

THE JOURNEY TOWARD NET-ZERO EMISSIONS: CHALLENGES IN COLLECTING SCOPE 3 DATA THROUGH THE LENS OF ENVIRONMENTAL MANAGEMENT ACCOUNTING IN VN30

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ABSTRACT

This study analyzes the current situation and challenges in measuring Scope 3 emissions data across the 30 leading listed companies in the Vietnamese market (VN30) through the lens of Environmental Management Accounting (EMA). Drawing upon Institutional Theory and the Resource-Based View (RBV), the research applies qualitative content analysis to data extracted from 2024 Sustainability Reports and Annual Reports, which were coded in accordance with Gioia's (2013) methodological framework and subjected to a rigorous inter-coder reliability testing process. Empirical results reveal the prevalence of the "Double Decoupling" phenomenon, indicating that most enterprises employ "cherry-picking" or "halo effect" techniques to construct a positive, communication-oriented image (symbolic sustainability reporting) to adapt to institutional pressures and technological deficiencies. Furthermore, environmental accounting systems lack integration with financial accounting, demonstrating a notable absence of monetized reports and Scope 3 data from supply chains and funding portfolios. Warning of the risk of losing competitive advantage amid global trade barriers such as the Carbon Border Adjustment Mechanism (CBAM), the study proposes the application of in-depth accounting tools (e.g., Internal Carbon Pricing - ICP, PCAF standards) and the establishment of a flexible policy roadmap for substantive EMA implementation, thereby preventing greenwashing risks.

Keywords: Environmental Management Accounting, EMA, Scope 3, Double Decoupling, Greenwashing, VN30.

1. INTRODUCTION

Currently, the global shift towards a low-carbon economy is no longer an encouraged option, but has become a mandatory requirement for countries and businesses. At the COP26 Climate Summit, Vietnam made a historic commitment: to achieve net-zero emissions by 2050.

This commitment stems from the practical pressure of climate change on long-term economic growth. To realize this international commitment, the Government issued Decree 06/2022/ND-CP mandating greenhouse gas (GHG) inventory for large-scale emitting facilities [1]. Simultaneously, the State Securities Commission issued Circular 96/2020/TT-BTC, mandating the disclosure of Environmental, Social and Governance (ESG) information in annual reports [2]. Located at the forefront of the economy, the group of 30 largest listed companies on the market (VN30) is facing enormous institutional pressure. They not only have to comply with domestic regulations such as the HOSE-Index rules (version 4.0) [3], but also

face integration pressure, typically the European Union's Carbon Border Adjustment Mechanism (CBAM). Therefore, in this context, the application of Environmental Management Accounting (EMA) to measure and make ecological data transparent has become a strategy to shape competitiveness.

It is important to note the reason for using empirical ESG data from the 2024 reporting cycle. Data collection for this study was conducted from late March to early April 2026, at which point a significant number of VN30 companies had not yet published their 2025 reports. Therefore, collecting a complete and consistent dataset for 2025 across all companies was not feasible, making the 2024 report the most recent comprehensive data available.

However, this 2024 dataset serves as an initial baseline reflecting the early readiness of leading Vietnamese businesses before tighter global regulatory frameworks (e.g the full implementation of the EU's Carbon Border Adjustment Mechanism (CBAM) in 2026). Analyzing the structural state of this initial database provides predictive insights into how these corporations must transition from voluntary compliance to mandatory and rigorous eco-accounting to maintain their competitive advantage in 2026 and beyond.

2. LITERATURE REVIEW

The practice of measuring and managing carbon footprints, particularly Scope 3 emissions, has been attracting considerable attention from the academic community. Recent systematic reviews indicate that while Scope 3 is crucial, reporting of this component is not yet a common practice and lacks comprehensiveness [4].

In emerging markets, supply chain decarbonization efforts are hampered by the double barrier of weak digital infrastructure and institutional inconsistencies [5]. Numerous empirical studies warn of the lack of data visibility across the value chain, severely undermining the reliability of indirect greenhouse gas reports [6], [7]. In addition, the predictive capabilities of machine learning models for non-disclosure businesses remain large, forcing investors to be cautious [8]. Notably, studies by Klaaßen & Stoll [9] and Arendt [10] have provided evidence of companies abusing the flexibility of voluntary reporting to "cherry-picking," missing large amounts of actual emissions or relying solely on carbon credits for offsets instead of radical reductions. Much of this empirical evidence is set in the context of developed markets, countries under pressure to integrate internationally while simultaneously facing a scarcity of technological resources. The challenge of measuring EMA and the strategic response of businesses in a developing economy remains a significant gap requiring further research.

The implementation of EMA in businesses is revealing a structural bottleneck. Businesses often easily establish accounting boundaries to identify and measure Scope 1 (direct emissions) and Scope 2 (indirect emissions from energy consumption) [11]. However, studies show that Scope 3, indirect emissions generated from the entire upstream and downstream value chain, is the most critical component, often accounting for a large proportion of an organization's total carbon footprint. The complexity of Scope 3 lies in the fact that even with effort, businesses often only control 56-70% of emissions at the first two supply tiers (Tier 1 and 2). To truly achieve Net-Zero, they are forced to access data deep down to the 4th or 5th supplier tier – a technical barrier that has proven almost impossible in the current technological context [12]. For manufacturing and retail, it's emissions from material extraction and the product lifecycle; for the financial sector, it's massive "financed emissions" from loan portfolios.

Despite its significant importance, Scope 3 is becoming the biggest "blind spot" of the EMA. Blurred boundaries and multi-tiered supply networks make data collection complex and costly. As a result, businesses often fall into systematic underreporting, severely distorting the

picture of ecological efficiency [9]. Although there have been many reviews of carbon accounting practices, the majority of current literature focuses on developed markets or is limited to Scope 1 and 2 [6], [13]. There is a significant lack of empirical studies that critically examine how emerging market firms are actually managing Scope 3.

From the perspective of Institutional Theory, when faced with compliance pressure but lacking resources, organizations tend to use a communication cloaking strategy, reporting only selective information, also known as "Double Decoupling" [14], [15], [16]. Businesses create sustainability reports to satisfy investors and stakeholders (Greenwashing), but the accounting system essentially does not record Scope 3. This means that the real ecological risk is not disclosed [15], [17].

To fill this gap, the study poses two research questions:

RQ1. What is the current level of completeness and practical challenges in recording Scope 3 data for leading companies (VN30) in Vietnam?

RQ2. From the perspective of EMA, what forms of "Decoupling" and "Greenwashing" are institutional pressures and internal resource capacity creating in ESG reporting practices?

Article Structure: To address the above questions, the remainder of the article is structured as follows: Section 3 establishes the theoretical background, Scope 3, and the Double Decoupling. Section 4 presents the qualitative content analysis method. Section 5 presents empirical results through the grouping of data fragmentation patterns in VN30. Section 6 discusses the causes and consequences of the greenwashing phenomenon. Finally, Section 7 provides conclusions and governance and policy implications.

