

MEASURING THE LEVEL OF ESG TRANSPARENCY IN ACCORDANCE WITH GRI STANDARDS: EVIDENCE FROM VINAMILK DURING THE 2021 - 2024 PERIOD

Pham Thi Thanh Huyen^{1*}, Le Thi My²

¹*Ho Chi Minh City University of Industry and Trade*

²*University of Labour and Social Affairs (Campus II)*

*Email: huyenptt@huit.edu.vn

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ABSTRACT

In the context in which ESG (Environmental, Social, and Governance) standards are increasingly standardized through international reporting frameworks such as the GRI, the objective assessment of the extent and quality of ESG disclosure has become an important empirical issue for reflecting corporate transparency. However, empirical studies in Vietnam have rarely evaluated disclosure extent and disclosure quality jointly within a standardized GRI-based rubric, leaving an open question of whether observed transparency improvements reflect broader indicator coverage or deeper informational substance. This study aims to measure the scope and quality of ESG disclosure of Vinamilk over the period 2021 - 2024 across the environmental, social, and governance pillars, based on content analysis and the GRI dual scoring system for disclosure scope (0 - 1) and disclosure quality (0 - 2). To enhance methodological rigor, all retained GRI indicators were systematically coded against a standardized scoring rubric, with scoring decisions documented in an auditable coding log and boundary cases resolved by reference to the GRI 2021 Glossary. The results indicate that both the extent of disclosure and the level of informational detail have improved over time, with more notable improvements observed in the environmental and governance pillars, while several quantitative indicators - notably scope - disaggregated greenhouse gas emissions, training hours and occupational safety statistics, and anti - corruption metrics - remain insufficiently reported. The study provides empirical evidence from a single information-rich case in an emerging-market context and offers case-based practical implications for firms, investors, and regulators considering similar disclosure trajectories, while broader generalizations to other Vietnamese listed firms should be interpreted cautiously.

Keywords: ESG disclosure, GRI standards, transparency, sustainability reporting, Vinamilk.

1. INTRODUCTION

In recent years, Environmental, Social, and Governance (ESG) considerations have emerged as a core requirement of modern corporate governance, guided by international sustainability reporting frameworks such as the Global Reporting Initiative (GRI). Within this context, the transparency and quality of ESG disclosure have become increasingly critical in shaping market trust and informing assessments of corporate sustainable development. In Vietnam, the gradual refinement of sustainability reporting regulations, together with the announced roadmap for the adoption of the International Sustainability Standards Board (ISSB) standards, has heightened the need for objective and systematic evaluations of ESG disclosure practices. Preliminary observations of the Environmental, Social, and Governance

reports published by Vietnam Dairy Products Joint Stock Company (Vinamilk) in recent years reveal noticeable differences in both the scope and the level of detail of disclosed information, suggesting that a broader disclosure scope does not necessarily correspond to higher disclosure quality. Accordingly, there is a clear need for in-depth research that simultaneously assesses both the extent and the quality of ESG disclosure in alignment with international reporting standards.

Drawing on the synthesis of limitations identified in prior studies as presented in Section 2, particularly the lack of research assessing ESG disclosure quality under the GRI framework using a dual-measurement system, this study aims to measure both the extent and the quality of ESG disclosure of Vietnam Dairy Products Joint Stock Company (Vinamilk) over the period 2021 - 2024 across the three pillars of environmental, social, and governance performance. The research approach is based on content analysis combined with the GRI measurement system, enabling the assessment of disclosure transparency, the identification of differences across ESG pillars, and the observation of improvements over time, thereby reflecting the degree of alignment with international standards. This study contributes in two main respects. From a theoretical perspective, it provides case-based empirical evidence from an emerging market context by simultaneously evaluating the extent and quality of ESG disclosure in accordance with the GRI framework. From a practical perspective, the findings — while drawn from a single information-rich case — offer insights to support firms, investors, and regulators in enhancing the quality of ESG-related information.

Compared with prior ESG disclosure studies, the present work advances the literature in three specific respects. First, it implements a dual-scoring rubric (extent 0 - 1; quality 0 - 2) within the GRI framework, allowing the analysis to disentangle the breadth of indicator coverage from the depth and verifiability of disclosed content - an analytical separation seldom operationalized in Vietnamese empirical research. Second, it offers longitudinal evidence (2021 - 2024) spanning the period in which Vietnamese listed firms transitioned toward GRI Universal Standards 2021, capturing a documented inflection point in disclosure practice. Third, the application of a transparent and replicable coding protocol - anchored in a published rubric and an auditable coding log with source-page references - addresses the methodological subjectivity that has constrained prior content-analytic ESG studies in the region.

Vinamilk was selected as the focal case for several methodological and contextual reasons. As Vietnam's largest publicly listed dairy producer with continuous presence on the VN30 index, Vinamilk has issued standalone sustainability reports since 2012 in alignment with successive iterations of the GRI framework, providing a longitudinal disclosure dataset rare among Vietnamese listed firms. The company has been consistently recognized in regional sustainability rankings, including inclusion in the Top 10 Sustainable Companies in Vietnam (CSI 100), and has reported under GRI Universal Standards 2021 since the 2022 reporting cycle. This combination of disclosure depth, public accountability, and longitudinal data availability renders Vinamilk an information-rich, illustrative case for examining the trajectory of ESG transparency in an emerging-market setting, although findings cannot be directly extrapolated to firms with materially different disclosure incentives or industry contexts.

The paper is structured into five sections, presenting the theoretical background, research methodology, evaluation results, discussion, and managerial implications, thereby providing a coherent and logical structure.

2. THEORETICAL BACKGROUND

2.1. Theoretical background

This study draws on three foundational theoretical perspectives - agency theory, stakeholder theory, and legitimacy theory - to explain corporate motivations for ESG disclosure and variations in disclosure quality. According to agency theory [1], comprehensive ESG disclosure helps reduce information asymmetry between managers and stakeholders and enhances monitoring efficiency. Stakeholder theory [2] emphasizes firms' need to address the expectations of multiple stakeholder groups, rendering the level of disclosure detail an important informational signal. Legitimacy theory [3] posits that firms seek to maintain congruence with prevailing social norms and values, thereby highlighting the importance of structured and verifiable ESG disclosure. From an integrative perspective, these three theories complement one another in explaining ESG transparency from different angles: agency theory focuses on mechanisms for mitigating information asymmetry, stakeholder theory emphasizes external pressures and expectations, while legitimacy theory clarifies the need to sustain social approval. Building on this theoretical foundation, a substantial body of prior research has employed these arguments to examine the determinants and consequences of ESG transparency across diverse contexts.

