Large (≥250 employees)	41.7		

Source: Author synthesis

Measurement Instrument and Quality Assurance

The questionnaire was developed by adapting and refining measurement scales previously validated and published in reputable studies. All variables were measured using 5-point Likert scales, ranging from 1 (Strongly Disagree) to 5

(Strongly Agree). For instance, the accounting capacity scale drew upon Burritt *et al.* (2011), the IT role scale referenced Melville (2010), and institutional pressure items were adapted from Delmas and Toffel (2004).

To ensure the instrument's validity and reliability within the Vietnamese context, a rigorous calibration procedure was executed: (1) Expert calibration: The draft questionnaire underwent three rounds of focus group discussions with academic experts in environmental accounting and senior managers to refine item wording and ensure practical relevance. (2) Pilot testing: A pilot study was conducted with a small sample of 30 firms to assess item clarity and evaluate the preliminary internal reliability of the scales. All scales achieved Cronbach's Alpha values exceeding 0.7 prior to the main survey deployment, indicating acceptable initial reliability.

Data Analysis Technique

Data analysis was conducted using SmartPLS software, strictly adhering to the PLS-SEM analytical procedure outlined by Hair *et al.* (2019). This procedure comprised three stages. First, to address the potential for Common Method Bias (CMB) arising from single-source data collection, we applied the Full Collinearity Variance Inflation Factor (VIF) approach proposed by Kock (2015). The results confirmed all VIF values were below the 3.3 threshold, indicating the data was not significantly influenced by CMB. Subsequently, the outer measurement model was evaluated for quality. We assessed internal consistency reliability (Cronbach's Alpha), composite reliability (CR), convergent validity (AVE), and discriminant validity (using the HTMT criterion). All metrics met the recommended thresholds set by Hair *et al.* (2019), ensuring the constructs possessed high reliability and validity. Finally, the inner structural model was assessed to examine the hypothesized relationships. Key metrics employed included path coefficients (β), p-values to test statistical significance, and the coefficient of determination (R^2) to evaluate the model's explanatory power. This methodology ensures the reliability of the results and permits robust testing of the interplay between institutional pressures and internal capabilities within the Vietnamese context.

Results and Discussion

The study employed PLS-SEM using SmartPLS software to examine the relationships between institutional factors, internal capabilities, and CARACC implementation. Results are presented in the following sequence: Common Method Bias (CMB) assessment, Measurement Model Evaluation, Structural Model Assessment, and Moderation Effect Testing.

Common Method Bias Assessment

To address potential common method bias (CMB) stemming from the single-source data collection, a full collinearity assessment was conducted using the VIF, a robust diagnostic technique. According to the conservative threshold recommended by Hair *et al.* (2019), VIF values below 3.3 suggest that CMB is not a major concern. The empirical results (**Table 2**) revealed that all VIF values at both the indicator level (outer VIFs) and the latent construct level (inner VIFs) were substantially below this threshold, with the highest recorded values being 2.311 and 1.031, respectively. Therefore, it can be confidently concluded that multicollinearity is not an issue within the model and that common method bias does not threaten the validity of the tested relationships, thereby reinforcing the reliability of the study's findings.

Table 2. Full Collinearity VIFs for Constructs and Indicators

Latent Construct (Indicators)	Outer VIF Range	Inner VIF
ACCAPA (ACCAPA1–ACCAPA5)	1.775 – 2.094	1.018
CARACC (CARACCI–CARACC5)	1.475 – 1.681	–
ITSYS (ITSYS1–ITSYS4)	1.939 – 2.077	1.020
LEADCM (LEADCM1–LEADCM4)	1.950 – 2.043	1.025



MARCMP (MARCMP1–MARCMP5)	1.963 – 2.311	1.017
Moderating Effect (REGPR*LEADCM)	1.000	1.007
REGPR (REGPR1–REGPR4)	1.822 – 1.983	1.031
STKPR (STKPR1–STKPR4)	1.890 – 2.186	1.016

Source: PLS-SEM Analysis (SmartPLS)

Measurement Model Evaluation

To assess the reliability and convergent validity of the scales, the study utilized Cronbach's Alpha, CR, and AVE. According to Hair *et al.* (2019), Cronbach's Alpha and CR values above 0.7 reflect scale reliability, while an AVE above 0.5 indicates that the observed variables adequately explain the variance of the latent concept. The analysis results show that all constructs met the requirements: Cronbach's Alpha ranged from 0.817 to 0.883, CR from 0.872 to 0.914, rho_A from 0.824 to 0.957, and AVE from 0.577 to 0.704. This demonstrates that the scales possess high internal reliability and good convergent validity.