3. THEORETICAL BACKGROUND

3.1. Environmental Management Accounting (EMA) and Carbon Footprint Measurement

EMA is defined as a part of management accounting that focuses on collecting, analyzing, and using financial and non-financial information to support internal decision-making processes aimed at improving the economic and ecological performance of the organization [18], [19].

The fundamental difference between EMA and traditional accounting is the close combination of two measures: physical measurement and monetary measurement [18], [19]. Accordingly, the physical measurement reflects the flow of materials, energy consumption and waste volume (e.g., kWh of electricity, cubic meters of water, tonnes of CO₂). However, for EMA to truly play a strategic role, these physical data must be monetized into environmental costs, revenues or benefits [20]. The inability to quantify ecological impacts with financial figures will lead to flawed business decisions, resulting in businesses overlooking potential risks or green investment opportunities (Green Capex) [4], [7].

Within the framework of the EMA, measuring the carbon footprint and greenhouse gas inventory has become the most important ecological measure [10], [14]. According to the Greenhouse Gas Protocol (GHG Protocol) standards, an enterprise's emissions are classified into three Scopes. Scope 1 includes direct emissions from sources owned or controlled by the organization. Scope 2 is indirect emissions from the consumption of purchased energy such as electricity, heat or steam [21]. Due to the clear physical boundaries, accounting for Scopes 1 and 2 is generally relatively favorable for most enterprises [11].

Conversely, Scope 3 encompasses all indirect emissions generated upstream and downstream, and often accounts for an overwhelming 70% to 90% of an organization's total emissions [11], [12]. The complexity of Scope 3 lies in the fact that it extends beyond the direct control boundaries of the enterprise, spans multi-tier supply chains, and involves

numerous external actors [8], [22]. Collecting Scope 3 data requires absolute transparency from suppliers, traceability capabilities, and sophisticated lifecycle assessment (LCA) models [23], [24]. The lack of data infrastructure and the fragmentation of standards have made Scope 3 a "blind spot," leading to frequent underreporting or use of inaccurate estimates by businesses, severely undermining the integrity of the system [8], [9].

3.2. Institutional Theory and the Phenomenon of Double Decoupling

Institutional Theory provides an analytical lens to explain the behavior of businesses under complex environmental measurement pressures [16]. According to DiMaggio and Powell (2000), organizations compete not only for resources and customers, but also for political power and legitimacy from social institutions [16], [25]. As global standards such as the Global Reporting Initiative (GRI) or the United Nations Sustainable Development Goals (SDGs) become increasingly popular, businesses will face "isomorphic pressures" forcing them to adopt sustainable development practices to maintain their survival and reputation in the market [15], [17].

However, faced with the complexity and enormous cost of measuring substantive ecology, especially Scope 3, businesses often respond by adopting "decoupling strategies" [15]. Decoupling is a tactic where an organization builds formal structures (such as publishing ESG reports with high-level commitments) to comply with external regulations, while maintaining resource-intensive business operations internally to protect profits [17], [19].

In the modern ESG reporting era, this phenomenon has evolved into "Double Decoupling" [14]. The first layer of decoupling is Greenwashing/PR-driven decoupling. In the context of this research, "greenwashing" is objectively defined as the symbolic reporting of sustainability or the selective disclosure of environmental information. This occurs when businesses announce Net-Zero commitments and promote superficial Corporate Social Responsibility (CSR) activities (such as charity, tree planting, saving printing paper), but do not change their business model to meet these commitments [17]. The second layer of disconnect is the physical-financial disconnect within the accounting system [19]. At this layer, the business may conduct physical inventory (such as measuring electricity, water or waste in Scope 1 and 2), but fails to or does not monetize these risks into the financial structure [18].

The failure to quantify and report Scope 3 is the main cause of the double decoupling. The reasons given to explain the Scope 3 data gap are often the lack of measurement methods and supply chain data. When Scope 3 is not reported, the greatest ecological impact is not disclosed. This prevents businesses from paying the true economic cost of decarbonization [15], [19].

3.3. Resource-Based View (RBV)

While the motivation for organizations to seek legitimacy through surface reporting is explained by Institutional Theory [25], the phenomenon of firms having different implementation choices under the same pressure is explained by RBV [26]. According to RBV, an organization's competitive advantage and strategic behavior are shaped by its internal capabilities and resources.

In the context of EMA, "monetizing" complex ecological data such as Scope 3 requires a superior technological, financial, and governance infrastructure [18], [19]. When businesses lack these strategic resources, the cost of measuring the supply chain will exceed the short-term financial benefits. The inevitable consequence is that they are forced to choose a "decoupling" or "data selection" strategy to adapt to institutional pressure [9], [15]. Conversely, businesses with strong technological and capital resources are able to transform ecological pressure into cost optimization advantages or create new revenue streams [20]. Thus, the existence of "decoupling" or "integration" is not simply a matter of compliance, but is essentially the result of differentiation in internal resource capabilities.

3.4. Legal Context in Vietnam

The pressure on businesses to comply with the EMA system comes not only from voluntary compliance with international standards but has also been concretized into coercive legal frameworks. At the COP26 Climate Summit, the Vietnamese Government made a strong commitment to achieving net-zero emissions by 2050 [1]. To realize this goal, the domestic legal framework is being rapidly improved, creating direct compliance pressures on economic sectors.

Most notably, Government Decree 06/2022/ND-CP stipulates the mandatory greenhouse gas inventory obligation for large-emission facilities (over 3,000 tonnes of CO₂ equivalent), and establishes a strict measurement, reporting and verification (MRV) process [1]. Along with that, Circular 96/2020/TT-BTC issued by the State Securities Commission (SSC) has shifted the disclosure of Environmental, Social and Governance (ESG) information from voluntary to a mandatory legal obligation in the Annual Reports of public companies. The mandatory reporting contents include energy consumption, material management, water and environmental law compliance policies [2].

Located at the forefront of the economy, the group of 30 listed companies with the largest market capitalization (VN30) is the focus of this institutional pressure. They are not only subject to supervision from State agencies but also face harsh market barriers such as the requirement to maintain presence in the Sustainable Development Index or the HOSE-Index version 4.0 rules [3]. Furthermore, VN30 companies participating in the global supply chain also face cross-border legal pressure. For example, the European Union's Carbon Border Adjustment Mechanism (CBAM) forces exporting companies to report transparently and pay for carbon emissions integrated into their products [27]. In this context, the delay in quantifying Scope 3 data is no longer a cost-effective option, but has become an existing risk that could potentially exclude Vietnamese companies from the global sustainable supply chain.

4. METHODOLOGY

4.1. Research Sample and Data Collection

To solve research questions empirically, this study selects the group of 30 largest listed companies (VN30) on the Ho Chi Minh City Stock Exchange (HOSE) [3]. The VN30 index basket represents companies with market capitalization and liquidity that lead the Vietnamese economy, covering key sectors such as finance - banking, real estate, industrial production and consumer goods. From the perspective of Institutional Theory, this leading group of companies is the subject of the strongest compliance pressure from domestic legal frameworks (Decree 06/2022/ND-CP, Circular 96/2020/TT-BTC) [1], [2] and global financial institutions.

