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Research on the Quality of Green Accounting Information Disclosure under the Background of Digital Transformation—A Case Study of Lenovo Group

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Abstract: *As digital transformation deepens, enterprises have improved environmental data collection and processing, creating technological conditions for higher-quality green accounting disclosure. Using Lenovo Group as a case and its public reports from 2016 to 2026, this paper examines the impact of digital transformation on disclosure quality. Findings show that as digital tools such as the carbon accounting platform, ESG management console, and LISSA system were rolled out, data collection broadened, quantitative indicators increased, and the non-disclosure rate fell substantially, indicating a relatively clear positive correlation. However, three shortcomings remain: insufficient disclosure scope, with environmental liabilities, environmental protection loans, and three-wastes revenue largely undisclosed; inconsistent disclosure format, with information scattered across reports and difficult to integrate; and overreliance on qualitative descriptions for key items, with insufficient quantitative support. This paper recommends that Lenovo leverage existing digital platforms to add a green accounting data module, establish a standardized data table section, and promote quantitative accounting of key financial green indicators, providing a reference for similar companies.*

Keywords: *Digital Transformation, Green Accounting, Information Disclosure Quality, Lenovo Group*

1. Introduction

1.1 Research Background

1.1.1 Lenovo Company Profile

Lenovo Group Limited (hereinafter referred to as "Lenovo") is a huge multinational enterprise primarily engaged in the research and development, manufacturing, and sales of proprietary-brand computer systems and related products, with diversified operations across the information technology industry. It holds a significant position in the global personal computer market. According to data released by IDC, Lenovo accounted for 24.4% of the global PC market in the second quarter of 2026, ranking first in the industry, while HP ranked second with a market share of 19.1%, representing a 5.3 percentage-point gap between the two companies. Against the backdrop of a 4.9% year-on-year decline in overall industry shipments, Lenovo's shipments decreased by less than the industry average, demonstrating relatively strong market resilience and operational stability.

In recent years, Lenovo has continued advancing its digital transformation, upgrading its traditional PC manufacturing business toward intelligent operations and integrating digital technologies across R&D, manufacturing, supply chain management, and corporate operations. Its AI server business has also grown rapidly, with x86 server shipments ranking second globally. Lenovo has completed a digital upgrade covering the entire "device-edge-cloud-network-intelligence" value chain, providing a reliable data foundation for its green accounting system. Overall, this transformation offers a solid technological foundation for accurately collecting, measuring, and disclosing carbon emissions and other green data in real time. This paper therefore selects Lenovo Group Limited as a case study to examine how digital transformation affects the quality of its green accounting disclosures.

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1.1.2 Challenges of Traditional Green Accounting and Lenovo's Digital Transformation

For a long time, green accounting has faced a fundamental challenge: environmental data have been difficult to measure with the same degree of precision as financial data. Due to the relatively latent nature of carbon emissions, traditional carbon accounting has primarily relied on estimation based on the relationship between emission factors and activity data [1], resulting in relatively coarse data granularity and limited timeliness [2]. Consequently, conventional financial measurement methods have been insufficient to support refined management decision-making. As a result, green accounting information in the past was often disclosed through qualitative descriptions and estimated data, leading to a certain degree of uncertainty in measurement results.

To address these issues, Lenovo launched its digital green accounting initiative in 2022, when its carbon accounting platform went live and laid the foundation for digital data collection. In 2023, its Wuhan Industrial Base introduced the in-house LeGreen system to collect resource consumption data in real time. From a green accounting perspective, the system improves traditional indirect estimation by enabling direct, precise measurement of environmental data such as resource consumption, thereby reducing subjective estimates, partly addressing insufficient granularity in traditional environmental data accounting, and ensuring the verifiability of carbon emissions data in subsequent green data measurements.

Meanwhile, Lenovo's independently developed ESG Management Console further improved the timeliness of traditional environmental data accounting. Incorporating six carbon monitoring dimensions and a 3D visualization platform for zero-carbon management, it obtains real-time carbon intensity per unit of product and dynamically visualizes carbon emission data, shifting green data accounting from periodic estimation and aggregation toward real-time monitoring. In 2024, Lenovo introduced the LISSA system, which, based on generative AI, accurately measures carbon emissions throughout the life cycle of IT equipment, reducing accounting errors and directly supporting management decisions.