Additionally, to examine discriminant validity, the study used the Heterotrait-Monotrait Ratio (HTMT) index. The results show that the HTMT values (with the highest value being 0.484) were all lower than the 0.85 threshold (Henseler *et al.*, 2015), thereby confirming that the latent variables in the model are clearly distinct from one another. This result indicates that the measurement model ensures both internal consistency and validity, serving as an important foundation for proceeding with the structural model analysis.

Table 3. Reliability and Validity of Constructs

Construct	Cronbach's Alpha	rho_A	Composite Reliability (CR)	AVE	Highest HTMT Value
ACCAPA	0.865	0.875	0.902	0.648	0.342 (with CARACC)
CARACC	0.817	0.824	0.872	0.577	0.484 (with LEADCM)
ITSYS	0.859	0.868	0.904	0.702	0.389 (with CARACC)
LEADCM	0.860	0.870	0.905	0.704	0.484 (with CARACC)
MARCMP	0.883	0.900	0.914	0.679	0.147 (with CARACC)
REGPR	0.842	0.885	0.891	0.672	0.282 (with CARACC)
STKPR	0.862	0.957	0.903	0.700	0.122 (with CARACC)

Source: PLS-SEM Analysis (SmartPLS)

Structural Model Evaluation and Hypothesis Testing

The findings from the evaluation of the structural model (**Table 4**) reveal a coefficient of determination of $R^2 = 0.419$ (adjusted $R^2 = 0.409$), which suggests a moderate-to-strong explanatory capability as per Cohen's (2013) categorization. This indicates that around 41.9% of the variability in the degree of carbon accounting implementation can be accounted for by the variables incorporated in the model.

The results of the PLS-SEM structural equation model analysis are presented in **Figure 2**:

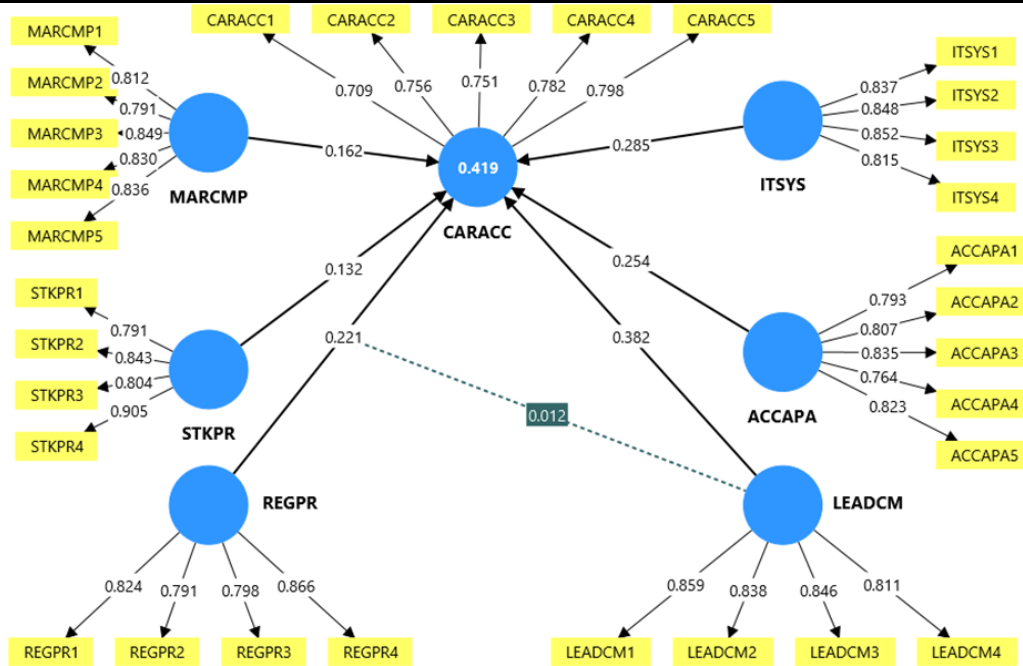


Figure 2. The results of the PLS-SEM structural equation model analysis

The findings from the relationship analysis between the variables, as illustrated in **Table 4**, demonstrate that all six independent factors exert a positive and statistically significant influence on CARACC. Notably, leadership commitment (LEADCM) displays the most substantial effect on CARACC, with a coefficient of $\beta = 0.382$, $t = 9.822$, and $p < 0.001$, underscoring the pivotal role of top management in advancing carbon accounting. Furthermore, information technology systems (ITSYS) also reveal a significant impact ($\beta = 0.285$, $t = 7.884$, $p < 0.001$), affirming that the modernization and integration of IT systems are essential for the comprehensive implementation of carbon credit recording and reporting processes. Subsequently, the ACCAPA exerts a favorable influence on CARACC, with a coefficient of $\beta = 0.254$, $t = 6.324$, and $p < 0.001$. This indicates that the technical proficiency and organizational robustness of the accounting department are crucial prerequisites for the successful implementation of carbon accounting.

Among the institutional factors, REGPR is also validated as a significant catalyst ($\beta = 0.221$, $t = 6.018$, $p < 0.001$), demonstrating that environmental regulations and policies are providing a distinct impetus for businesses to embrace carbon accounting practices. In addition, external environmental factors such as MARCMP and STKPR, while exhibiting lesser impacts, remain statistically significant ($\beta = 0.162$ and 0.132 , respectively, $p < 0.001$). This suggests that market-driven incentives in Vietnam are still in the nascent stages of development.

Table 4. Results of the Structural Model and Hypothesis Testing

Relationship	Path Coefficient (β)	Standard Error (SE)	t-value	p-value	Conclusion
LEADCM \rightarrow CARACC	0.382	0.039	9.822	0.000	Accepted
ITSYS \rightarrow CARACC	0.285	0.036	7.884	0.000	Accepted
ACCAPA \rightarrow CARACC	0.254	0.040	6.324	0.000	Accepted
REGPR \rightarrow CARACC	0.221	0.037	6.018	0.000	Accepted
MARCMP \rightarrow CARACC	0.162	0.039	4.116	0.000	Accepted
STKPR \rightarrow CARACC	0.132	0.040	3.277	0.001	Accepted
REGPR \times LEADCM \rightarrow CARACC	0.012	0.040	0.292	0.770	Rejected

Model Fit Indices:

- R^2 (CARACC) = 0.419
- Adjusted R^2 (CARACC) = 0.409

Source: PLS-SEM Analysis (SmartPLS)



The model evaluation results indicate that internal organizational elements such as leadership commitment, accounting capacity, and information technology systems have a significant and direct impact on the level of carbon accounting implementation. External influences, such as regulatory restraints, market competition, and stakeholder pressure, serve as both motivators and supporters. These findings provide solid empirical evidence supporting the research hypotheses and strategic suggestions for businesses looking to strengthen and optimize their carbon accounting systems in a formal, integrated, and compliant manner.

The results show that the interaction impact between REGPR and LEADCM on CARACC is not statistically significant ($\beta = 0.012$, $p = 0.770$) with respect to the moderating role (Hypothesis H7). Consequently, it can be said that LEADCM does not significantly moderate the link between REGPR and CARACC, and Hypothesis H7 is unsupported. This implies that while leadership commitment has a significant direct impact on CARACC, regulatory pressure still has a significant impact on carbon accounting practices.

Model Predictive Power and Assessment

This study employed the PLS predict technique to assess the model's accuracy and reliability in forecasting new observations. **Table 5** summarizes the key predictive metrics, offering a comprehensive view of the model's capability to predict the dependent variable CARACC.