Maintaining their position in the VN30 basket, especially in the face of the strict technical barriers of the HOSE-Index version 4.0 rules and the Sustainable Development Index [3], forces these enterprises to take the lead in establishing the EMA system and publishing sustainability reports [16], [19]. Therefore, analyzing the current state of VN30 reports provides the most representative picture of the maturity level of ESG in Vietnam.

This study uses the current VN30 index to identify leading companies in the current economy, then conducts a retrospective analysis of reports from 2024 to clarify the EMA's capabilities. The study utilizes two officially published sources: independent Sustainable Development Reports and Annual Reports published on the websites of the 30 companies in the VN30 index and the Ho Chi Minh City Stock Exchange (HOSE) portal.

The list of VN30 group companies is presented in Appendix 1.

While the Sustainable Development Report is often where businesses announce commitments under international governance frameworks (such as GRI, TCFD) or awards

[28], the Annual Report and Financial Report are documents reflecting the current state of resource allocation (green capital investment - Green Capex) and profit scale [18], [19]. The technique of cross-reference analysis of both types of reports is an important methodology [15], [17]. The comparison between what businesses communicate and what the accounting system actually records is key to detecting structural breaks [14], [15].

4.2. Data Analysis Framework

The study applies the Qualitative Content Analysis method. This method helps to systematize information in written form and published data into strategic behavioral patterns, thereby creating a foundation for making valid academic inferences about management practices [15], [17]. This study builds a Coding Tree, evaluating the actual EMA system of 30 enterprises based on the intersection between Institutional Theory and Resource-Based View (RBV) [16], [26] utilizing the Gioia methodology to ensure qualitative rigor during the coding process [29].

4.2.1. Coding Tree

The Coding Tree is structured along three analytical axes (Code Axis) as follows:

(1) Axis 1 - Code 1.1 (Institutional Pressure - Surface Commitment Level): This axis assesses how businesses create an image to satisfy pressure from stakeholders (from an institutional perspective) [30]. The coded criteria include: Net-Zero Commitment Statement; Presence of international reporting frameworks (GRI, SDGs); Corporate Social Responsibility (CSR) activities; and especially the use of independent Assurance services from Big4 auditing firms to create a "Halo Effect" of credibility [30].

(2) Axis 2 - Code 2.1 (Resources/RBV - Core Ecological Data): This axis directly reflects the actual capacity of the EMA system. Two criteria are used for coding: (i) The ability to accurately quantify greenhouse gas emissions, especially whether or not there is Scope 3 data in carbon-intensive business segments (such as financed emissions of the banking industry, or supply chain emissions of the manufacturing industry) [9], [11]; and (ii) The proportion of actual green capital flows (e.g., green credit outstanding) to total core asset size [18], [19].

(3) Axis 3 - Code 3.1 (Double Decoupling Phenomenon): Based on the gap between Code 1.1 and Code 2.1, businesses are classified into 4 forms [14], [15]:

(i) Sophisticated Decoupling: Possessing standardized reports, hiring independent auditors, but using "cherry-picking" techniques to measure easy components (such as electricity, water, office waste) and completely concealing the blind spots of the core supply chain's Scope 3 [9].

(ii) Structural Decoupling: There is a full climate inventory, but the financial system remains unchanged (e.g., 100% of revenue still depends on fossil fuels) [19].

(iii) Phased Decoupling: There is substantial physical effort, but the EMA system lacks the capacity to quantify corresponding emissions into financial data.

(iv) Non-decoupling: Ecological efforts are closely linked to technological and production capabilities, directly creating cost-saving advantages, demonstrating synergy between EMA and Financial Accounting [26].

The data encoding structure (Coding Tree) is presented in detail in Appendix 2.

4.2.2. Scoring Mechanism

For each company, raw quotes and financial data were extracted in their original form to support the code assignment decision [17]. Specifically, the coding unit was defined as a meaning unit (a sentence or paragraph conveying a distinct statement regarding environmental disclosure or EMA practices). Across the 55 analyzed documents (consisting of both 2024 Sustainability Reports and Annual Reports from 25 companies, and Annual Reports from 5

companies), a total of 320 text segments (meaning units) were extracted and subjected to the coding process.

The coding process was performed independently by two researchers to eliminate subjective bias. (Comprising the author and an advising co-supervisor). The confidence level reached $k=0.88$ (Cohen's Kappa). Cohen's Kappa was calculated based on the coders' agreement across the 9 first-order codes mapped in the coding tree (see Appendix 2).

Discrepancies in the data were reconciled after consultation with a third independent expert (the main doctoral supervisor). Based on academic content analysis standards, this coding structure achieved a high internal consensus threshold, demonstrating the consistency and robustness of the analytical tool in identifying disparities in EMA practice as shown by cross-referencing between ESG reports and annual reports of companies [15].

5. FINDINGS

Based on the results of Qualitative Content Analysis and cross-referencing data from the Sustainable Development Report and the 2024 Annual Report of 30 market-leading listed companies (VN30), the study has uncovered the nature of EMA implementation in Vietnam. The results show a deeply differentiated picture. Although 100% of the companies in the sample strive to meet institutional pressures through superficial commitments (Code 1.1), when examining the ability to quantify ecological data (Code 2.1), the phenomenon of "Double Decoupling" emerges in many forms [14], [15]. Based on industry specifics and the ability to handle data "blind spots" Scope 3 [9], the empirical findings are classified into the following four groups.

Table 1. Classification of 4 EMA Implementation Forms in VN30

Typology	Core characteristics	List of VN30 companies by classification	Percentage
1. Sophisticated Decoupling	Standard reporting/insurance framework; Quantifiable Scope 1 & 2. Failure or avoidance of measurement in Scope 3 (Supply chain blind spots).	21 Companies: ACB, BID, CTG, HDB, LPB, MBB, SHB, SSB, STB, TCB, TPB, VCB, VIB, VPB (Banking); SSI (Securities); VHM, VRE, VPL (Real Estate/Services); MWG, MSN (Retail/FMCG), VIC (Multi-industry)	70%
2. Structural Decoupling	Transparency in large-scale greenhouse gas data is crucial, but there is a lack of commensurate green investments (Green Capex) to transform the core financial system.	03 Companies: GAS, PLX (Fossil fuels); SAB (FMCG).	10%
3. Phased Decoupling	While there are genuine efforts to transition to energy-efficient and cost-effective solutions, the accounting system lacks the capacity to fully account for Scope 3 (Time Lag).	03 Companies: GVR (Agriculture); VNM (FMCG), DGC (Chemicals)	10%
4. Non-decoupling	Integrating EMA and Financial Accounting. Efforts to reduce emissions directly generate sustainable economic benefits (RBV) and competitive advantages.	03 Companies: FPT, HPG (Manufacturing/Technology); VJC (Aviation).	10%

