



Creating value beyond commercial outcomes: The ESG practices of online marketplaces for sustainable development

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Abstract

The popularity of online marketplaces continues to grow worldwide, and with it comes increased attention to the non-economic value they provide. This study aims to analyze the environmental, social, and governance (ESG) reports and news of 13 online marketplace operators and examine their engagement in ESG practices, considering their characteristics and the social environment. By comparing their practices with the generic ESG framework, the study identifies unique factors and approaches specific to ESG practices in online marketplaces, such as constructing industry ecology, contributing to national current affairs and policies, protecting intellectual property, and focusing on information and network security. The study also finds that market transactions, digital innovation, and participant ecology are three key mechanisms that explain the specificity of ESG practices in online marketplaces. The findings of this study offer an ESG framework that can be applied to online marketplaces. It highlights the importance of considering online marketplaces' social environment and individual characteristics in developing ESG practices. This study provides insights for online marketplace operators to improve their ESG practices and contributes to a growing body of literature on non-economic value creation in online marketplaces.

Keywords Online marketplaces · ESG · Non-economic value · Factor framework

JEL classification M150

“We will share our progress through two reports: our Annual Report on the health of our business and the ESG report on our progress in sustainability and the associated value we create.”

—Yong Zhang, Chairman of the Board, Alibaba

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Introduction

With the rapid development of digital technology and mobile Internet, online marketplaces have become a vital part of the digital economy by serving as intermediaries that connect the supply and demand sides of goods and services (Sun, 2010). From a global perspective, most digital giants are engaged in the operation of online marketplaces (Rowe & Markus, 2022), which results in fierce competition encompassing multiple aspects such as goods categories, supply chains, user bases, and marketing strategies. Such competition, however, drives online marketplace operators to overemphasize economic performance. As a result, the public and investors recently raise great concerns about the sustainability and social value of online marketplaces, which are crucial to the industry's ecology, users' interests, and society's healthy development (Meira et al., 2023; Zhou et al., 2022).

Environmental, social, and governance (ESG) measures the sustainability and social impact of corporate investments, emphasizing social goals beyond traditional financial metrics (Drempetic et al., 2020). In response to lessons

from the 2008 global financial crisis, where sustainability proved vital, ESG has become a critical criterion in evaluating companies in capital markets (Berry & Junkus, 2013; Meira et al., 2023). Online marketplaces, as a form of digital platform for business transactions, exhibit ESG performances that are subject to the same attention and regulation, but distinct from traditional businesses. For example, online marketplaces are usually leading innovators in using digital technologies like social media, short videos, live streaming, and big data to provide innovative solutions for environmental protections and grand societal challenges such as poverty alleviation and women empowerment (Li et al., 2019; Nguyen & Do, 2022).

However, as more and more online marketplaces begin to focus on ESG and sustainability issues, the existing ESG framework is not well suited to effectively assess ESG behaviors and initiatives. Although there have been plenty of studies on online marketplaces, most of them focus on their economic value or profitability (Constantinides et al., 2018), and only a small number of studies investigate how e-commerce online marketplaces play important roles in ESG-related issues such as environment protection (Frenken, 2017; Schaltegger et al., 2016), poverty alleviation (Li et al., 2019), and platform governance (Ondrus et al., 2015). These studies, however, are fragmented, and most of them are scattered in independent studies on a single dimension of ESG, lacking an integrated perspective for comprehensive analysis. As a result, there is still a lack of understanding of the unique characteristics of ESG for online marketplaces and the mechanisms that give rise to these characteristics. Hence, we ask two research questions: “What are the unique characteristics of ESG in online marketplaces? And what are the mechanisms that give rise to these unique characteristics?”.