Table 5. Model Predictive Power Assessment Results

Indicator	Value
Q ² _predict	0.387
RMSE	0.787
MAE	0.629

Source: PLS-SEM Analysis (SmartPLS)

The results in **Table 5** show a Q²_predict value of 0.387. This value substantially exceeds zero (Shmueli *et al.*, 2019), indicating the research model possesses a moderate degree of predictive power. This finding is significant given the complex nature of organizational behavior. It confirms that the integrated set of institutional factors and internal capabilities does more than explain sample data. The model can genuinely predict carbon accounting adoption trends in enterprises outside the study sample. Furthermore, analyzing the two error metrics, RMSE and MAE, reveals a manageable discrepancy. The mean absolute error, 0.629, is lower than the root mean square error, 0.787. This difference suggests that the distribution of prediction errors is relatively uniform. The errors are not significantly skewed by a small number of severe prediction outliers. This stability further reinforces the reliability of the forecasts generated by the model. Therefore, we conclude that the proposed model holds not only explanatory value but also practical predictive capacity. It serves as a valuable tool for managers and policymakers to quantify and anticipate future levels of carbon accounting application.

Discussion and Managerial Implications

Discussion of Key Findings

The results show that REGPR is a significant predictor of CARACC adoption, supporting hypothesis H1 ($\beta = 0.221$, $p < 0.001$). This finding, which highlights the crucial role that legal frameworks play in influencing corporate environmental conduct, is very congruent with institutional theory, especially the idea of coercive mechanisms (DiMaggio & Powell, 1983). Four mechanisms interact to create regulatory pressure in the Vietnamese context: the tightening of current regulations (Delmas & Toffel, 2004); the reinforcing effect of visible monitoring (Short & Toffel, 2010); strategic actions anticipating future carbon policies (Kolk & Pinkse, 2005); and the financial strain from financial compliance obligations (Christmann & Taylor, 2001). This conclusion is especially important because the Vietnamese government is aggressively creating a legal framework for greenhouse gas emissions and a market for carbon credits, changing the function of legislation from advisory to direct catalyst, and requiring more rigorous accounting standards.

Empirical analysis also supports hypothesis H2 ($\beta = 0.132$, $p = 0.001$), demonstrating that STKPR exerts a positive and statistically significant impact on CARACC, albeit its effect is more modest compared to other factors. This result underscores the importance of normative and non-governmental coercive institutional mechanisms. However, the relatively small effect size provides a nuanced understanding of the Vietnamese context, suggesting an initial yet incomplete consensus among stakeholders. This momentum encompasses diverse demands: international investors require climate risk information (Eccles *et al.*, 2014); supply chain customers, especially FDI enterprises, demand emissions transparency (Darnall *et al.*, 2010); employees increasingly expect sustainability commitments (Renwick *et al.*, 2013); and community scrutiny persists (Henriques & Sadorsky, 1999). The limited influence suggests these pressures in Vietnam have not fully matured. While pressure from international investors and export-oriented supply chains is evident, the impact from the domestic consumer market and local investors' remains fragmented.

The findings also confirm hypothesis H3 ($\beta = 0.162$, $p < 0.001$), affirming that MARCMP is a significant driver for CARACC implementation. This conclusion offers substantial empirical evidence for the mimetic mechanism (DiMaggio & Powell, 1983), which is particularly relevant as CARACC remains a new and uncertain domain. When leading competitors adopt it successfully, they create a benchmark that other firms emulate to mitigate risk (Kolk & Pinkse, 2005). Furthermore, the result aligns with the Porter hypothesis (Porter & Linde, 1995), as firms view CARACC not just as compliance but as a proactive approach to capitalize on market opportunities. Specifically, competition drives firms to meet the demand for low-carbon products (Ambec *et al.*, 2013) while seeking advantages through technological innovation (Hart, 1995), enhanced brand image (Orlitzky *et al.*, 2003), and long-term cost savings (King & Lenox, 2001).

According to the empirical analysis, hypothesis H4 receives the strongest support, as LEADCM demonstrates the largest positive and statistically significant effect on CARACC implementation ($\beta = 0.382$, $p < 0.001$). This result robustly reinforces the RBV (Barney, 1991), confirming leadership commitment as an intangible, rare, inimitable, and non-substitutable endogenous resource. It provides strategic value by directing the organization and efficiently allocating tangible resources (Wijethilake, 2017). This finding aligns with classic studies highlighting the essential role of management in environmental initiatives (Egri & Herman, 2000; Ramus & Steger, 2000; Daily & Huang, 2001). In the Vietnamese context, especially for small and medium-sized enterprises facing resource constraints, leadership functions as the essential driving force translating carbon-related risks or opportunities into tangible strategic action (Berry & Rondinelli, 1998; Henri & Journeault, 2010).