Source: Analysis and synthesis by the author

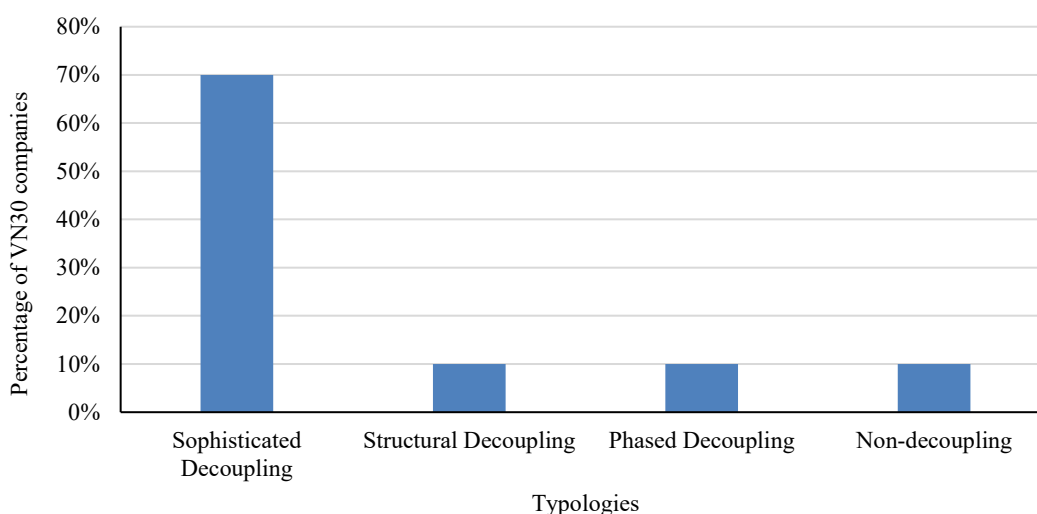


Figure 1. Proportion of the 4 EMA Implementation Typologies in VN30

Source: Created by the author

As visually illustrated in Figure 1, the distribution of EMA implementation typologies among Vietnam's top 30 (VN30) companies is highly asymmetrical. The sophisticated decoupling group overwhelmingly dominates, accounting for 70% of the surveyed companies (21 out of 30). Conversely, the remaining three typologies including structural decoupling, phased decoupling, and non-decoupling are evenly distributed, each accounting for 10%. This significant disparity highlights a systemic challenge in the Vietnamese market: while formal compliance and public relations-based sustainability are prevalent, the substantive integration of ecological risks into core financial accounting remains a rare exception, achieved by only a marginal fraction of industry-leading companies.

5.1. Sophisticated Decoupling

5.1.1. "Structural Impairment" in the Finance - Banking Group

Ecological risks of the financial and banking industry do not occur in internal operations (Scope 1 and 2), but lie in "Financed emissions" under Scope 3, i.e., the amount of greenhouse gases generated from projects and businesses that they finance [7]. Although serving as the primary conduit for resource allocation for the Net-Zero transition process, empirical analysis on the VN30 group shows that leading financial institutions are revealing an almost complete "structural limitations" in the EMA system [18], [19].

In terms of form, banks and securities companies have established standardized institutional frameworks to respond to integration pressure (Code 1.1) [16], [30]. Vietnam Investment and Development Bank (BIDV) pioneered the issuance of 3,000 billion VND of domestic sustainable bonds and achieved SQS2 (Very Good) rating from Moody's. Similarly, Asia Commercial Bank (ACB) used independent assurance services from KPMG for its sustainability report, while SSI Securities Corporation also demonstrated its capacity through advising on the successful issuance of more than 6,000 billion VND of green bonds. Similarly, VietinBank follows this trajectory, with its Sustainable Finance Framework is assessed by the international organization Sustainability. These efforts have created a "halo effect" of pioneering green capital market leadership to meet investor expectations without actually touching the core ecological risk zone [15], [30].

However, when analyzing in depth the ability to quantify ecological data (Code 2.1), the phenomenon of "Sophisticated Decoupling" has been revealed [14], [15]. Although

BIDV owns the leading green credit outstanding balance in the market at VND 80,870 billion, the measurement of carbon emissions from this substantial loan portfolio is completely neglected and is only on the "planned roadmap". VietinBank, with an outstanding loan balance to the economy of more than VND 1.72 million billion, completely lacks quantitative greenhouse gas inventory data, only stopping at formal physical measurements such as a reduction of 250kWh/person.

The incompetence of the EMA system is the reason for "cherry-picking" techniques in reports [9]. Instead of measuring climate risk from funding flows, ACB reported its Scope 3 Emissions using "printing paper usage" (equivalent to 1,470.2 tonnes of CO₂e), a figure that is disproportionate to the loan portfolio of VND 580,686 billion. SSI also used the "100% paperless office" campaign to replace the measurement of ecological risk from its proprietary trading and investment advisory portfolio with total assets of over VND 73,500 billion.

As Çalışkan (2025) [31] has confirmed, the allocation of emissions related to investment and financing contains great complexity in the control boundaries, causing financial institutions to face major barriers in making reports [7], [31]. The use of green debt figures or efforts to save paper and electricity at headquarters without reporting data of Scope 3 is clear evidence that: EMA in the Vietnamese financial group is not yet truly capable of becoming a financial-ecological risk assessment tool [15], [19].

5.1.2. Separating PR-driven communication from supply chain blind spots.

The retail, fast-moving consumer goods (FMCG) and multi – industry conglomerate sectors are the areas most directly and strongly under pressure from consumer and public scrutiny. To quickly establish legitimacy without changing cost structures [25], businesses in this group frequently adopt strategic misalignments to construct organizational facades.[15]. A notable manifestation is "PR-driven decoupling" and the "Halo Effect": Businesses invest significant budgets in green marketing campaigns or highlight a single sustainable subsidiary, while struggling to quantify ecological risks in the supply chain (Scope 3) due to technological gaps [9], [17]. A prime example of the "halo effect" in this sophisticated decoupling process is Vingroup (VIC). While VIC reports significant ecological milestones through its electric vehicle subsidiary VinFast (with CO₂e emissions of nearly 1.94 million tonnes), subsidiaries such as Vinhomes (VHM), Vincom Retail (VRE), and Vinpearl (VPL) lack comprehensive reporting on the enormous ecological risks arising from construction activities, high-carbon building materials, and tenant waste.

With the phenomenon of "PR-driven decoupling," Vincom Retail Joint Stock Company (VRE) is a prime example. In 2024, VRE prominently utilized media channels through a series of large-scale community-oriented marketing campaigns such as "Vincom Green - Fresh," "Go Green," and volunteer movements like "picking up trash," aiming to build the image of a "Green Leadership Enterprise." However, when analyzing the information from the EMA system, a structural breakdown became apparent. VRE's report completely lacked data in Scope 3. With the opening of 5 new shopping malls in 2024 and managing a total retail floor area of 1.84 million m² generating revenue of VND 8,939 billion, the enormous ecological risks from construction, consumption of carbon-intensive building materials (cement, steel), and waste from tenants were not reported.