These digital initiatives have enhanced the accuracy and timeliness of green data measurement, yielding more high-quality, quantifiable environmental data that enriches and improves green accounting disclosure. Overall, Lenovo's digital transformation provides a solid technological foundation for accurately collecting, measuring, and disclosing carbon emissions and other green data in real time.

1.2 Research Significance

Although green accounting research in China spans over three decades, it mainly focuses on heavily polluting manufacturing and rarely integrates digital transformation with disclosure quality. Taking Lenovo Group as a case, this paper traces its 2016 to 2026 disclosure system to examine how digital tools improve environmental data acquisition and green accounting disclosure, adding case evidence under digital transformation.

The significance is fourfold: extending the subject to technology-driven manufacturers, linking yearly disclosure changes to digital progress, assessing improvements while identifying digital coverage gaps and proposing directions, and using Lenovo, a global PC leader with full value-chain digitalization and tools such as the carbon accounting platform, ESG management console, and LISSA system, as a valuable case. It acknowledges digital transformation's positive impact while noting shortcomings in disclosure, and proposes platform-based optimization strategies for similar enterprises.

2. Theoretical Analysis

The theoretical research on green accounting in China can be traced back to the early 1990s. Ge Jiashu and Li Ruoshan (1992) published "A New Trend in Western Accounting Theory in the 1990s: Green Accounting Theory" in Accounting Research, providing the first systematic introduction of Western green accounting perspectives and laying an important theoretical foundation for the development of green accounting research in China. [3]Subsequently, scholars in this field conducted extensive and in-depth research on the conceptual boundaries and theoretical framework of green accounting. For example, Lu Guiying (2011) extended traditional accounting theory to the environmental domain in the Journal of Shanxi University of Finance and Economics. [4]At the international level, green accounting and the System of Environmental-Economic Accounting (SEEA) represent two major methodological approaches. The former focuses on welfare valuation, whereas the latter adopts an exchange-value approach, reflecting differences between the disciplinary paradigms of economics and accounting.

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In recent years, the deepening of digital transformation and the gradual development of ESG disclosure frameworks have emerged as important drivers of research on green accounting. Based on a systematic review of 86 studies indexed in Scopus and Web of Science, Valentinetti and Rea (2024) found that the primary drivers of digitalization in corporate sustainability accounting are technological and environmental factors, such as compatibility and stakeholder pressure, while organizational constraints, including the need for technical training, remain major barriers.[5] Lodhia et al. (2025) further pointed out that digital technologies can be integrated throughout the entire process of sustainability information disclosure. [6]Meanwhile, the rapid development of ESG investment and the introduction of sustainability reporting guidelines have gradually shifted research in this field from traditional environmental cost disclosure toward ESG information disclosure and the evaluation of disclosure quality.

A review of the existing literature indicates that green accounting research has generated a relatively extensive and well-developed body of knowledge. However, relatively limited attention has been paid to how digital transformation can enhance the quality of green accounting information disclosure, particularly regarding how digital technologies can be effectively applied to optimize green accounting information disclosure practices. Systematic case-based evidence remains limited, while existing studies have largely focused on heavily polluting manufacturing enterprises, with comparatively less attention given to technology-oriented enterprises. In response to these research gaps, this study selects Lenovo Group as a case enterprise to examine the evolution and characteristics of its green accounting information disclosure system in the context of digital transformation and to propose further optimization measures. The study aims to provide case-based evidence for research on corporate green accounting information disclosure in the context of digital transformation.

