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Design an ESG Rating System: A Case Study of the Chinese Dairy Industry

Shuran Ying[1,a,*]

[1]*Statistical Science Department, University College London, London, UK*
a. shur202308@163.com
**corresponding author*

Abstract: The Environmental, Social, and Governance (ESG) rating system has become a crucial framework for evaluating companies, but its lack of standardisation poses challenges. This study presents a case study of the Chinese dairy industry to design a standardised ESG rating system. The proposed system comprises four levels—aspect, theme, information, and indicators—with quantitative and qualitative performance indicators assigned weights based on their significance. Publicly available data from Chinese dairy companies are analysed to calculate weighted ESG scores, allowing for clear and comparable ratings. The case study focuses on environmental impact, social responsibility, governance standards, and negative aspects, offering insights into the industry's commitment to sustainability. The designed ESG rating system aims to address the current lack of standardisation, providing a tool for fair comparisons and guiding companies toward improvement. The case study underscores the importance of ESG considerations in a sector with significant environmental and social implications, contributing to more informed and responsible decision-making.

Keywords: ESG, ESG rating, Dairy industry, China

1. Introduction

The Environmental, Social, and Governance (ESG) rating system has emerged as a comprehensive framework for evaluating companies in these areas. According to Pacelli, Pampurini and Quaranta [1], the emphasis on ESG (Environmental, Social, and Governance) investment strategies has become a rising concern for financial institutions, intermediaries, and investors, particularly in response to the heightened focus from global political authorities. Thus, ESG has evolved into a critical performance indicator for firms, with its analysis often taking both qualitative and quantitative dimensions. Quantitative analysis, known for its comparability and standardization, is frequently employed by rating agencies to objectively assess companies. Rating agencies determine objective ESG ratings for companies using non-financial reporting and information that is publicly accessible [2]. ESG ratings assess a company's resilience to particular ESG risk factors, as indicated by MSCI [3]. The objective of ESG ratings is to mirror a company's capacity to adapt to environmental and societal shifts, along with its transparent communication in addressing these challenges, so ESG ratings play a crucial role in enabling sustainable decision-making in various aspects of daily life, as emphasised by CSRHub [4].

Despite the evident significance of ESG ratings, a crucial issue emerges—the lack of standardisation among various ESG rating systems. Since there is no specific requirement for what ESG indicators should be shown on the companies' reports and ESG rating system lacks standardisation, it will be essential to accelerate the standardisation process of ESG rating system and the standardisation of ESG policies. According to Financial Times [5], MIT Sloan School of

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Management researchers emphasise the urgent need to address the lack of standardisation in ESG scoring. According to Berg, Kölbel, and Rigobon [6], this lack of standardisation hinders the evaluation of ESG performance for companies, funds, and portfolios, and the divergence in ESG ratings diminishes companies' incentives to enhance their ESG performance, as mixed signals from rating agencies can lead to under-investment in improvement activities. Thus, for future designs of ESG grading system, standardisation of risk factors would be essential and meaningful.

The global dairy industry plays a vital role in meeting nutritional needs, but it also faces increasing scrutiny regarding its environmental impact, social responsibility, and corporate governance. Therefore, I will take the Chinese dairy industry as a case study to discuss the design of ESG rating system. This essay will introduce the possible method of designing an ESG rating system, then focus on a case study of Chinese Dairy Industry to analyse ESG rating system designing through three separate aspects, and finally obtain a conclusion and suggestions.

2. Design an ESG rating system

ESG rating, short for Environmental, Social, and Governance rating, is a measure of a company's performance in key areas related to sustainability and ethical business practices. ESG ratings are used by investors, stakeholders, and the public to assess how well a company is managing its impact on the environment, its relationships with society, and its governance practices. The designing process of an ESG rating system can be consisted by several steps, including defining levels, identifying key ESG risk factors, collecting data, standardisation, defining rating scale, etc.