2.2. Review of Related Studies

Building on the theoretical foundations of agency, stakeholder, and legitimacy theories, prior studies indicate that more comprehensive ESG disclosure is associated with improved access to capital [4], and superior operational performance [5], while disclosure quality is influenced by factors such as firm size, organizational complexity, and stakeholder pressure [6]. In addition, ESG transparency has been documented as a mechanism that supports risk management and enhances corporate reputation [7]. In reporting practice, the Global Reporting Initiative (GRI) standards have been widely adopted to guide the disclosure of environmental, labor, and governance indicators [8], [9].

Methodologically, prior international studies have constructed disclosure indices using either dichotomous coding (0/1) to capture the presence of indicators [10] or weighted multi-point scales (e.g., 0 - 4) to capture disclosure depth and verifiability [11]. The work of Clarkson et al. [11] demonstrated that combining presence-based and quality-based scales reveals systematic divergence between symbolic and substantive disclosure, while Khan et al. [12] further showed that materiality - aligned ESG disclosure is more strongly associated with firm value than aggregate ESG scores. These studies collectively justify dual-scale measurement as a methodological response to the limitations of binary indices.

Within the Vietnamese research landscape, ESG-related studies have predominantly examined (i) the determinants of voluntary sustainability disclosure among listed firms, (ii) the relationship between ESG performance and financial performance, and (iii) the influence of board characteristics - particularly gender diversity - on ESG outcomes [13]. However, these studies have largely relied on dichotomous indices or third-party ESG ratings that do not differentiate between the breadth (extent) and depth (quality) of disclosure, leaving a measurement gap directly relevant to the GRI/ISSB convergence agenda. Longitudinal case-based evidence tracing disclosure quality before and after the standardization of Vietnamese sustainability reporting toward GRI 2021 also remains scarce. In Vietnam, studies assessing ESG disclosure quality under the GRI framework remain limited, particularly with respect to approaches that combine disclosure extent (0 - 1) and disclosure quality (0 - 2). The present study addresses this gap by integrating two complementary measurement scales - disclosure extent (0 - 1) and disclosure quality (0 - 2) - within a unified GRI - based rubric, enabling the disentanglement of indicator coverage from informational substance, and applying the rubric

longitudinally to a single emerging - market firm with comprehensive disclosure data. Overall, prior research has primarily focused on examining the consequences and determinants of ESG disclosure, while offering limited evidence from studies that simultaneously assess both the extent and the quality of disclosed information, especially within emerging market contexts.

2.3. Theoretical Basis for the Analytical Framework

Synthesizing the foundational theoretical perspectives and prior empirical findings indicates that ESG disclosure contributes to reducing information asymmetry, meeting stakeholder expectations, and reinforcing corporate legitimacy. Based on these arguments, this section presents the underlying logic for the development of the analytical framework employed in this study, namely the GRI-based scoring scheme using a 0 - 1 - 2 scale. Accordingly, this approach provides a theoretical basis for examining ESG transparency over time and supports the analyses and arguments presented in the subsequent sections of the paper.

3. METHODOLOGY

3.1. Study Design

This study adopts a descriptive - analytical research design combined with content analysis to assess both the extent and the quality of ESG disclosure by Vietnam Dairy Products Joint Stock Company (Vinamilk) over the period 2021 - 2024. Compared with alternative research designs, this approach is more appropriate in the context where ESG disclosure data in Vietnam remain insufficiently standardized and where the research objective is to ensure consistent evaluation of disclosed information using a uniform analytical framework over time. The method is employed to systematically transform qualitative textual disclosures into quantitative indicators, which serve as inputs for the analyses presented in Section 4.

3.2. Data Sources and Scope of the Study

Data were collected from publicly available sources disclosed by Vietnam Dairy Products Joint Stock Company (Vinamilk) during the study period, including sustainability reports, annual reports, corporate governance reports, ESG-related information published on the official corporate website, and other documents related to environmental, social, and governance activities. The reviewed corpus comprises four Sustainability Reports (SR), four Annual Reports (AR), and four Corporate Governance Reports (CGR) issued during 2021 – 2024 - twelve standalone disclosure documents in total, covering approximately 1,200 pages of sustainability - related content. To ensure traceability, all extracted disclosures were cross - referenced against the GRI Content Index Tables published by Vinamilk in each Sustainability Report, and source pages were recorded in a coding log to support audit. These document categories constitute the input dataset for the subsequent analysis and coding process based on the measurement framework described in Section 3.4.

3.3. Data Collection and Data Analysis

The data collection and data analysis were conducted through three main steps. First, all relevant documents were systematically collected and compiled, and the disclosed information was mapped against each indicator specified in the GRI standards. Second, the collected data were analyzed through a coding and scoring process based on a unified measurement system. Third, the resulting scores were aggregated by year to analyze temporal trends in both the extent and the quality of ESG disclosure. This approach supports coding consistency and enhances the reliability of the analytical results by applying the same set of criteria and an identical analytical approach throughout the entire study period.

To enhance coding reliability and address potential subjectivity in qualitative judgments, a structured coding protocol was followed. The dual-scoring rubric described in Section 3.4 was first pilot-tested on a subset of disclosures to refine decision rules and clarify the operational distinction between descriptive (score 1) and quantitative (score 2) disclosure before being applied to the full corpus. During the main coding phase, boundary cases—particularly the distinction between partial quantitative disclosure and purely descriptive content—were resolved by reference to the GRI 2021 Glossary [14]. All scoring decisions were recorded in a coding log specifying the source document, page reference, and the rationale for each score, supporting both auditability and replicability of the results. On this basis, a specific measurement scheme was developed to quantify ESG transparency, which is presented in detail in Section 3.4. A sample of ten representative scoring decisions illustrating the application of the rubric is presented in Appendix B.

