



Transmission Pathways and Effect Test of ESG Performance on Financial Performance—A Case Study of Longi Green Energy Technology

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Abstract. Global environmental governance and sustainable development have become increasingly important since the 21st century, making the ESG concept a significant dimension for measuring the comprehensive value of companies. This paper takes Longi Green Energy Technology, a photovoltaic enterprise, as an example, analyzing the combined influence of ESG performance on Financial Performance. By comparing Longi Green Energy Technology's (hereafter referred to as "Longi") annual reports and sustainability reports from 2022 to 2024, this study finds that Longi's ESG performance exerts an overall positive effect on the improvement and stabilization of its financial performance, thereby enhancing its market competitiveness. Meanwhile, a variety of factors have led to issues during the process of its ESG development. This paper also focuses on the analysis and resolution of these problems. From the theoretical perspective, this paper combines the theories of ESG development and fills the gap in the case study research of photovoltaic enterprises in relevant fields, contributing to ESG research. From the practical perspective, the ESG development of Longi is representative both in the Chinese market and the photovoltaic industry, endowing this case study with certain referential significance.

Keywords: ESG Performance, Financial Performance, Longi Green Energy Technology, Photovoltaic Industry.

1 Introduction

With the deterioration of the global natural environment, reducing carbon emissions and accelerating economic green transformation have become a common consensus. China plans to gradually realize Carbon Peaking and Carbon Neutrality within 40 years. Moreover, with the development of the economy and management theory, social responsibilities shouldered by firms have been increasingly focused on by society. With all these prerequisites, companies' ESG performance has become increasingly important. ESG refers to an evaluation system for the values of enterprises, which places more emphasis on green and sustainable development than traditional. Firm's ESG performance not only affects the performance of its social responsibilities, but

directly influences its cost control, market development, and financing capacity. Ultimately, it will make a difference to the financial performance. This paper takes Longi Green Energy Technology for instance, trying to implement an analysis of the combined influence of ESG performance on Financial Performance.

Stakeholder Theory argues that enterprises need to take the interests of all stakeholders into consideration. Longi satisfies the needs of stakeholders and discloses comprehensive information through its excellent ESG performance. As a result, it lifts the efficiency of resource allocation. According to the Signaling Theory, Longi can take advantage of high-quality ESG performance to attract potential investors and transmit signals of development potential to the market. Such practice helps to lower financing costs and attract long-term investment. Resource-based View requests Longi to focus on and make use of ESG performance, convert it to a unique resource, and gain a competitive advantage [1]. Subsequent paragraphs, however, are indented.

Existing literature mainly focuses on companies' social responsibility, financial performance, and sustainability [2]; another hotspot is relevant to investment, such as investment preference. Enterprises' financial performance is positively influenced by superior ESG performance in multiple aspects. According to a research review, approximately 90% of studies found a significant correlation between corporate ESG performance and financial performance [3]. Firstly, on the cost side, firms are reducing energy consumption and pollution by considering environmental protection; reducing employee turnover, lowering the cost of recruitment and cultivation by considering employee benefits. It has been confirmed that ESG performance works in enhancing employee satisfaction, reducing turnover rate [4], and enhancing employees of Generation Z level of dedication [5]. Some researchers believe that companies should stick to ESG development due to the persistent dedication of employees. Secondly, on the revenue side, firms can not only expand into new markets but also create a green premium. It is reported that enhancing ESG performance helps in building customer loyalty, while enhancing customer satisfaction helps in creating a premium [6]. Thirdly, on the financing side, investors have a greater preference for companies behaving well in ESG [7]. As a result, such companies are allowed to reduce the financing interest rate and gain increasing profit. Subsequent paragraphs, however, are indented.

Although research integrating ESG performance with specific industries is gradually trending, related case studies remain scarce, creating a research gap. Such a situation is particularly evident in China, where case studies in relevant fields only account for 1% [2]. Meanwhile, as a key part in both sustainable development and the new energy industry, the photovoltaic industry is merely mentioned in ESG research either. Following the logic of industry characteristics - ESG practices - financial performance, this case study shows a thorough analysis of a representative enterprise in the photovoltaic industry, Longi's ESG performance. In of theoretical sense, this article fills the gap of photovoltaic industry case study in ESG research, expanding the relevant research database. In terms of practical sense, a case study focusing on a well-developed new energy enterprise could be typical, providing a learning experience to others.