To address these questions, we conduct a qualitative research based on the ESG reports and news of 13 Chinese leading online marketplaces. In recent years, we have witnessed successive waves of online marketplace developments emerging in China, from omnichannel marketing to online-to-offline retail, from social commerce to WeChat businesses, and from short videos to live streaming. While early generations of online marketplace companies in China were often modeled after their global counterparts, newer Chinese entrants are increasingly based on original ideas or bearing characteristics unique to themselves and becoming trendsetters (Li et al., 2022). For instance, in 2020, Tmall’s gross merchandise volume (GMV) reached \$709 billion, JD’s reached \$375 billion, and Pinduoduo’s reached \$181 billion. Meanwhile, Chinese online marketplaces are leading the way in ESG practices, setting examples for the entire industry. By prioritizing environmental efficiency, social responsibility, and strong governance, Chinese online marketplaces are not only making positive impacts on society and environment but also reinforcing their position as

leaders in the digital economy. Therefore, online marketplace companies in China offer revelatory exemplars for us to study the ESG practices of online marketplaces and address our research questions.

This study makes two-folded theoretical contributions to the sustainable growth and development of online marketplaces by highlighting their unique ESG practices and their potential impacts on society and the environment. First, it provides a reference for subsequent scholars to study ESG in online marketplaces and proposes the impact mechanisms of ESG in online marketplaces to promote the sustainable development of enterprises. Second, this study contributes to the literature on the non-economic value dimension of platform companies and advances academic understanding of the sustainability impact aspects of non-economic value, emphasizing the non-economic value beyond the economic value of online marketplaces.

Literature review

Online marketplaces

Online marketplaces are communities where buyers and sellers use internet technologies to exchange product information, negotiate, and transact. These can be divided into two categories: business-to-business (B2B) marketplaces facilitating exchange relationships between organizations and consumer-to-business (C2B) or consumer-to-consumer (C2C) marketplaces facilitating consumer transactions (Pavlou & Gefen, 2004). Online marketplaces include three key components and their interactions: the intermediary (platform), the seller (service provider), and the buyer (Sun, 2010). Due to the unique intermediary properties of online marketplaces, they have been widely used in different fields.

Online marketplaces have been utilized in commerce (Peng et al., 2023), services (Garcia, 2017; Lin et al., 2002; Ludwig et al., 2022), travel (Dolnicar & Zare, 2020), and entertainment (Smith & Telang, 2018), among others. For example, when companies use online marketplaces for e-commerce, they can promote the efficiency of resource integration through full user participation (Peng et al., 2023). Big data analytics and digital platform capabilities can help companies improve knowledge absorption (Khan & Tao, 2022) and further improve innovation (Jiang et al., 2023), thus improving business performance. In existing research on online marketplaces, the value platforms created for businesses and organizations is primarily in economic value or profitability (Constantinides et al., 2018). These economic values may be more obvious to consumers, such as the ability to obtain better goods and services by screening trustworthy sellers through publicly available review information on online marketplaces (Pavlou & Dimoka, 2006) and the

ability to enjoy lower price as barriers between marketplaces break down (Parker & Van Alstyne, 2005). However, the economic value of online marketplaces may not always be visible to their users. For example, online marketplaces can use the large amount of user data they accumulate to launch new businesses that create economic value (Lupton, 2014, 2016).

Compared to conventional businesses, online marketplaces have three distinct characteristics. First, online marketplaces are characterized as transactional intermediaries. Online marketplaces have revolutionized the way market transactions occur by providing a digital platform that connects buyers and sellers, making it convenient and efficient for both parties. These platforms offer accessibility to a wide range of products, cost-effectiveness, transparency, and convenience, benefiting users on both ends of the transaction (Du et al., 2018; Meira et al., 2023; Strader & Shaw, 1997). Furthermore, online marketplaces continuously innovate through digital technologies, such as personalization, mobile commerce, artificial intelligence (AI), augmented reality (AR), virtual reality (VR), blockchain, and cryptocurrencies, to enhance user experiences and streamline operations. These digital innovations are pivotal in the success of online marketplaces and drive their continued growth (Du et al., 2018; Nambisan et al., 2019). Finally, online marketplaces thrive through the active participation of various stakeholders, including merchants, buyers, third-party developers, logistics and payment providers, customer support, trust and safety teams, and regulatory authorities (Chen & Horton, 2016; Hong & Pavlou, 2014; Jaiswal et al., 2018). The collaboration of these stakeholders creates a vibrant ecosystem that sustains the marketplace's growth and ensures smooth transactions for all participants (Barrett et al., 2016; Hein et al., 2020).