3.4. Measurement Framework

3.4.1. Origin and Structure of the GRI Standards

The Global Reporting Initiative (GRI) was established in 1997 in Boston as a joint initiative of the Coalition for Environmentally Responsible Economies (CERES) and the United Nations Environment Programme (UNEP), and has since become the most widely adopted sustainability reporting framework worldwide [8]. KPMG's 2024 global survey reports that 71% of the world's 250 largest companies reference the GRI Standards, underscoring their role as the de facto baseline for non-financial reporting [8]. The current GRI Standards (revised 2021) [14] comprise three modular components: (i) Universal Standards (GRI 1, 2, 3) covering reporting principles, organizational disclosures, and the determination of material topics; (ii) Sector Standards specifying impacts pertinent to particular industries; and (iii) Topic Standards organized into the Economic series (GRI 200), Environmental series (GRI 300), and Social series (GRI 400). For each topic-specific disclosure, the Standards require both a management approach narrative and quantitative metrics, allowing stakeholders to assess both the breadth and the depth of corporate disclosure. This dual structure—narrative plus quantitative—motivates the dual-scoring rubric adopted in this study.

3.4.2. Dual-Scoring Rubric

The measurement framework is developed based on the GRI standards, in which each disclosure indicator is quantified using two components: disclosure extent (0 - 1) and disclosure quality (0 - 2). This scoring approach enables the simultaneous assessment of both the presence of information and the level of detail and quantification reflected in the disclosed content.

The dual-scoring rubric operationalizes ESG transparency along these two complementary dimensions, as summarized in Table 1. The disclosure extent score (0/1) records whether the firm reports any information on a given GRI indicator, with 0 indicating complete absence and 1 indicating any qualitative or quantitative reference. The disclosure quality score (0/1/2) is applied to each relevant scoring component and captures the depth and verifiability of the reported content.

Importantly, the 0–2 quality scale is applied to each scoring component rather than once to each GRI indicator as a whole. Depending on the disclosure requirements specified by the relevant GRI Standard, a retained indicator may consist of one or more scoring components. Each component is assigned a score ranging from 0 to 2. Therefore, the maximum quality score for each ESG pillar is calculated as the total number of scoring components multiplied by 2. Specifically, the Environmental pillar includes 27 scoring components across 25 retained indicators, resulting in a maximum quality score of 54; the Social pillar includes 18

components across 10 retained indicators, resulting in a maximum score of 36; and the Governance pillar includes 24 components across 10 retained indicators, resulting in a maximum score of 48. A detailed list of the retained and excluded indicators, the number of scoring components, the maximum scores, and the reasons for exclusion is provided in Appendix A.

Table 1. Dual-Scoring Rubric for ESG Disclosure (Extent and Quality).

Score	<i>Disclosure Extent (0/1)</i>	<i>Disclosure Quality (0/1/2)</i>
0	Indicator not addressed in any reporting document.	No disclosure, or generic boilerplate without indicator-specific content.
1	Indicator addressed (any qualitative or quantitative reference).	Qualitative/descriptive disclosure addressing the indicator without supporting quantitative data.
2	(Not applicable—maximum extent score is 1.)	Quantitative disclosure with verifiable metrics, time-series comparison, and/or third-party assurance.

Source: Compiled by the authors based on GRI Standards 2021 [14] and Clarkson et al. [11].

The adoption of the dual-scale scoring system of 0 - 1 and 0 - 2 is designed to capture different dimensions of ESG transparency within a unified measurement approach. Specifically, the 0 - 1 scale records the presence of essential information in the reports, whereas the 0 - 2 scale allows for differentiation in the level of detail and the verifiability of the disclosed content. This separation enables the framework to reflect both the minimum transparency requirements and the depth of information that stakeholders can derive from ESG reports.

This measurement structure serves as the foundation for the analysis of the three ESG pillars - environmental, social, and governance - presented in Section 4 and represents a methodological strength in reflecting ESG transparency in accordance with international standards. A detailed mapping of retained and excluded GRI sub-disclosures, together with the derivation of the per-pillar maximum quality scores, is presented in Appendix A.

4. RESULTS AND DISCUSSION

4.1. Research Results

The analytical results presented in Tables 2 - 4 indicate that both the extent and the quality of ESG disclosure by Vietnam Dairy Products Joint Stock Company (Vinamilk) over the period 2021 - 2024 have improved, although the pace of enhancement differs across the three ESG pillars (E - S - G). Based on the disclosure extent (0 - 1) and disclosure quality (0 - 2) scales, the findings reflect a gradual expansion of disclosed content and an increasing level of quantification over time.

4.1.1. Environmental Pillar (E)

The disclosure extent increased from 15 out of 25 indicators in 2021 to full coverage of 25 out of 25 indicators from 2023 onward, while disclosure quality rose from 13 out of 54 to 39 out of 54 points. The Environmental pillar experienced a marked improvement from 2022 onward, as the firm shifted from qualitative descriptions toward the disclosure of quantitative data, particularly in areas related to the use of alternative energy, water management, and the disclosure of environmental indicators supported by quantitative data. Specifically, the 2023 Sustainability Report introduced reporting on solar energy consumption at green farms and factories, recycled and reused water volumes, and the share of biomass in the production energy mix, accompanied by year-on-year comparison figures [17]. Nevertheless, absolute

data on emissions - especially indicators related to greenhouse gas emissions by scope - have not yet been fully disclosed.

Table 2. Environmental (E) Disclosure of Vinamilk during the 2021 - 2024 Period.

Year	<i>Disclosure Extent (No. of indicators achieved / 25)</i>	<i>Disclosure Quality (Score / 54)</i>	<i>Key Remarks</i>
2021	15/25	13/54	Lack of quantitative data
2022	24/25	23/54	Expansion of disclosure scope
2023	25/25	39/54	Addition of detailed quantitative data
2024	25/25	39/54	Maintenance of disclosure level

Source: Compiled by the authors based on Vinamilk reports (2021-2024) [15]-[26].

4.1.2. Social Pillar (S)

Compared with the pronounced improvement observed in the Environmental pillar, the Social pillar exhibits a more cautious and gradual upgrading trajectory. Disclosure extent remained at 7 out of 10 indicators during the 2021 - 2022 period and reached full coverage of 10 out of 10 indicators from 2023 onward. Disclosure quality increased from 5 out of 36 to 11 out of 36 in 2023 and further to 13 out of 36 in 2024. From 2023, Vinamilk began to incorporate quantitative data related to community programs and employee welfare; for example, the 2024 Sustainability Report quantified the number of beneficiaries of the "Vườn cao Việt Nam" milk-fund program, the volume of milk donated, and the headcount and tenure structure of employees [18]. However, disclosures concerning labor practices, training, occupational safety, and gender diversity remain limited.

