

How ESG Principles Drive the Sustainable Development of Internet Enterprises: Practices and Insights from Pinduoduo

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Abstract: As global attention to sustainable development continues to grow, the ESG (Environmental, Social, and Governance) framework has become a critical strategic model for enterprises seeking high-quality development. For internet companies, the implementation of ESG principles not only aligns with global trends in sustainability but also serves as a strategic approach to enhancing competitiveness and long-term corporate value. As one of China's leading e-commerce platforms, Pinduoduo has undertaken a range of explorations and practices to embed ESG principles into its operations. This paper uses Pinduoduo as a case study and employs a logistic regression model alongside CiteSpace visual analysis to examine the company's ESG practices across the three dimensions of environment, society, and governance. The study explores how consumption patterns and innovation models under the ESG framework promote sustainable development for both the enterprise and society. It concludes by summarizing key insights and experiences to provide reference points for other internet enterprises looking to construct ESG systems.

Keywords: Pinduoduo, ESG, Corporate Sustainable Development, CiteSpace, Logistic Regression Model

1. Introduction

The ESG framework emphasizes that enterprises should pursue economic gains while actively fulfilling social responsibilities and promoting environmental protection and societal progress. As key players in the digital economy, internet enterprises' ESG practices not only influence their own development but also set benchmarks for the broader industry. Pinduoduo, as one of the frontrunners in China's e-commerce sector, has in recent years implemented a series of measures to embody ESG principles, making it a worthy subject of in-depth research.

This study conducts a case analysis based on ESG reports from internet enterprises, focusing on Pinduoduo's performance. Using CiteSpace to generate a co-occurrence network of keywords from articles on the implementation of ESG theory, the paper summarizes the research hotspots concerning how internet companies build ESG systems. Additionally, logistic regression analysis is applied to Pinduoduo's management and agricultural product consumption data to examine how consumption strategies influenced by ESG governance structures impact corporate performance. Through this

analysis, the paper explores the paths and innovations through which internet companies engage with ESG principles across the dimensions of environment, society, and governance. Findings indicate that internet companies have undertaken valuable initiatives in ESG implementation, particularly achieving notable success in fulfilling social responsibilities. However, areas such as environmental information disclosure and green logistics still require further improvement. The conclusions presented in this paper offer meaningful insights for constructing ESG systems within the internet industry. The structure of the paper is as follows: Section 2 introduces the concept and common standards of ESG, along with its impact on corporate performance. Section 3 presents a case study of Pinduoduo, analyzing its sales strategies under ESG management and related corporate outcomes. Section 4 offers key reflections and implications.

2. Overview of ESG-related concepts

2.1. The concept of ESG and ESG reporting

ESG—Environmental, Social, and Governance—is a sustainability assessment framework that focuses on long-term value creation for enterprises. It systematically evaluates corporate performance across three dimensions: environmental responsibility (E), social responsibility (S), and governance structure (G), aiming to assess a company's ability to manage non-financial risks and seize non-financial opportunities.

An ESG report, also known as a Corporate Social Responsibility (CSR) report or sustainability report, is a non-financial disclosure document compiled by companies or institutions based on internationally recognized standards such as GRI (Global Reporting Initiative), SASB (Sustainability Accounting Standards Board), and TCFD (Task Force on Climate-related Financial Disclosures). The goal is to systematically disclose the organization's strategic planning, management practices, and performance outcomes in the environmental, social, and governance fields.

In April 2022, China officially released its first ESG standard, the Guidelines for ESG Information Disclosure, in Beijing. Subsequently, in June of the same year, a sub-forum of the Corporate ESG Development Forum launched the Guidelines for ESG Report Preparation, offering enterprises a basis for report preparation. These reports combine quantitative indicators with qualitative descriptions to disclose progress on key issues such as carbon footprint management, supply chain compliance, board diversity, and employee rights protection. An ESG report serves not only as a public commitment to social responsibility but also as a vital reference for investors to evaluate a company's sustainability risks and long-term value. Adhering to the "materiality principle," these reports focus on stakeholder concerns and enhance data credibility through third-party verification, ultimately supporting the optimization of capital allocation and construction of a sustainable business ecosystem within the global green finance system.

2.2. International ESG standards and frameworks

International ESG standards and frameworks are a series of guidelines and principles developed by global organizations or industry bodies to standardize corporate sustainability disclosures and management practices. Key types include: Reporting Frameworks: GRI (Global Reporting Initiative), SASB (Sustainability Accounting Standards Board); Climate-related Standards: TCFD (Task Force on Climate-related Financial Disclosures), CDP (Carbon Disclosure Project); Responsible Investment Standards: UN PRI (United Nations Principles for Responsible Investment), ISO 26000. These standards promote transparency in environmental governance, improve social risk management, and enhance governance structures by providing unified methodologies and quantitative metrics. They serve as implementation pathways for achieving global sustainability goals.