Similarly, Mobile World Investment Corporation (MWG) and Masan Group (MSN) also revealed structural inadequacies in the "blind spot" of Scope 3 [9]. MWG strongly promoted the image of sustainable development through campaigns such as "Green Wednesday" and energy optimization at stores. However, the core essence of the retail industry does not appear in the amount of electricity consumed at supermarkets, but in the carbon footprint generated from the lifecycle of tens of millions of electronic, refrigeration and food products that are

bought and sold repeatedly. MWG itself had to admit in its report: "MWG's Scope 3 data is currently incomplete and not comprehensive" due to the enormous scale of its supply chain.

For Masan (MSN), despite making progress in integrating economic and ecological aspects in production (good quantification of Scope 1 & 2), supply chain blind spots still exist. The network of thousands of agricultural suppliers, raw materials and plastic packaging waste downstream (post-consumption product lifecycle) has not yet been monetized into the enterprise's risk structure [18], [19].

This phenomenon is entirely consistent with the findings of Klaaßen and Stoll (2021) which indicated that the lack of a system in current carbon accounting practices has led to underreporting of up to 50% of total emissions, mainly due to companies exploiting loopholes to set inadequate measurement boundaries and applying operational exclusion techniques (data selection) [9]. By using marketing campaigns as an offsetting tool in consumer psychology, the VN30 retail group is temporarily obscuring the "Scope 3 data gap", thereby maintaining profit growth without facing the real economic cost of decarbonization across the global value chain [15], [17].

5.2. Structural Decoupling (Physical-Financial Fracture in the Industry/Energy Group)

A prominent characteristic of businesses in the heavy industry and energy sectors is their ability to statistically collect very detailed physical data. Thanks to their traditional operational measurement system, they can easily control input indicators such as kWh of electricity consumption, water volume, or waste volume. However, the EMA system of this group suffers from a serious breakdown at the output stage: they fail to monetize this physical data to integrate it into the financial structure, creating a form of "Structural Decoupling" [18], [19].

A prime example of this disconnect is the case of Vietnam Gas Corporation (PV GAS). Under strong pressure to comply with national commitments, PV GAS published a 140-page ESG report based on the GRI 11 industry standard, with the message "Advancing Towards a Green Future" and a Net-Zero 2050 commitment. In terms of tangible emissions, they transparently measured direct emissions under Scope 1 at 183,146.97 thousand tonnes of CO₂e. However, ecological mitigation actions were limited to small-scale measures (e.g., reducing 400 tonnes of CO₂e by replacing lights with LEDs). This structural disconnect is evident when compared to the Financial Report: while the company recorded revenue of VND 105,381 billion, primarily from fossil fuel extraction, specific Green Capex investments for energy transition were completely absent. PV GAS's financial accounting only accounts for provisions for land restoration as required by law. In reality, ESG reporting acts as a tool to meet institutional requirements [15], while the logic of core resource allocation still adheres to the carbon-intensive trajectory.

Another variant in this group is Saigon Beer, Alcohol and Beverage Corporation (SABECO). Compared to PV GAS, SABECO shows greater progress by linking some physical data with cost savings, such as reducing aluminum can weight by 15% or installing solar power at 13 factories. They have also begun to access advanced financial tools through managing "Green Deposits" at SMBC and VietinBank. However, SABECO's EMA system currently lacks the quantification of total Greenhouse Gases (GHG) from the agricultural and packaging supply chain network.

This disconnect between physical and financial data is entirely consistent with evidence from international literature. According to Kayser et al. [11], the lack of a mechanism to convert Scope 3 data into clear financial impacts leaves managers with no incentive to allocate budgets to address them [11]. When physical indicators (electricity, water, waste) are not converted by EMA into ecological risk costs or green capital investments, they are excluded from strategic decisions, causing the journey towards Net-Zero for this group of businesses to remain at the starting point of physical measurement [18], [19].

5.3. Forms 3 & 4: Phased decoupling and non-decoupling efforts (Bridging the gap)

Although the phenomenon of "Double Decoupling" occurs commonly under institutional pressure [14], [15], empirical analysis on the VN30 group still records a group of pioneering typical enterprises that have succeeded in narrowing and eliminating this gap. The common point of this group is the thorough application of Resource-Based View (RBV) theory [26]: they do not consider EMA as a tool to deal with information disclosure regulations, but turn it into a "strategic asset" to directly cut costs and create competitive advantage [18], [19]. When ecological logic is strongly linked with economic logic, the decoupling phenomenon gradually disappears.

An example of this substantive integration is Vietjet Aviation Joint Stock Company (VJC). For a specialized industry like aviation, where ecological risks are primarily concentrated in Scope 1, Vietjet is a prime example of economic-ecological synchronization.

Vietjet has transparently measured its biggest risk: 2.17 million tonnes of CO₂ emissions directly from burning aviation fuel (Scope 1) and used independent data verification services from the international organization VERIFAVIA. At Vietjet, eco-friendly actions are highly pragmatic because they are highly aligned with economic efficiency. With fuel costs reaching VND 23,858 billion in 2024, the company's investment in capital (Capex) to purchase 140 new aircraft (A330neo and A321neo) or the application of Artificial Intelligence (SkyBreathe) to optimize flight routes not only helps reduce 96,000 tonnes of CO₂ per year, but also directly saves hundreds of billions of VND. In Vietjet's case, it can be assessed that the EMA system has been seamlessly integrated with financial accounting.

Regarding "Phased Decoupling," Duc Giang Chemical Group (DGC) is a prime example of a technical gap. While DGC has demonstrated significant material efforts in circular economy activities – such as utilizing industrial waste to produce by-products and saving energy – its EMA system currently lacks the capacity to perform standard greenhouse gas inventories. The lack of CO₂ data is not due to deliberate "greenwashing" but rather highlights a transitional phase where robust material activities have yet to be translated into standard eco-accounting indicators.

On the other hand, the Non - decoupling group, comprising FPT, HPG, and VJC, strongly illustrates the explanatory power of Resource-Based View (RBV) theory. According to RBV, overcoming the enormous technological and financial barriers of measuring scope 3 requires superior internal resources. These three corporations possess superior technological infrastructure and strong capital flows, allowing them to transform ecological pressures into economic advantages. For example, FPT uses its core IT capabilities to build its own carbon accounting software, while HPG and VJC invest heavily in green capex (e.g., waste heat recovery systems and artificial intelligence for flight optimization). For them, ecological logic is highly linked with economic logic, causing the decoupling phenomenon naturally dissolve.