2 Introduction of Longi Green Energy Technology

2.1 A Profile of Longi

Longi was founded in 2000 in China and listed on the Shanghai Stock Exchange in 2012. As of 2024, it is the world's largest manufacturer of monocrystalline silicon wafers and holds an 18% market share in the global photovoltaic module market, ranking second globally. It covers the entire industrial chain. With the advancement of environmental awareness and the innovation of management theories in China, Longi propels the ESG development step by step. It released the annual sustainable report from 2018, with the guidance of the UN SDGs. This paper will combine annual reports with sustainable reports, analyzing their ESG performance and influence.

2.2 ESG Indicators and Development Situation

In the environmental dimension, Longi incorporates ISO14001 into the management system, perfecting the environmental protection system. Longi invested over 3 billion yuan in environmental protection annually from 2022 to 2024. The use of renewable electricity generated by photovoltaic power is its primary measure to reduce carbon emissions. Generating green hydrogen and introducing low-carbon technology served as an assistant means. With the help of comprehensive methods, Longi has avoided emissions of more than 700 million tons of greenhouse gases over the years. It also contributed to the work of global carbon emission reduction by promoting its photovoltaic technology. Other issues, like reducing wastage of water resources, reducing emissions of pollutants, and maintaining biological diversity, also received attention.

In the social dimension, the company focuses on labor human rights and participates in community building. Internally, Longi abides by relevant laws and protects the labor rights of employees. At the same time, it tries to promote its level of equality and diversity in terms of gender, age composition, and culture. During the observation period, the firm recruited local employees overseas, conducted roundtable discussions about cross-cultural communication, and anti-sexism. Externally, Longi donated photovoltaic power generation facilities to local communities, ensuring the electricity supply for locals. It also cooperated with institutions like the UN Refugee Agency, hospitals, and schools, providing training and donations.

In the governance dimension, Longi sets up an ESG department and groups to assist the ESG development and to build a more resilient enterprise [8]. The independence of the board of directors is protected by the company. Independent directors account for 1/3 of the board, communicate with medium and small shareholders, and conduct on-site inspections independently. Moreover, Longi builds its risk management system and publicizes its risk management culture.

2.3 ESG Performance

In general, Longi's commitment to ESG performance has yielded returns. In terms of ratings from several organizations from 2023 to 2024, the score given by MSCI rose

from BB to BBB, given by S&P Global Corporate Sustainability Assessment rose from 50 to 58, given by China Securities Index Company remained at AA.

Several ESG performance indicators are listed in Table 1. Most of the indicators in dimension E and S, for example, water saving, proportion of female employees, and charitable donations, presented increasing trends; on the other hand, in the G dimension, many indicators showed declines. Take the ESG score from several authorities into consideration; generally speaking, the ESG performance of Longi has made progress.

Table 1. Selected ESG performance indicators of Longi.

Dimension	Indicators	2022	2023	2024
E Aligned with UN SDGs Targets 6, 7, 12, 13, 14, 15	Environmental Protection Input (100 million yuan)	40.59	55.86	36.99
	Water Savings (kt)	9,593	5,529	11,882
	Electricity Saving (100 million kWh)	6.1	10.7	10.5
	Proportion of Renewable Electricity (%)	47.2	31.1	47.5
S Aligned with UN SDGs Targets 1, 2, 3, 4, 5, 8, 9, 10, 11, 16	Proportion of Female Employees (%)	19.5	26	25.51
	Average Training Hours Per Person (h)	28.83	30.24	57.73
	Charitable Donations (100 million yuan)	0.11	0.13	0.78
	Proportion of New Suppliers Meeting ESG Social Standard (%)	83	100	100
G Aligned with UN SDGs Targets 9, 12, 17	Operating Income (100 million yuan)	1290.0	1295.0	825.8
	Proportion of Independent Directors (%)	33.3	33.3	33.3
	Processing Ratio of Anonymous Whistleblowing for Business Ethics Violations (%)	100	100	100
	Research Input (100 million yuan)	71.4	77.2	50.1

Data sources: 2022, 2023, 2024 Sustainability Reports of Longi Green Energy Technology.