Second, online marketplaces are usually pioneers of digital innovation, engaging in a perpetual process of adaptation to evolving consumer proclivities and technological advancements. The role of personalization emerges as pivotal, with sophisticated algorithms scrutinizing user data to proffer tailored product recommendations and shopping encounters, ultimately engendering elevated levels of customer satisfaction and engagement (Chau & Xu, 2012; Kim et al., 2012). Illustratively, the ascent of mobile commerce stands yet another epochal innovation, affording users the ability to engage in transactions on-the-go, while affording vendors the prospect of harnessing location-based marketing modalities to target latent clienteles (Eggert, 2006; Luo & Zhang, 2013). Moreover, certain online marketplaces have embraced the transformative potential of blockchain technology and cryptocurrencies, endowing transactions with heightened security, expediting cross-border financial

operations, and mitigating the encumbrance of payment processing fees (Du et al., 2018).

Third, within online marketplaces, there exists a multifaceted ecosystem sustained through the concerted engagement of diverse stakeholders (Adner & Kapoor, 2010; Boley & Chang, 2007; Constantinides et al., 2018). Foremost among these are merchants or vendors, who function as the primary purveyors of goods and services. These stakeholders derive pronounced advantages, characterized by unfettered access to an extensive customer base and an entrenched infrastructure conducive to commercial activities (Constantinides et al., 2018; Kanat et al., 2018; Lusch & Nambisan, 2015). Besides, regulatory entities, in consonance with online marketplaces, collaborate to navigate the labyrinthine landscape of diverse regulations pertaining to consumer protection, data privacy, taxation, and sundry other aspects, thus ensuring sustainable expansion and adherence to prevailing legal frameworks (Cicchiello et al., 2023; Han et al., 2022).

Generic ESG framework and relevant theories

ESG is an acronym that was first introduced in a 2004 report prepared by 20 financial institutions in response to a call by United Nations Secretary-General Kofi Anon (Gillan et al., 2021). The concept was further developed in a report by the United Nations Principles for Responsible Investment (UN PRI), which defined responsible investment as integrating environmental, social, and corporate governance factors into investment decisions. This approach is also known as sustainable investment, ethical investment, and impact investment. It bridges the gap between the traditional financial assessment framework and the “investor-business-sustainability” market mechanism and has played an increasingly important role in global sustainable development. On the other hand, Corporate Social Responsibility (CSR) traditionally refers to corporate activities in social responsibility. One difference between the two terms is that ESG explicitly includes governance, while CSR indirectly includes governance issues related to environmental and social considerations. Therefore, ESG is often considered a broader term than CSR (Gillan et al., 2021). While CSR influences the internal processes and corporate culture for achieving sustainability, ESG provides a measurable set of benchmarks for external partners and investors to evaluate a company's sustainability performance (Cheng et al., 2023).

By synthesizing the previous ESG literature, it can be found that the underlying theories supporting ESG are sustainability theory, economic externality theory, stakeholder theory, resource-based view, signaling theory, legitimacy theory, and institutional theory. Based on the above theories, the main views that can support the ESG framework and the references are shown in Table 1.