The analysis also provides robust support for hypothesis H5 ($\beta = 0.254$, $p < 0.001$), as ACCAPA shows a positive and significant effect on CARACC execution. This outcome reinforces RBV principles (Barney, 1991) and addresses the research gap identified by Ferreira *et al.* (2010), shifting from recognizing "capacity deficit" as a barrier to quantifying "capacity presence" as a driver. This capability embodies strategic value through the ability to meet complex technical demands (Burritt *et al.*, 2011; Schaltegger & Csutora, 2012), understand standards (Ferreira *et al.*, 2010), institutionalize carbon data (Schaltegger *et al.*, 2006), maintain consistent training (Lodhia, 2015), and ensure effective interdepartmental coordination (Jasch, 2003; Qian *et al.*, 2011).

Similarly, hypothesis H6 is robustly validated ($\beta = 0.285$, $p < 0.001$), showing that ITSYS capability has a significant positive impact on CARACC. This result offers compelling empirical support for the assertion that IT is a critical technical foundation for modern environmental management (Melville, 2010; Dao *et al.*, 2011). This significant influence underscores CARACC's dependence on specialized IT capabilities for data automation, seamless integration into enterprise systems (Teuteberg & Marx-Gómez, 2010; Lodhia, 2015), and the analytical capacity to convert raw data into strategic insights (Chen *et al.*, 2012).

Finally, the moderating hypothesis (H7), regarding the ability of LEADCM to strengthen the REGPR-CARACC relationship, was found to be statistically insignificant. This finding, while contradicting expectations from dynamic capability theory (Teece, 2007), provides two important insights. First, a minimal compliance mechanism exists within a developing regulatory framework. In Vietnam, emissions regulations are still formative. Consequently, legal pressure acts as a universal mandatory driver, compelling basic actions regardless of leadership vision. Second, it reinforces the view that leadership commitment and regulatory pressure may function as substitutes rather than complements. When legal pressure is weak, intrinsic leadership dedication is the sole motivator for pioneers. Conversely, strong regulations compel all firms to comply, rendering the moderating role of leadership negligible.



This perspective aligns with research in emerging economies (Wijethilake, 2017). Therefore, the rejection of H7 offers a practical and complex understanding of the interplay between internal and external resources in emerging markets.

Research Implications

The findings of this study hold significance beyond Vietnam, offering profound theoretical, managerial, and policy implications. Theoretically, this research enriches the dialogue between the RBV and institutional theory through two primary contributions. First, it elucidates the hierarchy of factors affecting carbon accounting in an emerging economy. Empirical data indicate that internal, resource-based elements, particularly leadership commitment ($\beta = 0.382$) and IT systems ($\beta = 0.285$), exert a more significant impact than external institutional pressures such as legal regulations ($\beta = 0.221$). This suggests that in nations with developing legal structures, the inherent capacity and willingness of firms play a pivotal, not merely supportive, role. Second, the research presents empirical evidence of the independent influence of leadership commitment, questioning its presumed moderating function. Test results show that leadership commitment does not amplify the effect of legal pressure on CARACC implementation ($\beta = 0.012$, $p > 0.05$). This finding implies that in contexts of passive compliance, leadership commitment may act as a substitute rather than a complement to formal institutional forces; firms are motivated either by dedicated leadership or by regulatory requirements, but not by a combination of both. For managers, this study offers clear strategic guidance: firms must prioritize investments in leadership and IT infrastructure as the two critical pillars for success. Concurrently, building specialized accounting capacity is urgently needed, as this constitutes the primary barrier to translating commitment into practice, while proactively managing external pressures can transform them into competitive advantages (Coppol *et al.*, 2022; Spirito *et al.*, 2022; Prada *et al.*, 2024). Finally, for policymakers, this study provides an empirical basis for enhancing policy effectiveness. Regulatory pressure is confirmed as a significant driver ($\beta = 0.221$); therefore, regulatory bodies must continue to refine and rigorously enforce GHG reporting regulations. In the current phase, mandatory policies with clear sanctions will be most effective in raising the overall "compliance floor." In parallel, the government should develop capacity-building support programs, particularly for small and medium-sized enterprises, to help them overcome resource limitations in accounting and IT.