Finally, the maturity of the EMA system is further strengthened through independent Assurance structures, a proven factor in improving reporting quality [32]. Vinamilk Joint Stock Company is an example of efforts to narrow the gap by hiring Big4 auditing firms (PwC) to ensure the transparency of its reports. Vinamilk's physical practices (such as using biomass energy and solar power at 10 factories) have been quantified as a saving of VND 100.8 billion in raw material costs [18], while also helping 3 units achieve carbon neutrality standard PAS 2060.

Although Vinamilk's EMA system has integrated internal physical and financial data, the measurement boundaries remain limited to Scope 1 and 2, leaving a significant gap in the agricultural supply chain which will be discussed later.

In general, evidence from Vietjet, Vingroup and Vinamilk confirms a governance rule: Surface ESG reports (PR-driven) only create "formal decoupling" [15], [17] if organizations do not establish an EMA system capable of monetizing physical data into cost savings, green investment flows (Green Capex) and new revenue [18], [19]. Only in this way can greenwashing be broken, giving way to a truly sustainable and transparent value chain system [14].

6. DISCUSSION

The research results in Section 5 have shown a reality: the majority of leading enterprises in the VN30 group are using "Sophisticated Decoupling" strategies (not quantifying Scope 3 data) [14], [15]. This discussion will explain the reason: Why Scope 3 becomes an ideal "blind spot" for enterprises to create a greenwashing cover to satisfy investors and stakeholders [9], [17].

6.1. Why does Scope 3 create greenwashing?

Firstly, the conflict between institutional pressure and the lack of specific technical guidance. From the perspective of Institutional Theory [16], VN30 enterprises are under immense pressure from the capital market, typically the requirement to maintain presence in the Sustainable Development Index (VNSI) basket and information disclosure regulations according to Circular 96/2020/TT-BTC [2], [3]. However, current legal frameworks in Vietnam are mainly broad-based and lack detailed technical guidance to measure Scope 3. To satisfy foreign investors and funds (such as IFC, Moody's), enterprises are forced to present an excellent organizational facade [15]. Avoiding Scope 3, which is the most complex and has the largest emissions, helps them easily achieve "green" certifications without risking regulatory scrutiny or penalties for technical non-compliance [8].

Secondly, there is a scarcity of technology platforms and a huge cost barrier to data collection. Scope 3 emissions span across multi-tier supply chains beyond the physical control boundaries of the enterprise [11], [22]. For EMA to accurately quantify this data area, the organization must possess a cloud computing technology ecosystem, a Digital Twin architecture, or an ERP system integrated with Artificial Intelligence (AI) for real-time traceability [33].

However, Okeke's (2025) [5] study has shown that, in emerging economies, the lack of digital infrastructure and the high cost of deployment are the main barriers [5]. The evidence from MWG (The Gioi Di Dong) confirmed this when they admitted their inability to measure Scope 3 due to the overly complex scale of their supply chain. Paying tens of billions of VND for carbon inventory software and supplier data traceability platforms will erode short-term profits, going against the benefit of maximizing shareholder value [18], [19].

Thirdly, strategic responses to unavoidable technical barriers are necessary. It is essential to objectively acknowledge that accurately collecting multi-level Scope 3 data is practically impractical for most businesses due to current technological limitations. Thus, the initial lack of Scope 3 data stems from genuine capability gaps and technical barriers rather than deliberate obfuscation. However, this phenomenon evolves into a "sophisticated decoupling" when businesses utilize "cherry-picking" and superficial marketing to conceal these inevitable gaps [9], [14], [15].

Unable to overcome technological and cost barriers in measuring the entire supply chain, while still facing immense pressure from financial institutions, many VN30 companies have implemented aggressive PR campaigns or reported small metrics (such as office paper usage or employee flight numbers) to create a sustainability effect [30]. For example, some banks report Scope 3 using printed paper consumption instead of measuring emissions from their

core financial operations. Therefore, the "greenwashing" label applies not only to the lack of data but also to the strategic creation of organizational facades to distract stakeholders from these core ecological blind spots.

In summary, greenwashing around Scope 3 is a structural economic choice [19]. When the cost of supply chain transparency is too expensive, while the pressure to implement reporting to meet stakeholder expectations is too great [18], the use of the "Scope 3 Data Gap" has become a low-cost and safe legitimacy strategy without changing the core business model [15], [17], [25]. The decoupled communication is also reflected in the quality of the Net-Zero commitments themselves. Instead of making efforts to change the core supply chain to bring Scope 3 emissions to the residual level, most businesses leverage carbon credit purchases (offsets) as a solution; In fact, only about 22% of companies setting Net-Zero targets achieve integrity by committing to actual carbon removals [10].

Furthermore, the choice to avoid reporting on this Scope 3 also stems from the motivation to maximize short-term economic benefits. Large-scale empirical studies have confirmed that, while efforts to reduce emissions in Scope 1 and 2 have a direct positive impact on the financial performance of businesses, reducing emissions in Scope 3 has not shown any significant impact on profits [11].

6.2. Consequences for Integration into Global Value Chains

The misuse of Sustainable Development Reports as a media "facade" to avoid the core data area Scope 3 is not only a lack of transparency [9], [15], but is directly threatening the "resilience" and integration of Vietnamese businesses in the international market [17].

According to practical developments, global trade regulations have fundamentally changed. Vietnam's key export markets are shifting from encouraging voluntary reporting to imposing "cross-border legal pressures" [27]. The clearest evidence is the Carbon Border Adjustment Mechanism (CBAM) issued by the European Union (EU). Unlike the formal ESG standards that many VN30 enterprises are using, CBAM is a closely pragmatic ecological risk pricing mechanism. This mechanism requires exporting enterprises to accurately inventory and extract data on carbon emissions integrated into each product from the transition period (2023-2025) [27].

From the perspective of EMA, this is a major challenge for Vietnamese businesses [18]. If a business's EMA system only measures the amount of electricity and water used at the headquarters (Scope 1 & 2) without quantifying the carbon footprint from input materials and supply chain (Scope 3), they will fail to determine the actual environmental cost [19]. As a consequence, when exporting to the EU, these products will be subject to additional carbon tax based on default emission levels (which are often very high), increasing the cost of goods and eliminating the price competitiveness of Vietnamese goods [19], [26].

Furthermore, when ESG reporting is merely a formality, structural disruption will create systemic risk [15]. Multinational corporations are now bound by strict Net-Zero commitments to their own global supply chains. When technical barriers and supply chain auditing laws are activated simultaneously, the "greenwashing" cover will quickly be detected by digital auditing systems [17], [30]. Vietnamese businesses will face the risk of being excluded from the list of partners of global supply chains due to the inability to provide transparent Scope 3 data [9], [26].

In conclusion, maintaining a "decoupling" strategy to cope with domestic institutional pressure is no longer a safe option [16]. To truly integrate into the global value chain and ensure competitiveness and growth, VN30 enterprises must redesign the EMA system. Only when the complexity of Scope 3 is quantified and ecological risks are transformed into actual green investment flows (Green Capex) [18], [19], can Vietnamese enterprises overcome

CBAM barriers, build competitive advantages and core resilience in the new global economic era [26], [27].