Table 1 The theoretical foundations of the ESG framework

Theory foundation	The main perspective of the theory	Important references
Sustainability theory	Sustainability theory suggests that under the influence of market mechanisms and regulatory measures, environmental protection and economic growth can coexist and be compatible	Ge et al. (2022); Zhou et al. (2022)
Economic externality theory	The economic externality theory usually applies to the E (environmental) aspect of ESG. In ESG disclosure, it is important to focus not only on the negative externalities generated by the production and operation of enterprises but also on their positive externalities to pursue optimal resource allocation	Xia (2022)
Stakeholder theory	Whether ethically and morally or regarding sustainability, a company's management should be accountable to other stakeholders and shareholders. ESG activities should be a source of opportunity, competitive advantage, and corporate innovation rather than a cost, an act of charity, or even a constraint	Azmi et al. (2021); Bhandari et al. (2022); Nirino et al. (2021)
Resource-based view	The relationship between a firm's resources and sustained competitive advantage is possible if the resources are valuable, rare, inimitable, non-substitutable, and organized (VRIN-O). The current VRIN-O attributes of the firm's strategic resources are necessary but insufficient for achieving the firm's much-needed new goals. In addition to profits, companies need to respect social development, ecological justice, and governance compliance. Environmental and social activities can lead to the development of competitive advantages by creating unique skills and competencies within the company	Battisti et al. (2022); Bhandari et al. (2022)
Signaling theory	When companies disclose ESG-related information, they convey more information about their business operations and sustainability to the outside world	Chen et al. (2023); Zhong et al. (2022)
Legitimacy theory	Legitimacy theory posits that an organization must consider the rights and expectations of the broader public beyond solely those of investors. Non-compliance with societal expectations may lead to various sanctions, such as restrictions on a company's operations, resources, and product demand. When managers perceive a legitimacy gap, they develop strategies to correct their behavior and align with societal aspirations. As such, legitimacy theory is useful for understanding voluntary corporate social and environmental reporting	Alda (2021); Lokuwaduge and Heenetigala (2017)
Institutional theory	Institutional theory, which emphasizes external influences on organizations, posits that rules, laws, regulations, norms, or culture impact corporate behavior more than competitive factors. The advantages of regulation and government influence on ESG reporting and performance suggest that organizations respond to institutional pressures for social responsibility	Avetisyan and Hockerts (2017); Weber (2014)

ESG standard setting has progressed at the European Union (EU) level, but the current policy framework lacks a common definition of ESG factors, resulting in variations in market practices across institutions. While some institutions use various international frameworks and standards to define ESG factors, others use their definitions. Agencies currently make use of the following existing frameworks:

1. The United Nations Sustainable Development Goals (SDGs) consist of 17 interrelated global goals that aim to create a blueprint for a better, more sustainable future for all and are planned to be achieved by 2030.
2. The Principles for Responsible Investment (PRI) aim to support signatories, including asset owners/institutional investors, investment managers, and service providers

- (including advice, information, and data), to integrate environmental, social, and governance considerations into their investment and ownership decisions.
3. The Global Reporting Initiative (GRI) of the Global Sustainability Standards Board is designed to help organizations better understand, manage, and communicate their impact on sustainability-related issues.
 4. The ESG International Factors Framework of the European Banking Authority (EBA) synthesizes several commonly used ESG frameworks and standards internationally and proposes a generic ESG factor framework of general generality.

Although the above frameworks have been widely used in global ESG practice, the business model of online marketplaces has great specificity compared with traditional enterprises. Online marketplaces are typically digital platforms that connect two or more participants and form a large business ecosystem. Therefore, ESG practices in online marketplaces involve more participants, apply more advanced digital technologies, and address major social challenges more effectively in a market mechanism-based manner. The unique elements of ESG practices in online marketplaces compared to the prevailing international standards are not yet well understood and are worth exploring in depth.

ESG in the online marketplace context

As the technology of online marketplaces has evolved over time and different players participate in online marketplaces in different ways, other dimensions of impact beyond economic value have received increasing attention from the business and academic communities. In recent years, the topic of sustainability has gained prominence, with scholars and practitioners recognizing the critical role of online platforms in driving sustainable development (Kolk & Ciulli, 2020; Schaltegger et al., 2016). Embracing sustainability goes beyond mere profit-seeking and entails considering three essential pillars: social sustainability, environmental sustainability, and technological sustainability (Alt, 2020). By addressing these dimensions, online marketplaces can become transformative forces in promoting a more equitable, greener, and forward-looking global economy.