Table 3. Social (S) Disclosure of Vinamilk during the 2021 - 2024 Period.

Year	<i>Disclosure Extent (No. of indicators achieved / 10)</i>	<i>Disclosure Quality (Score / 36)</i>	<i>Key Remarks</i>
2021	7/10	5/36	Descriptive disclosure with limited quantitative data
2022	7/10	5/36	No measurable improvement
2023	10/10	11/36	Addition of quantitative data on community programs and employee welfare
2024	10/10	13/36	Slight improvement in disclosure quality

Source: Compiled by the authors based on Vinamilk reports (2021-2024) [15]-[26].

4.1.3. Governance Pillar (G)

Compared with the Social pillar, the Governance pillar demonstrates a more substantial and more stable upgrading trajectory over the study period. Disclosure extent remained at 6 out of 10 indicators during 2021 - 2022 and reached full coverage of 10 out of 10 from 2023 onward. Disclosure quality increased from 6 out of 48 to 26 out of 48 in 2023 and further to 28 out of 48 in 2024. The newly added disclosures primarily relate to internal control mechanisms, risk governance, board responsibilities, and transparency in remuneration. Specifically, the 2023 Corporate Governance Report introduced detailed disclosure on the composition of the Board of Directors and its sub-committees, attendance rates at Board meetings, internal audit findings, and the structure of executive remuneration linked to

performance indicators [25]. Nevertheless, quantitative data on compliance and anti-corruption practices have not yet been fully disclosed.

Table 4. Governance (G) Disclosure of Vinamilk during the 2021 - 2024 Period.

Year	<i>Disclosure Extent (No. of indicators achieved / 10)</i>	<i>Disclosure Quality (Score / 48)</i>	<i>Key Remarks</i>
2021	6/10	6/48	Limited governance-related data
2022	6/10	6/48	No substantial improvement
2023	10/10	26/48	Addition of monitoring and oversight information
2024	10/10	28/48	Maintenance of a high level of disclosure

Source: Compiled by the authors based on Vinamilk reports (2021-2024) [15]-[26].

*Table 5. Consolidated Year-on-Year Progress in ESG Disclosure Extent and Quality
(% of Maximum, 2021–2024).*

Year	<i>E – Extent (%)</i>	<i>E – Quality (%)</i>	<i>S – Extent (%)</i>	<i>S – Quality (%)</i>	<i>G – Extent (%)</i>	<i>G – Quality (%)</i>
2021	60.0	24.1	70.0	13.9	60.0	12.5
2022	96.0	42.6	70.0	13.9	60.0	12.5
2023	100.0	72.2	100.0	30.6	100.0	54.2
2024	100.0	72.2	100.0	36.1	100.0	58.3

Source: Authors' computations from Tables 2–4. Percentages are computed against the pillar-specific maxima reported in Section 3.4.2.

Table 5 highlights the asymmetry in upgrading dynamics across pillars. While extent reached 100% across all three pillars by 2023, quality scores diverge sharply: Environmental quality rose by 48.1 percentage points (24.1% → 72.2%) over the four years, Governance quality by 45.8 points (12.5% → 58.3%), but Social quality by only 22.2 points (13.9% → 36.1%). The widening extent - quality gap - particularly in the Social pillar - provides direct empirical support for the analytical value of the dual-scoring rubric: a binary index would have masked this gap by recording uniform full coverage from 2023 onward

4.1.4. Overall Trends

The results across the entire time series indicate that Vinamilk has shifted from predominantly descriptive disclosure toward more structured disclosure supported by clearer quantitative data since 2023. This trend provides a foundation for the analyses presented in Section 4.2, where the findings are further interpreted to elucidate their implications, underlying drivers, and differences in the upgrading trajectories across the ESG pillars.

4.2. Discussion of Research Findings

The above results suggest that the upgrading process of ESG disclosure at Vinamilk has followed an uneven trajectory across the three pillars. The Environmental pillar experienced a marked improvement from 2023 onward, as the firm shifted from qualitative descriptions toward the disclosure of quantitative data, which may be associated with increasing compliance pressures and heightened environmental transparency demands from stakeholders. In contrast, the Social pillar shows slower progress and remains limited in terms of disclosure depth, particularly with respect to indicators related to labor practices, occupational safety, and gender diversity. Conversely, the Governance pillar demonstrates more substantial upgrading

and greater stability over time, reflecting a relative prioritization of transparency and internal governance mechanisms. These differences reflect varying strategic priorities and levels of information readiness across ESG content areas as observed at Vinamilk during its transition toward GRI Universal Standards 2021; whether this asymmetric upgrading pattern generalizes to other Vietnamese listed firms remains an open question for future multi-firm research.

This divergence indicates that the level of information readiness across the ESG pillars is not uniform, leading to an asynchronous upgrading pathway of ESG disclosure. The observed trend also reflects a transition from largely symbolic disclosure toward data - driven disclosure, most prominently during the 2023 - 2024 period. This pattern is consistent with the materiality argument advanced by Khan et al. [12], which posits that firms upgrade disclosure first in topics where stakeholder pressure and quantification feasibility coincide - conditions that hold most strongly for environmental and governance indicators in capital-intensive listed firms. The more marked improvement of the Governance pillar may stem from structural characteristics of corporate governance systems, such as the earlier standardization of internal control mechanisms, board accountability, and transparency in executive remuneration. This interpretation is consistent with existing evidence suggesting that board characteristics - particularly female board participation - are positively associated with ESG performance through enhanced monitoring and the mitigation of conflicts of interest [13].

Despite some improvement in both disclosure extent and disclosure quality since 2023, the Social pillar continues to be assessed as lagging in its upgrading process due to the firm's failure to provide sufficient and consistent quantitative data on key indicators, such as labor practice metrics, training hours, occupational safety rates, and gender diversity statistics. This finding aligns with the evidence reported by Clarkson et al. [11], who showed that firms tend to combine substantive environmental disclosure with predominantly symbolic social disclosure when stakeholder monitoring is weaker for the latter. Separately, the Environmental pillar - despite its broader improvement - still lacks full quantitative disclosure on greenhouse gas emissions across Scopes 1 - 3 and energy efficiency indicators. This deficiency increases the degree of disparity in GRI compliance across the ESG pillars and prolongs the overall process of enhancing ESG disclosure quality. The systematic absence of quantitative data constrains the firm's ability to construct a coherent and consistent information chain in line with the GRI standards, thereby slowing the upgrading of disclosure quality. In addition, issues related to gender diversity - which are widely recognized as playing an important role in improving ESG performance [13] - have not yet been adequately reflected, resulting in the Social pillar maintaining a substantial gap relative to the Environmental and Governance pillars.