Firstly, the rating system is built on 4 levels. The first level is aspect, including environment, social, governance and negative aspects. The second level is theme, each theme is consisted by several points of information. The third level is information which is consisted by quantitative or qualitative performance indicators, such as environmental protection investment per unit of output (quantitative) or degree of completeness of supplier relationship management system (qualitative). Each indicator carries a particular weight according to its importance and effects. Figure 1 below shows an example of ESG rating system.

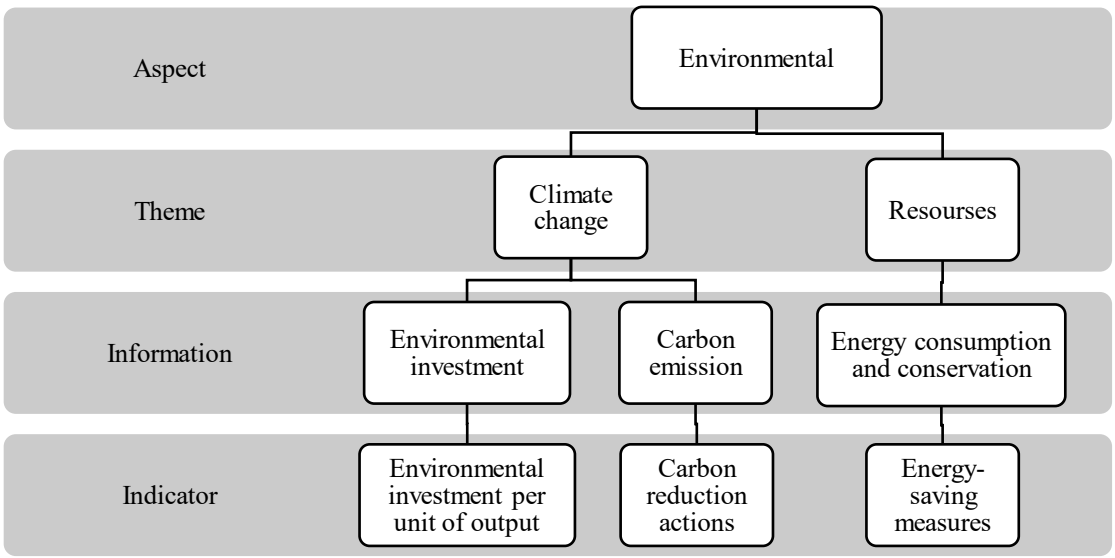

Figure 1: An example of rating system.

From the public datasets and companies' websites, the data for the indicators are available. As mentioned before, each of the ESG indicators is assigned a weight based on its significance and the weighting reflects the relative importance of each indicator in determining the overall ESG

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performance. The individual scores for each indicator are multiplied by their respective weights, and the results are summed to calculate a weighted ESG score. This score represents the aggregated performance across the four aspects (environmental, social, governance and negatives). The calculated weighted ESG score is then transformed into a numerical scale for ease of interpretation. This transformation standardises the scores, allowing for straightforward comparisons. Based on the transformed scores, the ESG ratings are assigned. The final results are often presented in a table. This table provides a clear and concise overview of the ESG scores and their corresponding ratings.

3. Case Study of Chinese dairy industry

3.1. Reasons of choosing Chinese dairy industry

The dairy industry is responsible for the highest proportion of carbon emissions produced by the agricultural sector and is vulnerable to climate change and must meet the constantly increasing nutritional needs of developing countries [7]. Figure 2 shows a high proportion of methane emissions is attributed by agriculture. The emissions of carbon will affect the climate change significantly.