3 Impact Mechanism of ESG Performance on Financial Performance

3.1 Impact on Profitability

The following part discusses the impact of ESG performance on Longi's financial performance from the perspectives of cost and revenue. As shown in Fig. 1, Longi's operating income ranked among the top three in the industry in 2022 and 2023; its gross profit margin also remained at a leading level during the same period, as presented in Fig. 2 [9].

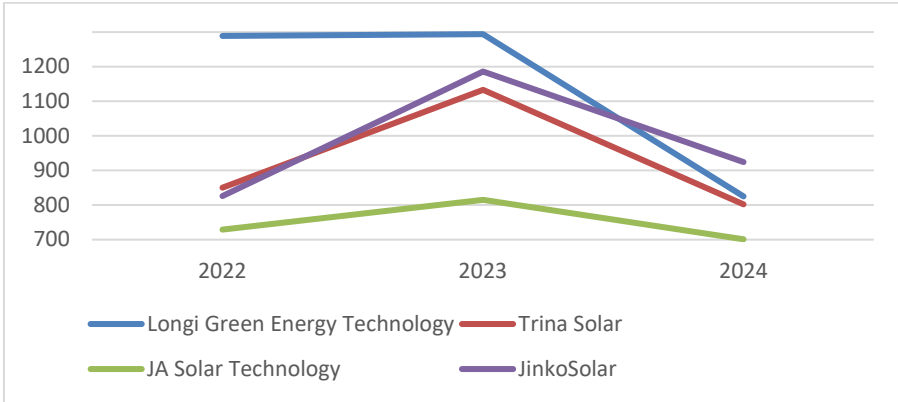


Fig. 1. Operating income from 2022 to 2024 (100 million yuan).

Data sources: 2022, 2023, 2024 Annual Reports of Longi Green Energy Technology, Trina Solar, JA Solar Technology, and JinkoSolar.

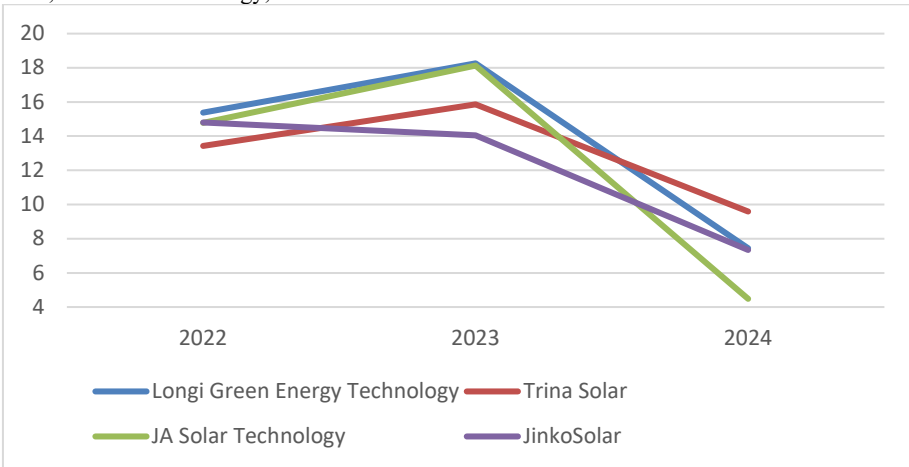


Fig. 2. Gross profit from 2022 to 2024 (%).

Data sources: 2022, 2023, 2024 Annual Reports of Longi Green Energy Technology, Trina Solar, JA Solar Technology, and JinkoSolar.

On the cost side, Longi invests capital in developing and introducing new technology. Taking data from Table 1 as an example, from 2023 to 2024, Longi directly cut down costs by using new water and electricity techniques. Besides, it reduced indirect costs by reducing emissions of greenhouse gases and raising the waste recycling rate. These actions helped in preserving the ecological environment and reducing the burden brought by the deterioration or governance of the ecological environment.