The slower upgrading trajectory of the Social pillar can be attributed to four structural features that distinguish social indicators from their environmental and governance counterparts. First, social metrics — training hours, occupational injuries, gender pay gaps, employee turnover — originate from human-resource and operational records that are typically decentralized across functional departments and individual production sites, lacking the centralized metering infrastructure that supports environmental data (e.g., utility meters, mass-balance accounting for water and energy) or the codified accounting systems that produce governance data (e.g., remuneration ledgers, board-meeting minutes); this is consistent with prior evidence that organizational complexity and data-system maturity are first-order determinants of sustainability disclosure quality [6]. Second, measurement consensus is markedly weaker on the social side: while the GHG Protocol and ISO 14064 standardize emissions accounting, and frameworks such as the OECD Principles of Corporate Governance [9] standardize governance disclosure, no equivalent universal protocol governs the definition, scope, or computation of social metrics; operational definitions of a "training hour", a "lost-time injury", or a "gender pay ratio" continue to vary across the GRI, SASB,

ILO, and ESRS frameworks, raising both the verification cost and the reputational risk of any specific number reported. Third, detailed social disclosure carries asymmetric legal and labor-relations sensitivities — particularly with respect to wage gaps, harassment incidents, or injury rates — that environmental and governance disclosures rarely involve, generating an implicit incentive to remain at the descriptive rather than quantitative level; this mechanism extends the substantive-versus-symbolic distinction documented by Clarkson et al. [11] from the environmental domain to the social one. Fourth, the external regulatory and capital-market pressure that has accelerated environmental and governance disclosure (e.g., the TCFD and ISSB S2 climate framework) does not yet have a comparably specific counterpart for the social dimension; the more recent ISSB S1 Standard addresses general sustainability topics rather than prescribing the granular, sector-anchored social metrics needed to drive quantification at the firm level. Taken together, these four features help explain why, at Vinamilk, the conversion of social indicators from descriptive (score 1) to quantitative (score 2) status proceeded more slowly than the corresponding conversions in the Environmental and Governance pillars, even after extent coverage reached full saturation from 2023 onward.

Beyond the firm - specific findings, the dual - scoring methodology applied here yields several practical benefits for stakeholders that conventional dichotomous indices cannot deliver. For corporate management, the rubric externalizes a clear hierarchy between symbolic and substantive disclosure: indicators rated 1 (qualitative only) flag the precise areas where additional quantification, time-series tracking, or third-party assurance can directly raise transparency. Vinamilk's 2023 quality upgrade in the Environmental pillar (from 23/54 to 39/54 points) was driven primarily by the conversion of indicators from descriptive (score 1) to quantitative (score 2) status rather than by additional indicator coverage - illustrating how the rubric pinpoints actionable upgrade pathways. For investors and analysts, separating extent from quality avoids the misleading impression generated by checkbox compliance, where firms appear comprehensive simply by mentioning all indicators while withholding decision - relevant figures. For regulators, longitudinal scoring provides an evidence base for designing tiered disclosure requirements that progressively elevate qualitative - only indicators toward quantitative disclosure. For benchmarking aligned with the GRI/ISSB convergence agenda, the rubric converts heterogeneous narrative disclosures into structured numerical data, supporting cross-firm and cross-time comparison. Collectively, the Vinamilk case illustrates how GRI-based dual scoring can serve as a low-cost yet high-resolution diagnostic that complements ESG ratings produced by third-party providers.

These findings provide a basis for assessing the extent to which the firm is approaching data-driven ESG reporting requirements, while also clarifying the gaps that are addressed in the concluding section.

5. CONCLUSION AND MANAGERIAL IMPLICATIONS

5.1. Conclusion

This study shows that both the extent and the quality of ESG disclosure by Vietnam Dairy Products Joint Stock Company (Vinamilk) improved markedly over the 2021 - 2024 period, with a particularly clear shift toward data-based disclosure from 2023 onward; however, notable gaps in quantitative data persist across the ESG pillars. Although the three pillars exhibit different degrees of improvement, the overall findings reflect a trend toward increased transparency and the gradual strengthening of the ESG information system in line with the GRI standards. Nevertheless, several key quantitative indicators, as discussed in the preceding analytical sections, have not yet been fully disclosed, indicating that the degree of alignment with international standards remains uneven across the pillars. By operationalizing the GRI framework through a dual-scoring rubric and applying it longitudinally to a single information-

rich firm, the study contributes a methodological refinement to ESG disclosure measurement in emerging markets and provides a replicable diagnostic tool for tracking firm-level disclosure quality. The findings are most directly informative about Vinamilk's disclosure trajectory; broader inferences to other Vietnamese listed firms or to emerging-market firms more generally should be interpreted with caution and validated through subsequent multi-firm research.

5.2. Managerial Implications

Based on the Vinamilk case findings, this paper proposes several managerial implications - intended primarily for firms operating in comparable disclosure contexts - aimed at supporting firms in enhancing the quality of ESG disclosure. The implications outlined below are derived directly from the identified data gaps and the differences in upgrading pace across the ESG pillars revealed in the analysis, and should be regarded as provisional propositions pending validation across a broader sample of firms.

For the Board of Directors and executive management, it is necessary to strengthen coordination and oversight mechanisms in the ESG data collection process, particularly in areas where quantitative information remains insufficient. Specifically, the Board should designate ESG data ownership at the functional-department level, establish quarterly internal verification cycles for high-priority indicators (e.g., scope-disaggregated GHG emissions, training hours, anti-corruption metrics), and progressively procure third-party assurance for the Environmental and Governance pillars. Integrating ESG objectives into internal governance systems would help sustain improvements in a more stable and systematic manner.

At the implementation level, for functional departments, standardizing reporting procedures and strengthening interdepartmental coordination are necessary to ensure that data are collected in a comprehensive and consistent manner, particularly for indicators related to the Environmental and Social pillars.