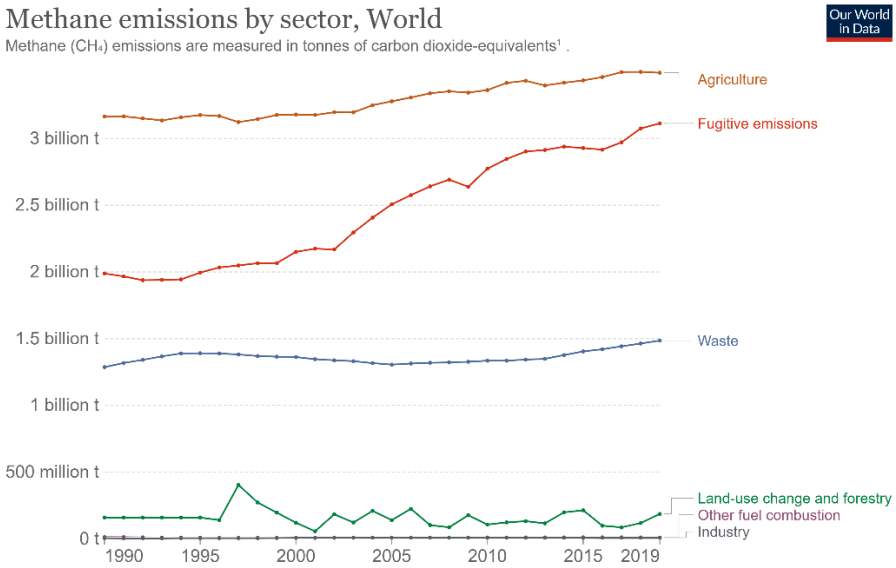

Figure 2: World methane emissions by sector [8].

According to Statista [9], since the 1990s, China's dairy industry has experienced a remarkable surge driven by profound economic and social transformations. This surge can be attributed to several factors, including a notable increase in disposable income, ongoing innovations in dairy products, shifts in dietary preferences, and a growing awareness of health considerations. Notably, dairy products are gaining widespread recognition as valuable sources of essential nutrients such as protein and calcium. The latest Chinese Dietary Guidelines recommend a daily consumption of 300 to 500 grams of dairy products for adults, reflecting the acknowledgment of their nutritional benefits. As presented by Figure 3, China stands as the world's second-largest market for dairy products and eggs in terms of sales revenue.

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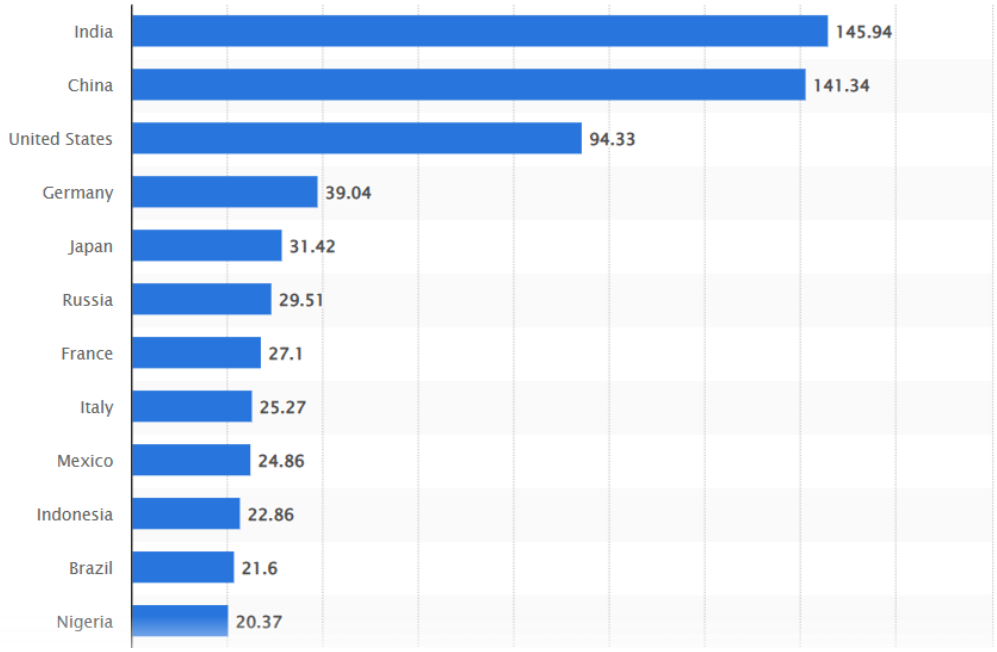

Figure 3: Revenue of the dairy products & eggs market worldwide in 2022, by country (in billion U.S. dollars) [9].