As securities regulators, stock exchanges, institutional investors, and listed companies worldwide place increasing importance on ESG reporting, organizations such as GRI, SASB, WEF (World Economic Forum), TCFD, and CDSB (Climate Disclosure Standards Board) have led initiatives to develop reporting standards. These initiatives have played a crucial role in advancing ESG reporting and fostering global convergence [1].

2.2.1. The GRI standards

The Global Reporting Initiative (GRI), established in 1997, has developed into the most widely adopted voluntary reporting framework worldwide. It is dedicated to helping companies understand and standardize the key issues of sustainable development. The GRI standards system consists of three interrelated types of standards: Universal Standards, Sector Standards, and Topic Standards [2].

Table 1: Development of the GRI standards

Year	Milestone Event
1997	GRI founded by the Coalition for Environmentally Responsible Economies (CERES) in the U.S.
2000	First edition of the Sustainability Reporting Guidelines (G1) released by GRI
2002	Second revised edition, known as G2, released
2006	Third edition (G3) of the guidelines released
2011	Revised G3.1 guidelines issued based on G3
2013	Fourth edition of the guidelines (G4) released, designed for improved clarity and usability
2016	GRI announced the transition from G4 to modular GRI Standards, pledging to continuously update them based on public feedback, instead of issuing new versions of the guidelines

2.2.2. SASB

The Sustainable Accounting Standards Board (SASB) is a non-profit organization dedicated to standardizing corporate sustainability information disclosure. Its vision is to develop sustainability accounting standards tailored to different industries, with a strong emphasis on practical applicability [3]. The core objective of SASB is to establish a unified, industry-specific set of sustainability accounting standards that help companies disclose ESG information relevant to financial performance clearly and accurately to investors, thereby enabling better assessment of corporate long-term value and risk.

SASB standards have gained widespread attention and application globally. Many companies refer to SASB standards when preparing their ESG reports to enhance the quality and professionalism of their disclosures. Simultaneously, investors increasingly rely on SASB-disclosed data for investment decision-making, which has in turn heightened capital market attention to corporate sustainability performance.

SASB has identified 26 industry sectors and developed specific sustainability accounting standards for each, based on five major dimensions: environmental, social capital, human capital, business model and innovation, and leadership and governance. These standards focus on ESG issues that have significant implications for a company's financial condition and operational performance. For example, in the oil and gas sector, key concerns include greenhouse gas emissions and resource management, while in the healthcare sector, product safety and data privacy are prioritized. By defining these material issues and corresponding disclosure metrics, SASB enhances the comparability and usability of corporate ESG disclosures.

2.3. ESG performance and corporate performance

ESG performance refers to a company's comprehensive outcomes and achievements across the three dimensions of Environmental, Social, and Governance. It serves as a critical framework for assessing

corporate and organizational sustainability, and is increasingly regarded as an indicator of long-term corporate value [4].

Currently, academic perspectives on the impact of ESG performance on corporate performance remain divided. Most studies indicate a positive relationship between ESG performance and business outcomes; however, some scholars present differing views.

In 2022, Nie Huihua and others examined the relationship between ESG practices and common prosperity from a corporate perspective. They concluded that ESG initiatives advance common prosperity by improving financial performance and enhancing internal income distribution [5]. In 2023, Cai Wenwen et al. found that under external pressures such as government regulation, industry competition, and public oversight, ESG performance can positively influence corporate outcomes and serve a beneficial moderating role [6]. In 2024, Guo Mengnan and Tian Yuwei's study revealed that ecological and environmental auditing can enhance corporate ESG performance through both informational and deterrent effects [7]. In 2025, research by Li Liangsheng et al. demonstrated a significant positive correlation between ESG performance and business performance, regardless of whether the firm was classified as a high-tech enterprise [8].

However, according to the 2024 Global ESG Outlook report, although the ESG market continues to grow and is projected to surpass \$40 trillion by 2030, the growth rate has clearly slowed. Moreover, political uncertainty has undermined ESG momentum. At the Breakthrough Energy Summit in London, Bill Gates noted that developed countries are showing signs of backlash against green energy policies. In particular, the potential re-election of Donald Trump and his associated policy direction could have a significant impact on global climate governance. Georgia et al. analyzed panel data from 85 European energy companies between 1995 and 2020, and their empirical findings suggested a slightly negative impact of ESG performance on profitability in the energy sector. Further analysis of ESG subcomponents revealed that environmental responsibility, in particular, had a significant negative effect [9].