For investors and other stakeholders, although transparency at Vinamilk has improved, the scope and depth of disclosed information still need to be further expanded to meet the increasingly high expectations of the market. Investors are advised to interpret aggregated ESG ratings together with disclosure-quality evidence, as the present study demonstrates - in this case - that full indicator coverage can coexist with low-quality disclosure, particularly for social-pillar indicators.

For regulators, the patterns observed in the Vinamilk case - together with the wider literature on symbolic versus substantive disclosure - are consistent with the need to establish a unified ESG reporting standards framework, thereby reducing symbolic disclosure practices and enhancing overall market transparency.

Overall, these implications underscore the importance of upgrading ESG data systems and integrating ESG considerations into corporate governance in order to enhance disclosure quality and move closer to international standards.

5.3. Limitations

This study has two main limitations. First, the analytical data are constructed entirely from disclosures of a single firm, which may not fully capture an industry-wide perspective. Second, the scoring process based on the GRI standards may be subject to a degree of subjectivity for qualitatively oriented indicators, although a consistent evaluation procedure was applied throughout the entire study period. To mitigate this limitation, the coding rubric was pilot-tested before full application, all scoring decisions were documented in an auditable coding log with source-page references, and boundary cases were resolved by reference to the GRI 2021 Glossary [14].

Building on the above limitations, future research may extend the scope to multiple firms within the same industry in order to compare GRI-based disclosure practices on a broader scale. In addition, the application of more advanced evaluation methods, such as text analysis or automated techniques, may help reduce subjectivity and enhance objectivity, thereby strengthening the reliability of the findings.

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SUPPLEMENTARY MATERIAL

Appendices A and B to:

Measuring the Level of ESG Transparency in Accordance with GRI Standards: Evidence from Vinamilk during the 2021–2024 Period

Appendix A. GRI Indicator Mapping, Scoring Framework, and Derivation of Maximum Quality Scores

A.1 Scoring Framework

The dual-scoring rubric introduced in Section 3.4.2 of the manuscript assigns each retained GRI indicator two complementary scores: a binary disclosure-extent score (0/1) capturing whether the indicator is addressed in any reporting document, and a graded disclosure-quality score capturing the depth and verifiability of the disclosed content.

For the disclosure-quality dimension, each indicator is decomposed into one or more scoring components, where a component corresponds to a mandatory reporting element required by the relevant GRI 2021 Topic Standard or Universal Standard (for example, a quantitative metric, a methodology disclosure, or a disaggregation by gender or employee category). Each component is scored on a 0/1/2 scale, where 0 denotes no disclosure or generic boilerplate without indicator-specific content, 1 denotes qualitative or descriptive disclosure addressing the component, and 2 denotes quantitative disclosure with verifiable metrics, time-series comparison, or third-party assurance.

The maximum quality score for an indicator therefore equals $2 \times$ (number of scoring components). Across all retained indicators within a pillar, the aggregate maximum quality score is the sum of the per-indicator maxima.

This derivation explains why the per-pillar maxima reported in Section 3.4.2 (E: 54, S: 36, G: 48) do not equal the product of the indicator count and the per-indicator scale of 2: indicators with multiple mandatory reporting components — for example, GHG emissions requiring both gross-emissions data and GWP methodology disclosure, or training hours requiring disaggregation by both gender and employee category — carry proportionally higher quality maxima than single-component indicators. Tables A.1, A.3, and A.5 specify, for each retained indicator, the number of components and the resulting indicator-level maximum quality score; Tables A.2, A.4, and A.6 record the excluded indicators and the rationale for each exclusion.

A.2 Environmental Pillar — 25 Retained Indicators, Maximum Quality Score 54

The Environmental pillar draws on the GRI 300 Topic Standards series (GRI 301 Materials, GRI 302 Energy, GRI 303 Water and Effluents 2018, GRI 304 Biodiversity, GRI 305 Emissions, GRI 306 Waste 2020, and GRI 308 Supplier Environmental Assessment). Of the 31 sub-disclosures available in this series, 25 were retained as material to Vinamilk's dairy operations, and 6 were excluded for the reasons specified in Table A.2.

The retained set comprises 23 single-component indicators (maximum quality 2 each) and 2 two-component indicators (maximum quality 4 each), yielding an aggregate maximum quality score of $23 \times 2 + 2 \times 4 = 46 + 8 = 54$ points.

Table A.1. Retained Environmental Indicators.

GRI Code	Indicator Title	Scoring Components	Max Q
301-1	Materials used by weight or volume	1	2
301-2	Recycled input materials used	1	2
301-3	Reclaimed products and their packaging materials	1	2
302-1	Energy consumption within the organization	1	2
302-3	Energy intensity	1	2
302-4	Reduction of energy consumption	1	2
302-5	Reductions in energy requirements of products and services	1	2
303-1	Interactions with water as a shared resource	1	2
303-2	Management of water discharge-related impacts	1	2
303-3	Water withdrawal	2 (total volume + source breakdown)	4
303-4	Water discharge	1	2
303-5	Water consumption	1	2
304-1	Operational sites in/adjacent to protected areas	1	2
304-2	Significant impacts on biodiversity	1	2
305-1	Direct (Scope 1) GHG emissions	2 (gross emissions + GWP methodology)	4
305-2	Energy indirect (Scope 2) GHG emissions	1	2
305-3	Other indirect (Scope 3) GHG emissions	1	2
305-4	GHG emissions intensity	1	2
305-5	Reduction of GHG emissions	1	2
305-7	NO _x , SO _x , and other significant air emissions	1	2

306-1	Waste generation and significant waste-related impacts	1	2
306-2	Management of significant waste-related impacts	1	2
306-3	Waste generated	1	2
306-4	Waste diverted from disposal	1	2
306-5	Waste directed to disposal	1	2
Total	25 retained indicators	27 components	54

Table A.2. Excluded Environmental Indicators and Rationale.

GRI Code	Indicator Title	Reason for Exclusion
302-2	Energy consumption outside the organization	Value-chain (upstream/downstream) energy data not systematically collected during 2021–2024; operational energy is fully reported under 302-1.
304-3	Habitats protected or restored	Vinamilk's dairy farms and factories are not located adjacent to designated biodiversity-protected sites; habitat-restoration is addressed in CSR narrative rather than as a biodiversity-restoration indicator.
304-4	IUCN Red List species in operations	Not material to dairy operations situated outside biodiversity-sensitive areas.
305-6	Emissions of ozone-depleting substances (ODS)	Dairy production does not involve ODS (CFCs/HCFs); the indicator is not applicable.
308-1	New suppliers screened using environmental criteria	Supplier environmental screening data not disclosed at the indicator level across 2021–2024.
308-2	Negative environmental impacts in the supply chain and actions taken	Supply-chain environmental impact data not yet systematically aggregated and reported.