Since Chinese dairy industry is an influencing and huge sector and it is highly associated with ESG indicators, I choose it as a case study for the design of ESG rating system.

3.2. Data and design

Several publicly listed companies in the Chinese dairy industry are selected for further study, encompassing leading, mid-tier, and trailing enterprises. Due to the relatively lax requirements in China regarding the disclosure of ESG reports, the indicators provided by each company lack standardisation. For instance, some companies may choose not to disclose certain data, or there might be inconsistencies in data units. The ESG reports disclosed by companies contain fragmented relevant information without specific ratings. Therefore, the selection of subsequent indicators is based on summarising the information from the reports of various companies in recent years. The final selection is made based on disclosure frequency, level of detail and other factors. Referring to those ESG reports from recent years, commonly used indicators in the dairy industry are chosen as ESG indicators to enhance a certain level of standardisation. The indicators which are summarised in the following tables are sourced and chosen from the ESG reports disclosed on these companies' official websites [10][11][12][13][14]. The detailed explanation will be elaborated separately in later discussion.

After recording the data for each indicator, data were divided into quantitative and qualitative data to further analysis. For qualitative data, quantitative analysis is likely to be challenging, so the evaluation will be based on the completeness, authenticity, and effectiveness of disclosure, using a 10-point scale, with a score of 0 for non-disclosure. In terms of quantitative data, a quantitative analysis would be more specific and effective. I believe comparing each indicator with industry average data, calculating using percentage changes, and ultimately converting to a 10-point scale (with 0 points for non-disclosure) would yield significant results. After conducting separate data analyses for qualitative and quantitative indicators, I calculate a final weighted score based on the importance weight assigned to each indicator. The weighted scores are then categorised into 7 levels.

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Table 1 below shows in detail how to present the weighted scores and ESG ratings. Given the calculated weighted scores, clear ESG ratings can be shown.

Table 1: ESG Scores output.

Weighted score	ESG rating
8.6-10.0	AAA
7.1-8.6	AA
5.7-7.1	A
4.3-5.7	BBB
2.9-4.3	BB
1.4-2.9	B
0.0-1.4	CCC

3.3. Environmental Considerations

The environmental aspect of ESG evaluates a company's impact on the natural world and how it manages and mitigates environmental risks. The dairy industry is a significant contributor to environmental issues, with concerns ranging from methane emissions from cattle to water pollution from dairy farm runoff. The ESG grading system evaluates companies on their efforts to mitigate these environmental challenges. The environmental indicators assess enterprises' efforts and accomplishments in mitigating the negative impact of operations amid specific environmental risks, aiming to gauge the achievement of established environmental goals, covering environmental risk exposure and risk management capabilities. After concluding the environmental part of ESG reports of those chosen listed companies, the following table showing important indicators are summarised.

Table 2: Environmental ESG indicators.

Aspects	Themes	Information	Indicators
Environmental	Climate change	Total environmental investment (2%)	Environmental investment per unit of output (2%)
		Carbon emission (4%)	Carbon emission per ton of product (2%), carbon reduction actions (2%)
		Carbon footprint (1%)	Emission processes (1%)
		Strategies and plans for climate change (3%)	Action measures (3%)
	Natural resources	Energy consumption and conservation (6%)	Comprehensive energy consumption per unit of output (2%), energy consumption density (2%), energy-saving measures (2%)
		Water resource consumption and conservation (3%)	Water savings per ton of product (1%), water-saving measures (2%)
		Strategies for biodiversity conservation (1%)	Action measures (1%)
	Pollution and waste	Packaging and raw material usage (3%)	Paper savings per ton of product (1%), recycling measures (2%)
		Waste and disposal (8%)	Wastewater emission per ton of product (2%), waste-air emission per ton of product (2%), reuse rate of treated water (1%), wastewater treatment per ton of product (1%), treatment measures (2%)
	Development opportunities	Green environmental actions (1%)	Action Measures (1%)
		Animal welfare and husbandry (1%)	Action Measures (1%)

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Table 2, including both quantitative and qualitative indicators in each theme of environmental aspect, indicates that the company's environmental performance is analysed through quantitative assessments of various indicators, including energy and water consumption, emissions, biodiversity protection, waste management, and innovative initiatives. Transparency in disclosure regarding these aspects is a key component of the evaluation. The quantitative analysis of a company's environmental performance involves evaluating its financial commitment to environmental initiatives, analysing emissions and production processes, assessing energy-saving measures, and examining water consumption, biodiversity protection, procurement, recycling, and waste disposal. The company's disclosure of innovative initiatives and measures for animal welfare contributes to a comprehensive evaluation within a standardised quantitative framework, demonstrating its commitment to sustainability and environmental responsibility.