Limitations and Future Research Directions

This study acknowledges several inherent limitations. The geographical scope was confined to Vietnam, which limits the contextual generalizability of the findings. Furthermore, the cross-sectional design precludes conclusive causal inference, and the reliance on self-reported data introduces potential subjective or social desirability biases. The research also did not sufficiently account for firm heterogeneity, such as differences in ownership (state-owned, private, FDI) or scale, and may have omitted other potential variables, such as industry-specific characteristics or organizational culture elements. Future research should, therefore, expand to diverse national contexts to test the model's robustness. Longitudinal studies are necessary to monitor the evolution of CARACC adoption as the carbon market matures and to clarify causal relationships. Qualitative methods, such as case studies, would be valuable for deeply exploring the reasons underlying the absence of the moderation effect. Subsequent research should also examine more intricate models, including the mediating role of organizational culture or the moderating impact of absorptive capacity, and conduct multi-group analyses to address heterogeneity among firm types.

Conclusion

This study illuminates the factors influencing the adoption of carbon accounting in Vietnam, drawing upon Institutional Theory, the RBV, and Stakeholder Theory. PLS-SEM analysis confirms the model's suitability, revealing that endogenous factors such as leadership commitment and advanced information technology systems exert a strong direct influence on implementation. Concurrently, external institutional pressures, including REGP and STKPR, also play a significant role. Crucially, the study revealed an independent, rather than interactive, influence between leadership commitment and regulatory pressure. This finding provides critical insight into the reality of carbon governance in Vietnam, suggesting the necessity of concerted efforts from both firms and the state to build a sustainable carbon ecosystem.



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References

- AlShammasi, H., Alkhalidi, G., Alharbi, L., & Alyami, M. (2024). Shifts in parental perception of pediatric patients needing dental rehabilitation under general anesthesia post-pandemic. *Turkish Journal of Public Health Dentistry*, 4(1), 29–35. doi:10.51847/jAv4cm0TTn
- Ambec, S., Cohen, M. A., Elgie, S., & Lanoie, P. (2013). The Porter hypothesis at 20: Can environmental regulation enhance innovation and competitiveness? *Review of Environmental Economics and Policy*. doi:10.1093/reep/res016
- Bansal, P., & Roth, K. (2000). Why companies go green: a model of ecological responsiveness. *Academy of Management Journal*, 43(4), 717–736. doi:10.2307/1556363
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. doi:10.1177/014920639101700108
- Berry, M. A., & Rondinelli, D. A. (1998). Proactive corporate environmental management: a new industrial revolution. *Academy of Management Perspectives*, 12(2), 38–50. doi:10.5465/ame.1998.650515
- Burritt, R. L., Schaltegger, S., & Zvezdov, D. (2011). Carbon management accounting: explaining practice in leading German companies. *Australian Accounting Review*, 21(1), 80–98. doi:10.1111/j.1835-2561.2010.00121.x
- Calvin, K., Dasgupta, D., Krinner, G., Mukherji, A., Thorne, P. W., Trisos, C., Romero, J., Aldunce, P., Barrett, K., & Blanco, G. (Eds.). (2023). *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Intergovernmental Panel on Climate Change (IPCC). <https://www.ipcc.ch/report/ar6/syr/>
- Cantile, T., Lombardi, S., Quaraniello, M., Riccitiello, F., Leuci, S., & Riccitiello, A. (2024). Investigating parental approaches to handling dental injuries in children. *Turkish Journal of Public Health Dentistry*, 4(2), 6–11. doi:10.51847/UISoCgkNTZ
- Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: from big data to big impact. *Management Information Systems Quarterly*, 1165–1188. doi:10.2307/41703503
- Christmann, P., & Taylor, G. (2001). Globalization and the environment: determinants of firm self-regulation in China. *Journal of International Business Studies*, 32(3), 439–458. doi:10.2139/ssrn.277452
- Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences* (2nd, revised ed.). Routledge. doi:10.4324/9780203771587
- Coppol, R., Cantile, T., Fiore, A. D., & Prisa, D. (2022). Interprofessional management of necrotizing periodontitis in an elderly patient requiring nursing care: a case report. *Asian Journal of Periodontology and Orthodontics*, 2, 106–112. doi:10.51847/7HotgYQTcU
- Cunha, R., Moreira, T., & Miranda, G. (2024). Systematic review of risk factors for spontaneous atrial fibrillation in dogs: Insights from 2.36 million cases. *International Journal of Veterinary Research and Allied Sciences*, 4(1), 105–118. doi:10.51847/opx03ns8F8
- Daily, B. F., & Huang, S. C. (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations & Production Management*, 21(12), 1539–1552. doi:10.1108/01443570110410892
- Dao, V., Langella, I., & Carbo, J. (2011). From green to sustainability: Information technology and an integrated sustainability framework. *The Journal of Strategic Information Systems*, 20(1), 63–79. doi:10.1016/j.jsis.2011.01.002