On the revenue side, better ESG performance is beneficial for Longi to expand into new markets and create a green premium. Strong positive correlation could be

observed between consumers' cognition of green welfare and their willingness to buy [10]. There is a global trend in propagandizing and popularizing green manufacturing. Longi also made efforts to advance its ESG performance. Such a situation helps Longi to attract and cultivate loyal customers and to charge a green premium. Besides, green premium inspires customers to get positive thoughts about themselves, increasing their preference for green products [11]. As a result, Longi can achieve a positive cycle, where it develops its ESG practice, attracts customers, charges a green premium, inspires their positive thoughts, and finally creates a greener premium.

3.2 Impact on Operation Efficiency

ESG performance has positive impacts on Longi's operating efficiency in two aspects. For the employees, Longi raises their satisfaction by anti-discrimination and guaranteeing rights. By doing so, Longi enhances work efficiency and retention rate. Moreover, with a huge amount of training, Longi could upgrade employees' skills, avoiding situations of work-related injuries or deaths.

For the supply chains, Longi can enhance resource allocation efficiency by advancing its ESG performance. As shown in Fig. 3, although Longi's inventory turnover ratio slightly decreased in 2024, it remained higher than most peers in 2022 and 2023. That is due to Longi's efforts in aspects of supply chains, staff training, and so on.

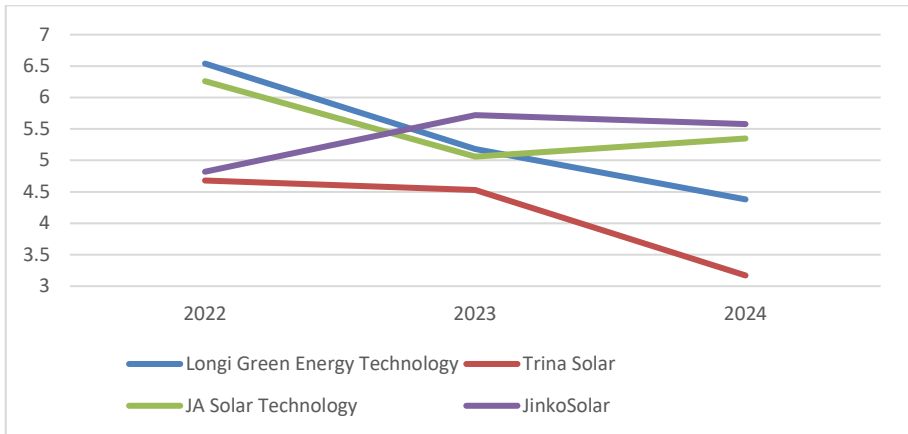


Fig. 3. Rate of stock turnover from 2022 to 2024(times).

Data sources: 2022, 2023, 2024 Annual Reports of Longi Green Energy Technology, Trina Solar, JA Solar Technology, and JinkoSolar

3.3 Impact on Financing Cost

Longi can leverage satisfactory ESG performance to attract capital and reduce the coupon rate of the green bond. Good ESG performance is beneficial to attract investment from individuals and the government. Green certifications from third

parties help in significantly decreasing the financing cost of green bonds. Furthermore, if Longi invests proceeds of green bonds in environmental protection projects, it will obtain more investor preference and reduce financing costs to a larger extent [12].

Based on a comprehensive analysis of the above studies, it can be reasonably inferred that developing ESG performance brings competitive advantages to Longi in financing. It helps Longi to attract investment and reduce interest rates, providing a more solid guarantee for operation. When capitals obtained from green bonds are used to develop and promote its ESG performance, Longi is capable of attracting more investment and gaining a lower interest rate.