3. Case study of ESG in internet enterprises

Based on a questionnaire survey conducted with 1,049 participants regarding their willingness to purchase agricultural products via Pinduoduo, this study combines user responses, Pinduoduo's platform sales data, and the company's internal ESG system framework to conduct a case study analysis. It aims to summarize the impact of ESG-based management models and sales strategies on the performance of internet enterprises.

3.1. Data processing model

3.1.1. Logistic regression model

The logistic regression model is a nonlinear probability model used to examine the quantitative relationship between categorical outcomes and influencing factors. It is one of the most commonly used data mining models for analyzing categorical dependent variables. There are three main types: binary logistic regression, multinomial logistic regression, and ordinal logistic regression. Based on the nature of the collected data, this study employs a binary logistic regression model. Specifically, a binary logit choice model, which follows the logistic cumulative distribution function, is applied under the condition that repeated observations are permitted. Let the probability of choosing to purchase agricultural products on Pinduoduo be denoted as: $P_i = \Pr(Y_i = 1)$, then the probability of not purchasing on Pinduoduo is: $1 - P_i$. Thus, the logit function can be expressed as:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + \mu_i \quad (1)$$

Note: As the sample size is appropriate, chi-square testing was not performed in this section.

To explore the characteristics of users who choose Pinduoduo as their agricultural product purchasing platform, the logistic regression model is specified as:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 \text{gender} + \beta_2 \text{age} + \beta_3 \text{perfeession} + \beta_4 \text{marriage} + \beta_5 \text{education} + \beta_6 \text{income} + \beta_7 \text{experinment} \quad (2)$$

In this model, each data point represents a binary outcome: Let $Y = 1$ indicate that the respondent has purchased agricultural products on Pinduoduo, and $Y = 0$ otherwise. The independent variables X are constructed from individual-level descriptors of Pinduoduo's product sales format: $X = (\text{gender}, \text{age}, \text{profession}, \text{marriage}, \text{education}, \text{income}, \text{experiment})$.

Here, $P(Y=1|X)$ represents the probability of purchase, $P(Y=0|X)$ the probability of non-purchase, X denotes the explanatory variables, B_i ($i > 0$) represents the partial regression coefficients, indicating the contribution of each explanatory variable, and B_0 is the intercept.

The threshold probability P is set at 0.5. Thus: If $P(Y=1|X) > 0.5$, the respondent is classified as likely to purchase (positive group); If $P(Y=1|X) \leq 0.5$ or $P(Y=0|X) > 0.5$, the respondent is classified as unlikely to purchase (negative group).

The results show that the ESG-based sales model significantly increases users' willingness to purchase. The main reasons cited by users include "reasonable pricing," "fresh produce," "eco-friendly and attractive packaging," and "satisfactory service," indicating the importance of ESG-aligned sales approaches that resonate with social responsibility values.

3.1.2. CiteSpace visualization analysis

A search for the keywords "ESG and corporate development" on CNKI yielded 4,562 results. Relevant articles aligned with the theme of this study were selected for keyword co-occurrence network analysis using CiteSpace, as shown in the following figure:

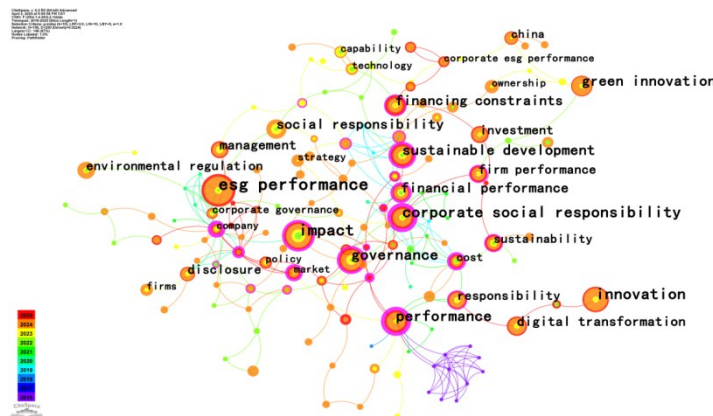


Figure 1: CiteSpace visualization map

As illustrated in the figure, current research hotspots focus on how companies build ESG frameworks to enhance corporate value, improve performance, increase resilience, and ultimately achieve sustainable development. These themes are specifically reflected in the implementation of green finance concepts, innovation practices, increased investment in R&D, and enhanced environmental information disclosure.

3.2. Analysis of results

1. Environmental Dimension (E): Green Transition and Sustainable Development

Pinduoduo's environmental initiatives primarily focus on promoting green logistics and reducing carbon emissions. However, according to a 2024 research report, the company still has room for improvement in areas such as green packaging and sustainability information disclosure. For instance, its efforts in packaging reduction, harmless processing, and recyclable packaging lag behind those of peers like Alibaba and JD.com. Moreover, the absence of a dedicated sustainability section on Pinduoduo's Chinese official website highlights shortcomings in environmental transparency.