3. Case Analysis

3.1 Sample Selection and Data Sources

This study selects Lenovo Group's publicly available annual reports, sustainability reports, environmental, social and governance (ESG) reports, social value reports, and carbon neutrality action reports published between 2016 and 2026 as the research sample. The sample period covers the complete evolution of Lenovo's green accounting information disclosure from a single reporting medium to multiple disclosure channels. The data are primarily sourced from Lenovo's official website, where all annual and specialized reports are publicly released by the company. The evaluation indicators for the quality of green accounting information disclosure are based on the assessment system developed by Wu Wen (2024). [7]The relevant data were collected through a systematic review of each report and manual extraction of the disclosed information. On this basis, the research dataset was constructed and subsequently used for the objective evaluation and comparative analysis of the disclosure indicators.

3.2 Data Analysis

3.2.1 Analysis of Changes in Disclosure Media

The format of Lenovo’s green accounting disclosures has undergone continuous evolution and updates (see Figure 1). Specifically, from 2016 to 2018, in addition to its annual reports, Lenovo Group primarily disclosed green accounting information through its sustainability reports; however, starting in 2019, the sustainability reports were replaced by environmental, social, and governance (ESG) reports. Starting in 2022, as Lenovo’s digital transformation took hold, the company began publishing a Social Value Report and a Carbon Neutrality Action Report in addition to its existing Environmental, Social, and Governance Report and annual report, and disclosed green accounting information in these documents. The 2025 Social Value Report and Carbon Neutrality Action Report have not yet been released. Considering that the release of these reports in previous years was delayed by several months or more (for example, the 2024 Social Value Report was released in June 2025), it is not possible to determine based solely on publicly available information whether they have already been completed but not yet published. Therefore, this article does not make any further inferences or analyses on this matter. This demonstrates that Lenovo continues to place increasing importance on its green accounting disclosure system. As digitalization advances and data accuracy improves, the company’s disclosure channels are gradually becoming more diversified.

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Year / Disclosure Carrier	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Annual Report	√	√	√	√	√	√	√	√	√	√
Sustainable Development Report	√	√	√	×	×	×	×	×	×	×
ESG Report	×	×	×	√	√	√	√	√	√	√
Social Value Report	×	×	×	×	×	×	√	√	√	×
Carbon Neutrality Action Report	×	×	×	×	×	×	√	√	×	×

Figure 1: Lenovo Green Accounting Disclosure Carrier Change Figure.

3.2.2 Analysis of Changes in Disclosure Indicators

This paper follows Wu Wen (2024) to score Lenovo's environmental accounting disclosure quality using its annual, sustainability, ESG, and other green accounting reports. It assesses 15 dimensions, such as environmental investments, liabilities, government subsidies, tax breaks, pollution fees, penalties, ISO certifications, organizational structure, and pollutant reductions. Quantitative disclosures score 2, textual descriptions 1, and non-disclosures 0; total scores range from 0 to 30, with higher scores indicating higher quality. The system reflects true disclosure quality, covers multiple dimensions, balances qualitative and quantitative aspects, and is feasible for data collection. Since Lenovo has long disclosed green accounting information in sustainability and ESG reports beyond annual reports, this paper extends Wu Wen's (2024) scope from annual reports to other annual reports. Results are shown in Figure 2.

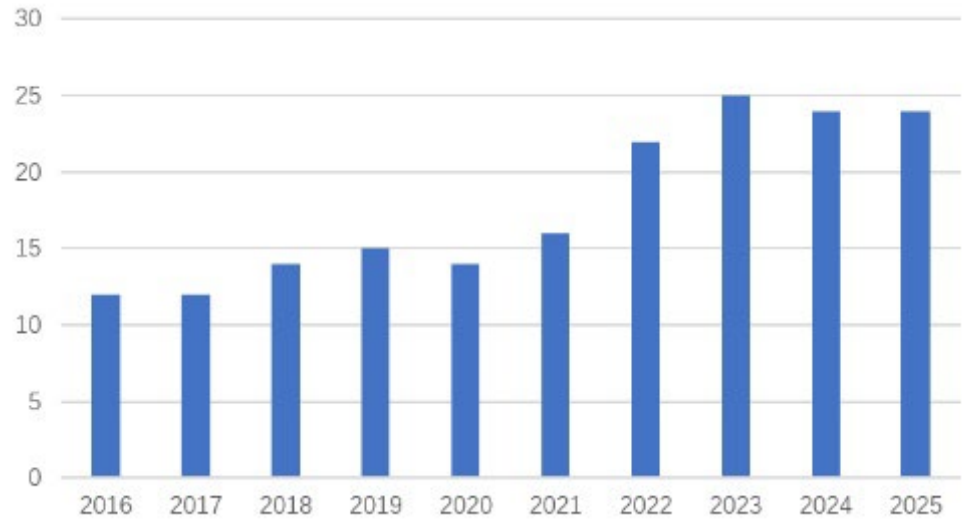


Figure 2: Lenovo Indicator Score Change Figure.