3.4. Social Responsibility

Social responsibility within the dairy industry encompasses ethical treatment of animals, fair labour practices, and community involvement. ESG grading considers how companies address these social concerns, promoting responsible and ethical behavior. The social indicators of a company primarily assess the fulfilment of social responsibilities to various stakeholders in its production and operations, encompassing employees, customers, communities, rural development, and others. This responsibility extends to multiple parties involved, such as employees, suppliers, customers, and communities. After concluding the social part of ESG reports of those chosen listed companies, the following table showing important indicators are summarised.

Table 3: Social ESG indicators.

Aspects	Themes	Information	Indicators
Social	Human capital	Labour force management (2%)	The complexity of the workforce, relationships between management and labour, intensity of labour protection, efforts to enhance employee engagement
		Health and safety (4.5%)	Management of workplace safety, workplace safety standards in the industry and region
		Development of human capital (5%)	Talent demand, the ability to attract, retain, and develop a highly skilled workforce
		Labour standards in the supply chain (2%)	Supply chain management and transparency, workplace standards in supplier locations
	Development opportunities related to social responsibility	Opportunities in the telecommunications industry (0.8%)	Management of local community relations, efforts to distribute benefits to the local community
		Opportunities in the financial industry (1%)	Efforts to expand financial services to historically underserved markets (including small business loans and innovative distribution channels)
		Opportunities in the health insurance industry (1.2%)	Efforts to expand healthcare products and services to developing countries and underserved markets
		Opportunities in the nutrition and wellness industry (3.5%)	Nutritional components of food, efforts to introduce products with higher nutritional value or more health benefits
	Product responsibility	Product safety and quality (4%)	Completeness of the quality management system
		Product innovation (3%)	Investment in research and development platform (1.5%) and innovative products (1.5%)

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Table 3: (continued).

		Consumer service (2%)	Completeness of the after-sales service system
		Supplier procurement management (2%)	Completeness of the supplier relationship management system
		Privacy and data security (1%)	Information security measures
		Responsible investing (1%)	Interaction between the company and investors
	Whether there are conflicts of interest with stakeholders	Community relations management (1%)	Contributions made by the company to the community

Table 3 shows that the evaluation covers the intricacies of workforce management, labour relations, the rigor of labour protection, and initiatives for employee engagement. It also includes the management of workplace safety and industry-specific safety standards, talent acquisition and development, transparent supply chain management, and adherence to workplace standards in supplier locations. Additionally, it assesses community relations management, efforts to benefit local communities, expansion of financial services to underserved markets, and initiatives to extend healthcare products and services to developing regions. The evaluation extends to nutritional aspects of food, the completeness of the quality management system, investment in research and development, after-sales service, supplier relationship management, information security, company-investor interaction, and the company's contributions to the community.

3.5. Governance Standards

Governance is a crucial aspect of sustainable business practices. The ESG grading system assesses the governance standards of dairy companies, ensuring transparency, accountability, and adherence to ethical principles. Governance evaluates the impact of decision-making and checks-and-balances mechanisms on a company's sustainability. It involves distributing responsibilities among decision-makers, coordinating interests with stakeholders, and implementing institutional arrangements to protect shareholder rights and optimise board functions. Through the governance part of ESG reports of those chosen listed companies, the following table showing important indicators are summarised.

Table 4: Governance ESG indicators.