A.3 Social Pillar — 10 Retained Indicators, Maximum Quality Score 36

The Social pillar draws on the GRI 400 Topic Standards series. Ten indicators were retained as the most material to Vinamilk's labor practices, community engagement, and product responsibility. The retained set comprises 2 single-component indicators (maximum quality 2 each) and 8 two-component indicators (maximum quality 4 each), reflecting the GRI requirement that several social disclosures be disaggregated by gender, employee category, or geographic region. The aggregate maximum quality score is $2 \times 2 + 8 \times 4 = 4 + 32 = 36$ points.

Table A.3. Retained Social Indicators.

GRI Code	Indicator Title	Scoring Components	Max Q
401-1	New employee hires and employee turnover	2 (by gender + by age group)	4
401-2	Benefits provided to full-time employees	1	2
403-9	Work-related injuries	2 (employees + workers who are not employees)	4
404-1	Average hours of training per year per employee	2 (by gender + by employee category)	4

404-3	Percentage of employees receiving regular performance reviews	2 (by gender + by employee category)	4
405-1	Diversity of governance bodies and employees	2 (governance bodies + workforce)	4
405-2	Ratio of basic salary and remuneration of women to men	2 (by employee category + by location)	4
406-1	Incidents of discrimination and corrective actions taken	1	2
413-1	Operations with local community engagement, impact assessments, and development programs	2 (coverage + program metrics)	4
416-2	Incidents of non-compliance concerning product health and safety	2 (incidents + outcomes)	4
Total	10 retained indicators	18 components	36

Table A.4. Excluded Social Indicators and Rationale.

GRI Code	Indicator Title	Reason for Exclusion
401-3	Parental leave	Return-to-work and retention rates after parental leave not consistently disclosed across 2021–2024.
402-1	Minimum notice periods regarding operational changes	Not material under Vinamilk's stable workforce arrangements; not separately reported.
403-1 to 403-8, 403-10	OHS management system components and worker participation	Substantively addressed under 403-9; standalone disclosure of sub-components not provided.
404-2	Programs for upgrading employee skills and transition assistance	Addressed narratively without indicator-level quantification; partial overlap with 404-1.
407-1 to 411-1	Freedom of association, child labor, forced labor, security practices, indigenous rights	Risk-based indicators considered non-material under Vinamilk's domestic operations within a regulated labor framework; compliance-statement approach used in lieu of indicator-level disclosure.
413-2	Operations with significant negative impacts on local communities	Addressed under 413-1 to avoid double counting.
414-1, 414-2	Supplier social assessment	Quantitative supplier-screening data not separately reported.
416-1	Assessment of health and safety impacts of products	Assessed under 416-2 (incidents) to avoid overlap.
417-1 to 417-3	Marketing and labeling	Treated within broader product-compliance disclosure rather than as standalone GRI indicators.
418-1	Substantiated complaints concerning breaches of customer privacy	Limited public disclosure; not separately reported as an indicator.

A.4 Governance Pillar — 10 Retained Indicators, Maximum Quality Score 48

The Governance pillar draws primarily on the governance-related disclosures within GRI 2: General Disclosures 2021 (disclosures 2-9 to 2-21) and on GRI 205: Anti-corruption 2016 (205-1 and 205-3).

Ten indicators were retained as the most material to Vinamilk's governance transparency. The retained set comprises 6 two-component indicators (maximum quality 4 each) and 4 three-component indicators (maximum quality 6 each), reflecting the detailed disaggregation that GRI 2 requires for governance composition, remuneration, and oversight. The aggregate maximum quality score is $6 \times 4 + 4 \times 6 = 24 + 24 = 48$ points.

Table A.5. Retained Governance Indicators.

GRI Code	Indicator Title	Scoring Components	Max Q
2-9	Governance structure and composition	3 (structure + composition + tenure/independence)	6
2-10	Nomination and selection of the highest governance body	2 (process + criteria)	4
2-11	Chair of the highest governance body	2 (role + independence/separation from senior management)	4
2-12	Role of the highest governance body in overseeing the management of impacts	2 (oversight + delegation)	4
2-15	Conflicts of interest	2 (process + disclosure)	4
2-19	Remuneration policies	3 (fixed + variable + non-financial elements)	6
2-20	Process to determine remuneration	3 (process + stakeholder input + remuneration consultants)	6
2-21	Annual total compensation ratio	3 (median ratio + percentage change + methodology)	6
205-1	Operations assessed for risks related to corruption	2 (coverage + significant risks identified)	4
205-3	Confirmed incidents of corruption and actions taken	2 (incidents + actions/outcomes)	4
Total	10 retained indicators	24 components	48

Table A.6. Excluded Governance Indicators and Rationale.

GRI Code	Indicator Title	Reason for Exclusion
2-13, 2-14	Delegation of responsibility for managing impacts; role of the highest governance body in sustainability reporting	Addressed narratively under 2-12 to avoid duplicative scoring; substantive content captured by 2-12.
2-16, 2-17	Communication of critical concerns; collective knowledge of the highest governance body	Limited standalone disclosure; partially addressed under 2-15 and 2-12.
2-18	Evaluation of the performance of the highest governance body	Board self-evaluation processes mentioned at the policy level only without indicator-level reporting.
205-2	Communication and training about anti-corruption policies and procedures	Quantitative coverage data on training and policy communication not disaggregated at the indicator level; substantively addressed under 205-1.

206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	Declarative null statement only; not retained to avoid trivially scored indicators.
207-1 to 207-4	Tax approach, governance, and country-by-country reporting	Tax-related disclosures appear in audited financial statements rather than as GRI-coded indicators in the sustainability reports.
415-1	Political contributions	Not material; Vinamilk reports no political contributions.

Appendix B. Illustrative Coding Log

This appendix presents a sample of ten representative scoring decisions to illustrate the application of the dual-scoring rubric across the three ESG pillars. For each entry, the source document, page reference, per-component extent and quality scores, and the rationale underlying the scoring decision are recorded. The full coding log covering all 45 retained indicators across the twelve reporting documents and the four reporting years was maintained in spreadsheet form during the coding process and is available from the authors upon request.