Specifically, Lenovo's scores from 2016 to 2021 were not particularly high; although they showed an overall upward trend, the increase was modest and subject to fluctuations. The pivotal year marking a phase in Lenovo's digital transformation was 2022. In the reports covering 2022–2025, Lenovo's transformation advanced further and matured, with a noticeable improvement in the quality of the disclosed metrics. Regarding the environmental section, compared to previous years, there was a greater volume of quantitative data disclosed, and the specificity of the disclosed content also saw significant improvement and development. It should be noted that this quality showed a certain degree of decline in 2025, though it remained within a reasonable range. The improvement in disclosure quality during this phase was driven not only by the company's own heightened awareness of disclosure but also by the implementation of Lenovo's digital transformation; the maturity of digitalization further enhanced the

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measurability of green accounting information.

3.2.3 Analysis of Quantitative Changes in Disclosures

Based on the indicator data calculated in Figure 2, the indicators were further processed using the values 0, 1, and 2 (corresponding to "data not disclosed," "qualitative disclosure," and "quantitative disclosure," respectively). The non-disclosure rate and quantitative disclosure rate for Lenovo's green accounting initiatives over the past decade were comprehensively summarized and statistically analyzed (see Figures 3 and 4). In Figure 3, the non-disclosure rate is calculated as follows: Non-disclosure rate = Number of indicators assigned a value of 0 / Total number of indicators × 100%. In Figure 4, the quantitative disclosure rate is calculated as follows: Quantitative disclosure rate = Number of indicators assigned a value of 2 / Total number of indicators × 100%.

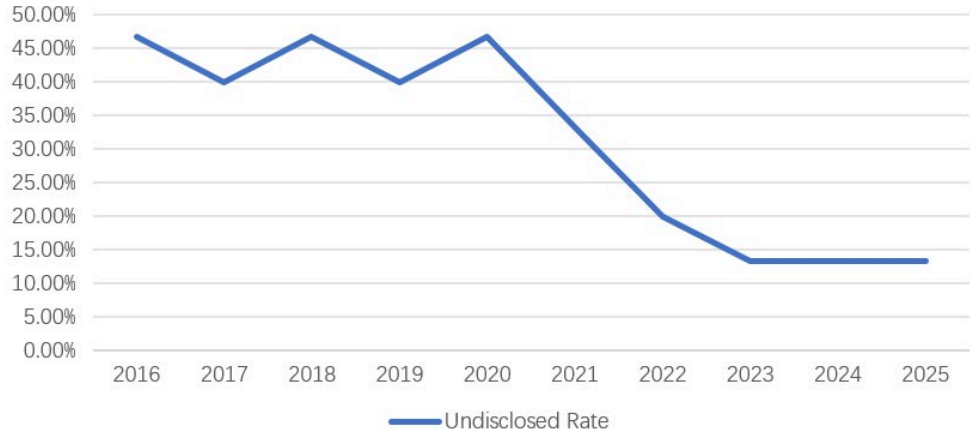


Figure 3: Change Figure of Undisclosed Rate of Lenovo Green Accounting Indicators.



Figure 4: Lenovo Green Accounting Indicators Quantitative Disclosure Rate Figure.

As shown in Figure 3, Lenovo Group's non-disclosure rate generally exhibited a fluctuating downward trend from 2016 to 2025. From 2016 to 2020, the non-disclosure rate fluctuated repeatedly without a sustained decline. In 2021, it fell below 40% for the first time, followed by a substantial decline over the subsequent two years. Thereafter, the non-disclosure rate remained relatively stable, with no further change for three consecutive years, indicating that the disclosure level had entered a relatively stable stage.