- Darnall, N., Henriques, I., & Sadowsky, P. (2010). Adopting proactive environmental strategy: the influence of stakeholders and firm size. *Journal of Management Studies*, 47(6), 1072–1094. doi:10.1111/j.1467-6486.2009.00873.x
- Delmas, M., & Toffel, M. W. (2004). Stakeholders and environmental management practices: an institutional framework. *Business Strategy and the Environment*, 13(4), 209–222. doi:10.1002/bse.409
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160. doi:10.1016/s0742-3322(00)17011-1
- Duraimurugan, V., Paramanandham, J., Jayakumar, S., Krishnappa, K., & Nivetha, N. (2022). Ecological characteristics of tree-holes and insect larval diversity in tree-hole water in Mayiladuthurai Taluk. *Entomology Letters*, 2(1), 37–42. doi:10.51847/7aUDVhAJ9D
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857. doi:10.1287/mnsc.2014.1984
- Egri, C. P., & Herman, S. (2000). Leadership in the North American environmental sector: Values, leadership styles, and contexts of environmental leaders and their organizations. *Academy of Management Journal*, 43(4), 571–604.
- Fernandes, A. L., Malik, J. B., Ansari, S. R., Murali, S., & Thirupathii, J. (2022). Saudi dentists' knowledge and approaches to managing tooth wear: A cross-sectional survey-based analysis. *Turkish Journal of Public Health Dentistry*, 2(2), 1–12. doi:10.51847/p7ulFD4XZm
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge University Press. doi:10.1017/cbo9781139192675
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986–1014. doi:10.2307/258963
- Henri, J.-F., & Journeault, M. (2010). Eco-control: The influence of management control systems on environmental and economic performance. *Accounting, Organizations and Society*, 35(1), 63–80. doi:10.1016/j.aos.2009.02.001
- Jensen, M., Nielsen, E., & Hansen, L. (2022). Domestication and divergent evolution of neuropeptide prohormone genes in Cetartiodactyla: Insights from 118 genomes. *International Journal of Veterinary Research and Allied Sciences*, 2(2), 78–88. doi:10.51847/WX16oPLKkE
- Kinareikina, A. G., & Silivanova, E. A. (2023). Chlorfenapyr resistance and acetylcholinesterase enzyme activity in *Musca domestica*. *Entomology Letters*, 3(1), 28–35. doi:10.51847/TnXtgnRRyx
- Omokunle, A. B. (2024). Environmental evaluation of a tropical river based on aquatic insect communities and water quality indicators. *Entomology Letters*, 4(1), 8–16. doi:10.51847/joBLkOjCre
- Prada, A. M., Cicalău, G. I. P., & Ciavoi, G. (2024). Resin infiltration for white-spot lesion management after orthodontic treatment. *Asian Journal of Periodontology and Orthodontics*, 4, 19–23. doi:10.51847/ZTuGEanCSV
- Spirito, F. D., Iacono, V. J., Alfredo, I., Alessandra, A., Sbordone, L., & Lanza, A. (2022). Impact of COVID-19 awareness on periodontal disease prevention and management. *Asian Journal of Periodontology and Orthodontics*, 2, 16–26. doi:10.51847/t8D9TJGOCU
- Wei, W., Xia, M., Min, L., & Fei, T. (2023). Evaluation of PIVKA-II and histological grading systems as prognostic indicators in 22 surgically treated canine hepatocellular carcinomas. *International Journal of Veterinary Research and Allied Sciences*, 3(1), 32–38. doi:10.51847/TSUvLmwYHA