Aspects	Themes	Information	Indicators
Governance	Internal governance	Board of Directors (5%)	Effectiveness of the Board of Directors in governing management and strategy, protecting investor value, and representing shareholder interests
		Compensation (3%)	Consistency between compensation, other incentive measures, and corporate strategy
		Supervisory Board members (3%)	Effectiveness of the Supervisory Board in overseeing management and strategy
		Shareholders' meeting (3%)	Shareholders' responsibilities and return on investment
	Corporate behaviour	Risk governance (7%)	Effectiveness of the risk management system, risk analysis, and risk governance
		Business ethics (5%)	Unethical business behaviour, such as fraud, improper executive conduct, corrupt practices, money laundering, or violations of antitrust regulations
		Supervision and complaints (7%)	Issues of oversight and management within the company, handling consumer complaints

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Table 4 demonstrates that the evaluation focuses on the Board of Directors' effectiveness in managing strategy, protecting investor value, and representing shareholder interests. It also considers consistency between compensation, incentives, and corporate strategy, along with the Supervisory Board's effectiveness in overseeing management. Additionally, it assesses shareholders' responsibilities and returns, the effectiveness of the risk management system, and unethical business behaviour. Oversight and management issues within the company, including the handling of consumer complaints, are also part of the assessment.

3.6. Negatives

Negative aspects showing the negative information of the company, including financial problems, credit problems, safety problems, etc. The bad performance of firms would be shown so the existence of such data will influence the ESG rating negatively. The following table 5 showing important indicators are summarised through the negative part of ESG reports of those chosen listed companies.

Table 5: Negative ESG indicators.

Aspects	Themes	Information	Indicators
Negative	Operational management	Financial issues (0.5%)	Decline in performance (0.2%), financial issues (0.3%)
		Integrity concerns (0.3%)	Default and breach of trust (0.3%)
		Safety issues (1.1%)	Safety incidents (0.4%), severe leaks (0.4%), environmental pollution (0.3%)
	Governance	Legal violations (1.9%)	Non-compliance with information disclosure (0.2%), labour violations (0.2%), other legal violations (1.5%)
		Dispute problems (0.5%)	Litigation disputes (0.5%)
		Risk hazards (0.4%)	Risk warnings (0.4%)
	Products	Raw material and other issues (0.3%)	Unqualified quality inspections (0.3%)

Table 5 shows a summary which encompasses various negative aspects of company operations, including a decline in performance and financial issues. Additionally, it involves default and breach of trust, safety incidents, severe leaks, and environmental pollution. Non-compliance is highlighted with information disclosure, labour violations, and other legal violations. Litigation disputes, risk warnings, and unqualified quality inspections further contribute to the assessment of potential risks and issues within the company.

4. Conclusion

In conclusion, the evaluation of the Chinese dairy industry's ESG performance reveals a comprehensive framework that addresses environmental impact, social responsibility, governance standards, and negative aspects. The ESG rating system designed for this industry incorporates a multilevel structure, including aspects, themes, and specific quantitative and qualitative indicators, each assigned weights based on their importance. Through the analysis of publicly available data from selected companies, the ESG rating system provides a nuanced understanding of their commitment to sustainability. Notably, the environmental considerations cover various indicators related to climate change, natural resources, pollution and waste, and development opportunities. The social responsibility assessment includes human capital, development opportunities, and product responsibility. Governance standards are evaluated through internal governance, corporate behaviour,

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and supervisory mechanisms. The negative aspects scrutinise operational, governance, and product-related issues that may pose risks to the company's overall ESG performance.

This ESG rating system aims to standardise the evaluation process, addressing the existing lack of standardisation in current ESG rating systems. Standardisation is crucial for facilitating fair comparisons and providing companies with clear guidelines for improvement. The case study on the Chinese dairy industry underscores the significance of ESG considerations in a sector with substantial environmental and social implications. However, the lack of standardisation remains a challenge in ensuring the effectiveness of ESG ratings. The proposed ESG rating system contributes to a more standardised and comparable approach, offering insights into the industry's strengths and areas for improvement. A standardised ESG rating system becomes an invaluable tool for companies, investors, and stakeholders alike in fostering sustainable practices and responsible corporate behaviour.

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