7. IMPLICATIONS AND CONCLUSION

7.1. Conclusion

This study has provided an empirical analysis of the journey towards Net-Zero of 30 leading Vietnamese market enterprises (VN30) through the lens of EMA. The research results show that, despite institutional pressure from domestic legal frameworks and international integration [16], [27], most of the current ESG reporting efforts of the VN30 group have only reached a formal level and have not achieved comprehensive substance [15], [17].

The phenomenon of "Sophisticated Decoupling" is widespread [14]. Enterprises tend to establish an "organizational facade" through measuring simple physical indicators (Scope 1 and 2) or superficial communication activities [15]. Conversely, they failed or did not perform the quantification of Scope 3 data stemming from the core supply chain and funding portfolio [7], [9].

In general, when ecological impacts are not monetized into financial measures, sustainability reporting remains merely a greenwashing [18], [19]. To survive in the new global economy, Vietnamese businesses require a paradigm shift in their EMA system: shifting from counting discrete physical parameters to comprehensively integrating Scope 3 risks into green capital allocation decisions (Green Capex) and long-term business strategies [18], [19], [26].

7.2. Theoretical Implications

This study contributes to the development of Institutional Theory by clarifying the mechanism of the "Double Decoupling" phenomenon in emerging markets [14], [15]. Different from developed economies with strict technical regulations, the institutional context in Vietnam has a paradox: The pressure for international integration (such as the CBAM mechanism or the expectations of FDI flows) is extremely strong [27], while the domestic information disclosure legal frameworks (such as Circular 96/2020) are broad in nature, lacking specialized measurement guidelines [2].

The study argues that it is this institutional void that creates sophisticated variations of the decoupling phenomenon. Instead of non-compliance, businesses take full advantage of the policy gray area to use "cherry-picking" techniques [9]. The looseness of domestic technical guidance allows them to set up internationally standardized sustainability reports, even using independent assurance services for basic social indicators to create a "Halo Effect" [30]. Through this, businesses easily achieve international legitimacy without restructuring the EMA system to measure the risks of Scope 3 [17]. This is a critical theoretical contribution, asserting that "decoupling" in emerging markets is a deliberate structural construct far more than merely a superficial communication response.

7.3. Management and Policy Implications

Based on empirical findings regarding the "Sophisticated Decoupling" phenomenon and the "Scope 3 Data Gap," the study proposes two groups of specialized solutions to eliminate the greenwashing facade and re-establish the true role of EMA in VN30 enterprises.

Firstly, for the company's management (Internal Governance): Instead of media-based response solutions, restructuring the EMA system is urgently required. Businesses need to establish an Internal Carbon Pricing (ICP) mechanism to monetize climate risks, forcing investment decisions (Green Capex) to take into account actual ecological costs. To address

supply chain blind spots, the application of Activity-Based Costing (ABC) extended to upstream and downstream partners will help accurately allocate indirect emissions to each product, instead of relying solely on industry average estimates.

Specifically for the Finance and Banking sector, the lack of data in Scope 3 (Financing Emissions) largely stems from objective barriers to collecting data from borrowers. Therefore, instead of facing the pressure to immediately measure the entire portfolio, financial institutions need to adopt the PCAF (Partnership for Carbon Accounting Financials) standard. This is a necessary strategic step to provide an internationally standardized methodology, helping banks gradually and fairly transparently disclose credit risk in a systematic manner and avoid being accused of "greenwashing".

In addition, businesses are forced to change their way of working with the supply chain. To collect truthful Scope 3 data, businesses cannot simply impose from the top down but need to implement a supplier engagement strategy, through building trust, supporting professional training, and establishing financial incentive mechanisms to encourage suppliers to decarbonize together [22].

Furthermore, to resolve the conflict between the "uncontrollable" nature of Scope 3 and the need for precise quantification, businesses require a practical, phased roadmap that aligns with Vietnam's developing digital infrastructure. In the short term, businesses should transition from an "uncontrollable" state to an "estimable" state by utilizing indirect data and industry-averaged emission factors. In the medium and long term, to achieve a fully "quantifiable" state, VN30 businesses must lead the development of an integrated digital ecosystem. By progressively integrating Tier 1 suppliers into this digital infrastructure before expanding to lower tiers, businesses can systematically collect initial physical data. This phased integration of technology is key to eliminating blind spots in Scope 3 without creating an insurmountable technological burden on the supply chain.

Secondly, for regulatory bodies (the Government and the State Securities Commission): The inadequacy of the current legal framework lies in its "one-size-fits-all" approach. To overcome this, the State Securities Commission needs to issue a flexible information disclosure roadmap (phased approach) accompanied by sector-specific guidelines. For example, the industrial sector should prioritize material lifecycle inventory, the banking sector should adhere to the PCAF roadmap, while the retail and consumer sectors should focus on supplier engagement strategies. In particular, to break down the structure of sophisticated decoupling, legalizing the requirement for independent auditing and assurance of greenhouse gas data is a solution to ensure that sustainability reporting becomes a measure of true value.

Finally, while advanced tools like Internal Carbon Pricing (ICP) or PCAF are essential for large corporations (VN30), they place a significant financial and operational burden on Small and Medium-sized Enterprises (SMEs). To ensure the viability of the EMA transition across the economy, policies need to foster a collaborative ecosystem. Instead of deploying costly independent carbon accounting systems, SMEs can benefit from a "shared data platform" initiated by VN30 supply chain leaders. By integrating into the digital infrastructure of large corporations, SMEs can transparently report their basic energy metrics, thereby providing data for VN30 buyer Scope 3 calculations. Regulators should encourage this symbiosis through tax incentives for large firms that provide technological support and capacity building to their SME suppliers, thereby democratizing EMA implementation.

7.4. Limitations and Future Research Directions

Although the study has provided empirical evidence on the phenomenon of decoupling and its forms in ESG reporting, certain limitations remain.

Firstly, the sample size is limited to the 30 largest listed companies (VN30). Since this group possesses abundant resources and faces the strongest international institutional pressure, the results may not be representative of the entire economy, especially the small and medium-sized enterprise (SME) sector.

Secondly, the content analysis method based on secondary data (2024 report) only observes the consequences of information disclosure and does not measure the true intentions of the Board of Directors. The creation of a facade by businesses may be due to objective limitations in data capacity rather than a proactive strategy [15], [17].

From these limitations, future studies need to expand the survey scope to include SMEs to compare the completeness of the EMA system. At the same time, conducting longitudinal studies to monitor changes in reporting behavior when cross-border carbon tax mechanisms (such as CBAM) are officially implemented [27], or quantitative analyses measuring the direct financial impact of emissions reductions in Scope 3 [11], will be practical directions to fill the theoretical gaps in sustainable governance./.