2. Social Dimension (S): Social Responsibility and Innovative Practices

Pinduoduo has implemented a range of innovative practices in fulfilling its social responsibilities, reflecting a shift from risk avoidance to strategic integration.

(1) Poverty Alleviation and Rural Revitalization

Through the "SkyNet" model and the "Duoduo Orchard" initiative, Pinduoduo leverages big data and artificial intelligence to integrate fragmented agricultural resources, facilitating the sale of agricultural products and advancing rural revitalization.

(2) Talent Development and Empowerment

Pinduoduo has launched the "Duoduo University" model for rural revitalization, offering training and guidance to encourage highly educated individuals to return to rural areas and start businesses. This initiative equips rural producers with relevant knowledge and enhances their self-sufficiency. To date, "Duoduo University" has conducted programs in 21 provinces, training over 6,700 participants, with the goal of cultivating 10,000 new rural business talents within five years.

(3) Data Security and Privacy Protection

Pinduoduo has taken proactive steps in data security by modifying product features and enhancing privacy protection. The company has pledged not to delete users' original images and has collaborated with smartphone manufacturers to improve user experience.

3. Governance Dimension (G): Strategic Integration and Ecosystem Development

Pinduoduo integrates ESG principles into its corporate strategy, promoting the deep fusion of social responsibility and business operations. By collaborating with government agencies, farmers, and cooperatives, Pinduoduo has built a low-waste, positively circulating ecosystem that achieves both business profitability and social benefits.

3.3. Insights and recommendations from Pinduoduo's ESG practices

1. Enhance Environmental Information Disclosure

Pinduoduo should improve its regulatory framework for green logistics and packaging reduction, while strengthening transparency and information disclosure. For example, it can emulate Alibaba and JD.com by establishing a dedicated sustainability section and regularly publishing ESG reports.

2. Promote Technology-Driven Empowerment

Pinduoduo should continue leveraging emerging technologies such as big data and artificial intelligence to optimize the agricultural supply chain and advance agricultural science and technology. At the same time, it could explore broader applications of green technology, such as incentive mechanisms for consumers to adopt recyclable packaging.

3. Deepen Strategic Integration of Social Responsibility

Pinduoduo should further embed social responsibility into its core business strategy, using innovative models to address social issues sustainably. For instance, through an "empowerment over relief" approach, it can help rural areas build self-sustaining economies and increase its social impact.

4. Conclusion and recommendations

This study, through a multi-dimensional analysis, reveals both the significant value and existing challenges of ESG practices in internet enterprises. The findings indicate that companies like Pinduoduo have achieved notable success in the area of social responsibility. Their innovative practices affirm the positive role ESG principles play in enhancing corporate resilience and promoting sustainable development. Specifically, Pinduoduo has established a nationwide agricultural product distribution system through its “Cloud Group Purchase for Farmland” digital platform, covering over 2,000 counties. In 2023, this system facilitated agricultural product sales exceeding RMB 200 billion in GMV, benefiting more than 10 million farmers and forming a demonstrative “digital rural revitalization model.”

CiteSpace visualization analysis further shows that building ESG systems to enhance corporate value, promote green finance, and strengthen R&D investment has become a research hotspot in both academic and industrial circles. From 2020 to 2024, related literature saw an average annual growth rate of approximately 37%, with rising interest in topics such as “nonlinear relationships between ESG and corporate performance” and “green supply chain financial innovation.”

However, the study also points out areas where internet enterprises need improvement. These include the lack of standardization in environmental information disclosure—such as inconsistencies in carbon footprint accounting—and underdeveloped green logistics systems, particularly the low rate of packaging material reuse. Systematic optimization is required to achieve balanced development across all three ESG dimensions.

Therefore, the following recommendations are proposed: Environmental Dimension: The government should establish a standardized environmental information disclosure framework and introduce third-party certification agencies to audit key metrics such as carbon emissions and energy consumption. It should also promote the upgrade of green logistics systems by encouraging the use of biodegradable packaging and optimizing cold-chain transportation routes. Governance Dimension: Enterprises should improve their ESG governance structures by establishing independent ESG committees, integrating ESG goals into executive performance evaluation systems, and developing risk warning and dynamic adjustment mechanisms related to ESG issues. Social Dimension: It is recommended to further develop and expand distinctive rural assistance models such as “Cloud Group Purchase for Farmland,” explore long-term mechanisms for empowering rural revitalization through digital technology, and enhance the protection of labor rights.

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