4 Problems and Suggestions of Longi's ESG Practice

4.1 Existing Problems

The first problem is the insufficient correlation between ESG input and financial returns. The primary external factor should be a chaotic and opaque ESG marking system. There are more than 600 third-party rating agencies; 10 are prohibited in Longi's 2024 Sustainable Report. Due to the lack of a uniform standard, there's a significant difference in indicators, weight, and methods among agencies. As a result, the same company during the same period could get scores with a huge difference, making the scores less referential. Moreover, limited by the absence of regulators and insufficiency of transparency, greenwashing keeps recurring despite repeated prohibitions. Many enterprises, like H&M and Volkswagen, were exposed to environmental scandals after getting a high ESG grade. These limitations and scandals weaken the positive feedback from the market. The main internal factor is limited experience, which causes improper resource allocation and improper investment. For instance, Longi invested more than three billion yuan in an innovative technology called BC battery, but the market responded poorly.

Secondly, the diversity level needs to be strengthened. Plenty of studies show that more diverse teams are beneficial to promote firms' ESG performance and business value [13]. Taking gender diversity as an example, for better ESG performance, a company will need at least 3 female directors [14]. However, for Longi, the number gradually dropped from 3 in 2021 to 1 in 2024. At the executive level, the proportion of employees who are not of Chinese mainland nationality declined from 20% in 2022 to 8.9% in 2024. The proportion of female employees consistently remained below 30%. In general, Longi prefers males with Chinese mainland nationality, leading to a low level of diversity.

4.2 Suggestions

Firstly, an ESG - Financial Performance System should be established. In the face of improper resource allocation, Longi needs to pay more attention to financial indicators and strengthen the influence of financial performance on ESG practice. For example, when Longi perceives that market reaction is not strong, it can make a com-

parative analysis of investment for new technology, market loss due to lag in technology, and market expansion due to new technology. Combining with financial indicators like gross margin and money flow, Longi can estimate the financial impact of new technology and decide whether to continue developing the technology. Taking full account of the current situation of the photovoltaic industry, which has the characteristics of supply-demand imbalance and market contraction, Longi needs to attach great importance to this system. More resources could be put into an ESG project that helps in promoting financial performance.

Secondly, Longi needs to build a diverse workforce. Longi can strengthen cooperation with overseas institutions, women's associations, and schools, and improve the quality of local labor through financial support and induction training. Besides, it can try to reach an agreement with the local government, enjoying preferential policies by providing employment positions. Moreover, it can advertise its diverse atmosphere, attracting potential customers and investors who focus on related topics. By doing so, Longi creates motivation for itself to develop diversification further. For on-the-job employees, Longi is capable of meeting the goal by strengthening the construction of cross-cultural exchange roundtable discussions and providing an equal workplace environment. Besides, Longi needs to reconsider the positive influence of female directors on ESG and financial performance. Longi should address gender discrimination issues and make efforts to increase the number of female directors to more than 3 by the release of its 2026 Sustainability Report.

5 Conclusion

This paper focuses on Longi Green Energy Technology, analyzing how the ESG practice and performance influence its financial performance. To sum up, Longi's ESG practice has positive effects on its financial performance through enhancing profitability and operational efficiency, attracting investment, and reducing financing costs. Its ESG performance gives Longi stronger competitiveness and resilience. The ESG system of Longi performs well in 3 dimensions and many aspects, received affirmation from authorities. On the other hand, Longi has encountered issues like insufficient financial returns and diversity. In response to these problems, this paper offers proposals like establishing an ESG-Financial Performance System and building a diverse workforce.

The main contribution of this paper is to bridge the gap in the current ESG research field, where there are relatively few case studies on the photovoltaic industry. From the theoretical perspective, this study integrates academic theories with Longi's characteristics as a photovoltaic enterprise, enriching the application scenarios of these theories in the new energy field. A detailed is conducted on the impacts and influencing mechanisms of Longi's ESG practice on its financial performance. It also proposes innovative research approaches. At the practical level, this study points out the flaws and suggestions of Longi's ESG system, providing valuable insights for ESG development for both Longi and other companies. The main shortcomings of

this article lie in the single source of first-hand information. This paper mainly relies on information from reports released by listed companies, and has not conducted on-site investigations. More rigorous data analysis and first-hand information will be used in future research. The following research will discuss the impact mechanism in a more rigorous and professional approach.

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