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APPENDIX

Appendix 1. List of VN30 companies analyzed in the study

No.	Code	Organization name	Key industry group
1	ACB	Asia Commercial Bank	Finance / Banking
2	BIDV	Vietnam Investment and Development Bank (BIDV)	Finance / Banking
3	CTG	Vietnam Joint Stock Commercial Bank for Industry and Trade (VietinBank)	Finance / Banking
4	DGC	Duc Giang Chemical Group Joint Stock Company	Industry / Chemicals
5	FPT	FPT Group	Technology
6	GAS	Vietnam Gas Corporation (PV GAS)	Energy / Oil and Gas
7	GVR	Vietnam Rubber Industry Group	Agriculture / Industry
8	HDB	Ho Chi Minh City Development Bank (HDBank)	Finance / Banking
9	HPG	Hoa Phat Group	Industry / Steel
10	LPB	Loc Phat Commercial Bank (LPBank)	Finance / Banking
11	MBB	Military Commercial Joint Stock Bank (MBBank)	Finance / Banking
12	MSN	Masan Group Joint Stock Company	Consumer / Retail / Manufacturing
13	MW G	Mobile World Investment Joint Stock Company	Retail / Consumer
14	PLX	Vietnam National Petroleum Group (Petrolimex)	Energy / Oil and Gas
15	SAB	Saigon Beer, Alcohol and Beverage Joint Stock Company	Consumer / Food
16	SHB	Saigon - Hanoi Commercial Joint Stock Bank	Finance / Banking
17	SSB	Southeast Asia Commercial Joint Stock Bank (SeABank)	Finance / Banking
18	SSI	SSI Securities Joint Stock Company	Finance / Securities
19	STB	Sacombank (Saigon Thuong Tin Commercial Joint Stock Bank)	Finance / Banking
20	TCB	Techcombank (Vietnam Technological and Commercial Joint Stock Bank)	Finance / Banking
21	TPB	TPBank (Tien Phong Commercial Joint Stock Bank)	Finance / Banking
22	VCB	Vietcombank (Vietnam Foreign Trade Commercial Joint Stock Bank)	Finance / Banking
23	VHM	Vinhomes Joint Stock Company	Real Estate
24	VIB	Vietnam International Commercial Joint Stock Bank	Finance / Banking
25	VIC	Vingroup	Multi-industry Corporations
26	VJC	Vietjet Aviation Joint Stock Company	Transportation / Aviation
27	VNM	Vinamilk Joint Stock Company	Consumer / Food
28	VPB	Vietnam Prosperity Bank	Finance / Banking
29	VPL	Vinpearl Joint Stock Company	Tourism / Services
30	VRE	Vincom Retail Joint Stock Company	Real Estate / Retail

Source: Ho Chi Minh City Stock Exchange Portal, <https://www.hsx.vn/vi/tin-tuc/hose-danh-muc-co-phieu-thanh-phan-cua-bo-chi-so-hose-index-ky-thang-7-2025/2388633> accessed on April 1, 2026.

Appendix 2. Coding Tree Structure for Environmental Management Accounting in VN30

Aggregate Dimensions	Second-order Themes	First-order Evidence (Evidence extracted from VN30 Report)
Code 1.1: Institutional Pressure & Symbolic Commitment	1.1a. Institutional Commitment & Compliance	- Declaring the goal of achieving Net-Zero by 2050 and publishing a Sustainable Development Report based on GRI, TCFD, and the 17 SDGs. (f=30/30) - Actively engaging in CSR activities (e.g., spending hundreds of billions of VND on community charity, tree planting, etc.). (Excluding 2 companies that focus heavily on core physical / technical data rather than superficial CSR: DGC, HPG). (f=28/30)
	1.1b. The "Halo Effect & Assurance" Technique	- Utilizing independent assurance services from Big4 firms (PwC, KPMG, EY) but only auditing easily measurable human and social indicators. (Including representative companies: ACB, TPB, STB, VNM...). (f=8/30) - Using the achievements of one business segment (e.g., measuring Scope 3 of the VinFast electric vehicle segment) to represent the entire diversified conglomerate. (Includes: VIC, VHM, VRE, VPL. (VIC only reported on VinFast's Scope 3 success and did not report on the 3 real estate, service companies). (f=4/30)
Code 2.1: Resources and Data (Resources/RBV & Core Ecological Data)	2.1a. Greenhouse Gas Data Gap	- Inventory of waste, electricity, and water (Scope 1 & 2) at the head office. (Excludes three businesses: VIB (only measures air conditioning temperature adjustments and paper collection), SHB (only reports electricity, gasoline costs, no CO₂ emissions), and DGC (does not report on greenhouse gas emissions)). (f=27/30) - Comprehensive deficiencies in Scope 3 (Scope 3): Failure to measure "Emissions financed" from hundreds of trillions of VND in outstanding credit, or lack of data on the supply chain of construction materials and goods. (Excluding 5 companies that have quantified greenhouse gas emissions or integrated data into their core operations: GAS, PLX, FPT, HPG, VJC). (f=25/30)
	2.1b. Allocate Green Capital (Green Capex) modestly.	- Green credit / capex exists but accounts for a small proportion (<5%) of the total assets and capital or total outstanding loans (for example, green credit accounts for only 0.05% - 3.3% of total outstanding loans). (Excluding 09 companies: GAS, PLX, SAB, GVR, VNM, DGC, FPT, HPG, VJC). (f=21/30)
	2.1c. Genuine economic-ecological integration (RBV Integration)	- Transforming physical efforts into economic benefits. (For example: using AI to optimize flight paths to reduce fuel costs (Vietjet), utilizing waste heat to reduce electricity costs (Hoa Phat).) (Including: FPT, HPG, VJC). (f=3/30)
	3.1a. Sophisticated Decoupling	- The reporting framework meets international standards but applies "cherry-picking" (data selection) or "halo effect". (For example, reporting on printed paper volume, airline tickets, etc., but not measuring carbon risk from the loan portfolio.) (Excluding 09 companies: GAS, PLX, SAB, GVR, VNM, DGC, FPT, HPG, VJC). (f=21/30)

Code 3.1: Decoupling Phenomenon	3.1b. Structural Decoupling	- While the company transparently inventories massive amounts of CO ₂ (tens of millions of tons), 100% of its revenue and investment capital (Capex) remains heavily reliant on fossil fuels. (Including: GAS, PLX, SAB). (f=3/30)
	3.1c. Phased Decoupling	- Efforts were made to convert the physical data, but the accounting system lacked the capacity to record comprehensive GHG data in a timely manner (Including: GVR, VNM, DGC) (f=3/30).
	3.1d. Non- Decoupling	- Integrating environmental protection goals and maximizing financial returns; an accounting system that records and reports both economic and ecological data, supported by strong technological resources (RBV) (Including: FPT, HPG, VJC) (f=3/30)

(Note: $f=x/30$ represents the frequency of occurrence of qualitative codes among the VN30 companies surveyed). Source: Analysis and synthesis by the author.