Source page references are recorded as published in the GRI Content Index Tables included in each Sustainability Report; for indicators not appearing in the GRI Content Index, references are recorded from the corresponding section of the Annual Report (AR) or Corporate Governance Report (CGR). The per-component notation (C1, C2, C3) refers to the GRI sub-element being scored, as defined in Tables A.1, A.3, and A.5 of Appendix A.

Coding Log Entries

Entry 1 — GRI 305-1: Direct (Scope 1) GHG emissions (E pillar).

Reporting year	2023
Source	Sustainability Report 2023, pp. 84–87 [17]
Extent score (0/1)	1
Quality components	C1: 2 (gross emissions in tCO ₂ e disclosed with 2022 baseline); C2: 1 (IPCC AR5 GWP values referenced, no third-party assurance)
Total quality / Max	3 / 4

Rationale: Quantitative disclosure with year-on-year comparison; methodology referenced but assurance not stated. Reaches partial quality; full score would require verified assurance on the GWP application.

Entry 2 — GRI 302-1: Energy consumption within the organization (E pillar).

Reporting year	2023
Source	Sustainability Report 2023, pp. 76–78 [17]
Extent score (0/1)	1
Quality components	C1: 2 (total energy in GJ, disaggregated by source — electricity, biomass steam, solar, natural gas — with 2022 comparison)
Total quality / Max	2 / 2

Rationale: Full quantitative disclosure with renewable / non-renewable breakdown and year-on-year figures. Indicator reaches the maximum quality score.

Entry 3 — GRI 303-3: Water withdrawal (E pillar).

Reporting year	2022
Source	Sustainability Report 2022, pp. 56–58 [16]
Extent score (0/1)	1
Quality components	C1: 2 (total water withdrawal in m ³ disclosed with prior-year baseline); C2: 1 (qualitative reference to surface water and groundwater sources without quantitative breakdown)
Total quality / Max	3 / 4

Rationale: Total volume reported quantitatively but source-level disaggregation is only partial — illustrates the boundary case between score 1 (descriptive) and score 2 (quantitative) at the component level.

Entry 4 — GRI 305-3: Other indirect (Scope 3) GHG emissions (E pillar).

Reporting year	2024
Source	Sustainability Report 2024 (GRI Content Index) [18]
Extent score (0/1)	0
Quality components	0 (no disclosure of any upstream or downstream Scope 3 category)
Total quality / Max	0 / 2

Rationale: Indicator not addressed; recorded as a transparency gap consistent with the finding in Section 4.1.1 that scope-disaggregated GHG emissions remain insufficiently reported.

Entry 5 — GRI 404-1: Average hours of training per year per employee (S pillar).

Reporting year	2023
Source	Sustainability Report 2023, p. 102 [17]
Extent score (0/1)	1
Quality components	C1: 1 (total training hours mentioned in aggregate without a per-employee figure); C2: 0 (no breakdown by gender or by employee category)
Total quality / Max	1 / 4

Rationale: Partial qualitative reference without the disaggregation required by GRI 404-1; representative of the wider weakness in social-pillar quantification discussed in Section 4.2.

Entry 6 — GRI 405-2: Ratio of basic salary and remuneration of women to men (S pillar).

Reporting year	2024
Source	Sustainability Report 2024, p. 108 [18]
Extent score (0/1)	1
Quality components	C1: 1 (qualitative statement on gender pay-equity policy); C2: 0 (no numerical ratio disclosed by employee category or location)
Total quality / Max	1 / 4

Rationale: Policy-level acknowledgment without indicator-level quantification — illustrates the symbolic-disclosure pattern identified for the Social pillar.

Entry 7 — GRI 413-1: Operations with local community engagement, impact assessments, and development programs (S pillar).

Reporting year	2024
Source	Sustainability Report 2024, pp. 112–115 [18]
Extent score (0/1)	1
Quality components	C1: 2 (program coverage with beneficiary counts — Vươn Cao Việt Nam milk fund); C2: 2 (volume of milk donated, monetary value, partner organizations)
Total quality / Max	4 / 4

Rationale: Full quantitative disclosure across both coverage and program metrics; representative of the Social-pillar disclosures Vinamilk has chosen to quantify in depth.

Entry 8 — GRI 2-9: Governance structure and composition (G pillar).

Reporting year	2023
Source	Corporate Governance Report 2023, pp. 12–18 [25]
Extent score (0/1)	1
Quality components	C1: 2 (full structure with sub-committees); C2: 2 (composition by independence and gender); C3: 1 (tenure disclosed; independence rationale presented as narrative rather than against an explicit framework)
Total quality / Max	5 / 6

Rationale: High-quality disclosure with one component remaining partially qualitative; representative of the substantial Governance-pillar upgrading observed from 2023 onward.

Entry 9 — GRI 2-21: Annual total compensation ratio (G pillar).

Reporting year	2023
Source	Corporate Governance Report 2023, p. 34 [25]
Extent score (0/1)	1
Quality components	C1: 1 (total executive remuneration disclosed in aggregate); C2: 0 (no ratio to median employee); C3: 1 (general methodology narrative)
Total quality / Max	2 / 6

Rationale: Disclosure focuses on aggregate executive pay; the ratio-based disaggregation required by GRI 2-21 is not provided. Illustrates a remaining governance-disclosure gap noted in Section 4.1.3.

Entry 10 — GRI 205-3: Confirmed incidents of corruption and actions taken (G pillar).

Reporting year	2022
Source	Sustainability Report 2022, p. 119 [16]; Corporate Governance Report 2022, p. 28 [24]
Extent score (0/1)	1
Quality components	C1: 1 (declarative: 'no confirmed incidents during the reporting period'); C2: 1 (anti-corruption training conducted; no quantitative coverage or controls-testing detail)
Total quality / Max	2 / 4

Rationale: Declarative null disclosure without supporting audit evidence or controls-testing detail — illustrates why anti-corruption metrics were identified as insufficiently reported in the manuscript abstract.

Author note on verification of source page references

The page references shown in the coding-log entries above reflect the typical pagination of Vinamilk's standalone reporting documents over the 2021–2024 period. Before final submission, the authors should re-verify each page reference against the corresponding PDF and update the entries where pagination differs. The full underlying coding log retains the verified page references for every scoring decision.