As shown in Figure 4, Lenovo's quantitative disclosure rate remained relatively low from 2016 to 2021. Although minor fluctuations and some improvement were observed, the overall level remained limited. In particular, the quantitative disclosure rate remained unchanged for four consecutive years from 2018 to 2021, suggesting that the disclosure system had reached a bottleneck. A substantial increase occurred in 2022, with the quantitative disclosure rate rising by 26.67 percentage points from the previous year. It continued to increase in 2023, reaching 80.00%, the highest level observed over the ten-year period. The rate declined slightly in 2024 and remained unchanged in 2025, indicating that quantitative

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disclosure had subsequently entered a relatively stable stage.

3.2.4 Conclusion

The results of the analysis of these two data sets reveal that digital transformation currently has a significant positive correlation with Lenovo's green accounting disclosures. Digitalization not only makes it easier to obtain green accounting data—and ensures it is more comprehensive and accurate—but also further enhances the transparency and completeness of green accounting disclosures. With real-time, reliable data to support their operations, companies will have a stronger basis for making green decisions, such as emissions reduction. These results can then be directly reflected as quantifiable data in the next report, creating a virtuous cycle that naturally improves the quality of green accounting disclosures. However, since Lenovo currently focuses primarily on carbon emissions, it has not achieved a comprehensive improvement across all indicators; further efforts are still needed to better apply digitalization to all aspects of green accounting disclosures.

3.3 Existing Problems

(1) Disclosure remains insufficiently comprehensive. "Contingent environmental liabilities" and "environmental loans" remain consistently zero, and "revenue from the sale of the three wastes" is minimal, so this area is not fully established. Carbon emissions and energy consumption are detailed, but financial green information—environmental liabilities, subsidy income, and three-wastes revenue—is virtually absent; Lenovo's 2022 carbon accounting platform excludes environmental loans and contingent liabilities, leaving digital tools only partly integrated. China lacks unified green accounting standards and clear guidelines, while external raters' emphasis on carbon emissions leads firms to prioritize mandated indicators; years of zero balances also suggest other green accounting aspects may be overlooked. Lenovo thus still has room to improve, moving from partial to comprehensive green accounting disclosure.

(2) Disclosures lack a unified format. Although supported by ESG principles, related data are scattered across reports, raising users' search costs and hindering quick overall assessment. This fragmented disclosure format not only undermines the accessibility and usability of the information but also runs counter to the demand for efficient information provision in today's rapidly evolving digital age.

(3) Some disclosures remain predominantly qualitative. Lenovo's ESG report describes its green strategy and environmental philosophy at length, but quantitative data on key green accounting items such as environmental costs, environmental liabilities and environmental revenues from the three wastes remain scarce. Digital transformation, especially the carbon accounting platform, has increased quantitative data and improved carbon emissions quantification, but mainly for subsidiary indicators such as carbon emissions. Quantification of financial green information, including environmental expenditures and waste treatment costs, remains low. Qualitative descriptions reflect Lenovo's environmental stance and initiatives, but without quantitative support, information users cannot accurately assess its green accounting status or compare it with industry peers, reducing the decision usefulness of the information.

3.4 Solution Proposals

The analysis indicates that Lenovo's digital transformation has yielded positive results and has improved the quality of its disclosures to some extent; however, these improvements have been concentrated on environmental performance information, such as carbon emissions, while green accounting information with stronger financial attributes—such as environmental protection loans—remains underreported. Green accounting information is scattered across annual reports, ESG reports, and special reports, and there is an imbalance between qualitative and quantitative data. Lenovo can leverage digital technologies for data collection, processing, integration, and report generation to enhance its green accounting disclosure system in terms of scope, format, and content.

(1) To address the insufficient scope of disclosure, Lenovo should expand the scope of its green accounting disclosures to include environmental protection loans, contingent environmental liabilities, and revenue from the sale of "three wastes" within its existing system. It could leverage its ESG Management Console and carbon accounting platform to add dedicated green accounting modules, embedding recognition, measurement, and disclosure into these digital systems. This would help close data gaps and, through cross-system linkages, reduce fragmentation of green accounting information

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across management processes.

(2) Addressing the lack of a standardized disclosure format, Lenovo could leverage its existing automated ESG reporting platform to systematically collect and integrate green accounting information currently dispersed across different disclosure channels. It could add a dedicated "Green Accounting Data" section in the ESG report to present key variables such as environmental costs, liabilities, and benefits centrally, reducing users' collection costs and improving accessibility and accuracy. It could also build a green accounting database with consistent definitions, classifications, and indexing to enhance comparability and reduce stakeholder analysis costs.

(3) Addressing the predominance of qualitative disclosure in certain areas, Lenovo could add automated detection and accounting functions for relevant green data to its carbon accounting platform, thereby promoting the quantitative disclosure of indicators such as environmental protection expenditure, environmental costs, and environmental benefits. Drawing on Tianjin's zero-carbon factory experience, it could document green accounting information from source documents to final reports to ensure traceability and verifiability. Replacing ambiguous qualitative descriptions with specific quantitative data would improve accuracy, reliability, and stakeholders' ability to compare environmental performance, helping green accounting information better support decision-making.

4. Conclusions

This paper investigates the impact of digital transformation on green accounting information disclosure quality based on Lenovo Group's public reports from 2016 to 2026. The results verify that digital tools including the carbon accounting platform, ESG management console and LISSA system can effectively improve disclosure performance. Nevertheless,Lenovo still has drawbacks including incomplete disclosure scope, inconsistent reporting formats and insufficient quantitative support for key green-accounting items.

To address these deficiencies, Lenovo should add a dedicated green accounting data module on existing digital platforms, build standardized data tables, and promote the quantitative accounting of core financial-related green indicators. Looking ahead, with the continuous advancement of the Dual-Carbon goals and the gradual implementation of domestic sustainable disclosure standards, the value of green accounting information will become increasingly prominent. As a pioneer in digital green management, Lenovo shall further improve its green accounting disclosure system and extend the data coverage of current digital platforms to environmental liabilities, environmental benefits and green costs so as to consolidate its leading position in the industry. It is also expected that Lenovo will share its practical experience in digital green accounting with supply-chain partners to improve the overall disclosure level of the industry and provide referable examples for peer enterprises.

References

[1] Bertolini M , Duttilo P , Lisi F . Accounting carbon emissions from electricity generation: A review and comparison of emission factor-based methods[J].Applied Energy,2025,392125992-125992. DOI:10.1016/J.APENERGY.2025.125992.

[2] Li G ,Wang Q ,Wang P , et al. Dynamic Measurement of Power Grid Carbon Emission Factors Based on Carbon Emission Flow Theory[J].Energies,2026,19(4):950-950.DOI:10.3390/EN19040950.

[3] Jiashu Ge, Ruoshan Li. A new trend of Western accounting theory in the 1990s - green accounting theory [J]. Accounting Research, 1992,(5):1-6.

[4] Guiying Lu. Discussion on the theoretical system of green accounting [J]. Journal of Shanxi University of Finance and Economics, 2011,33(S1):178. DOI:10.13781/j.cnki.1007-9556.2011.s1.199.

[5] Diego V ,A. M R .Factors influencing the digitalization of sustainability accounting, reporting and disclosure: a systematic literature review[J]. Meditari Accountancy Research,2025,33(2):633-680. DOI:10.1108/MEDAR-02-2024-2385.

[6] Sumit L ,Bilal M F ,Umesh S , et al. Digital technologies and sustainability accounting, reporting and assurance: framework and research opportunities[J]. Meditari Accountancy Research,2025,33(2):417-441. DOI:10.1108/MEDAR-01-2025-2796.

[7] Wu Wen. Cost stickiness, relational transactions and enterprise environmental accounting information disclosure [J]. Financial Accounting Newsletter,2024,(1):50-54. DOI:10.16144/j.cnki.issn1002-8072.2024.01.024.