Social sustainability, as an integral aspect of ESG, emphasizes the positive impact of online platforms on society. Such platforms can empower rural e-commerce development, opening up new economic opportunities for communities previously isolated from mainstream markets (Li et al., 2019). By leveraging digital technologies, these platforms can bridge the urban–rural divide, facilitating female urban–rural migration and enhancing access to education, healthcare, and financial services for previously underserved populations (Nguyen & Do, 2022). Additionally, online

platforms have demonstrated the potential to co-create public values with residents, fostering collective decision-making processes and empowering citizens to participate actively in public affairs (Katsamakos et al., 2022; Meijer & Boon, 2021). As such, these digital marketplaces contribute to a more inclusive society by enabling stakeholders from all walks of life to participate and benefit from the growing digital economy.

Turning to environmental sustainability, the impact of online marketplaces on the natural environment cannot be overlooked. While e-commerce has the potential to reduce the carbon footprint associated with traditional retail by eliminating the need for physical storefronts and reducing transportation needs, it also poses new challenges related to packaging waste and increased demand for energy-hungry data centers (Henderikx & Stoffers, 2022; Pansera & Sarkar, 2016). Recognizing the urgency of mitigating environmental impacts, forward-thinking online platforms have embraced innovative business models aimed at reducing negative effects on the planet (Schaltegger et al., 2016). One such model gaining traction is that of sharing platforms, where consumers can engage in collaborative consumption, reducing material demand and energy use (Frenken, 2017). By encouraging sustainable consumption practices, these platforms not only benefit the environment but also resonate with the increasing number of eco-conscious consumers seeking more responsible ways to shop.

Despite the growing interest in sustainability within the literature, the number of comprehensive studies examining the sustainability aspects of online marketplaces remains relatively limited. While individual studies have touched upon various sustainability dimensions, these efforts are often fragmented and lack an integrated perspective for a comprehensive analysis (Liu et al., 2022; Saura et al., 2021). Addressing this research gap, our paper aims to provide an in-depth and cohesive discussion of the value of online platforms in advancing sustainability by adopting the lens of ESG.

The concept of ESG offers a holistic approach that considers not only financial performance but also a company's impact on society and the environment (Avramov et al., 2022; Zhou et al., 2022). By applying the principles of ESG to online marketplaces, we can gain deeper insights into their sustainability efforts and identify areas where further improvements are needed (Meira et al., 2023). Additionally, this research will shed light on the challenges faced by online platforms in integrating sustainable practices into their core strategies, providing valuable guidance for policymakers, businesses, and consumers striving for a more sustainable digital future.

In the subsequent sections of this paper, we will delve into the specific components of ESG, exploring the significance of each criterion within the context of online marketplaces.

Furthermore, we will review relevant research and case studies that have investigated the application of ESG principles in the digital marketplace landscape. By synthesizing existing knowledge and offering fresh perspectives, this study aims to contribute to the growing body of literature on sustainable online marketplaces and inspire future research in this vital domain. With an ever-increasing reliance on digital technologies and their impact on global socioeconomic and environmental challenges, understanding the role of online platforms in sustainability becomes an imperative task for shaping a more resilient and responsible digital era.

Research methods

In order to answer our research questions, this study conducts a content analysis of ESG reports issued by Chinese online marketplace companies based on the generic ESG framework, which is referred to in the ESG risk management and supervision report published by the EBA. This generic framework (Li et al., 2021) and the use of ESG reports as a research sample have been widely adopted in previous studies (Arvidsson & Dumay, 2022; Lee et al., 2022; Lokuwaduge & Heenetigala, 2017).

Data collection

Since China is a global leader in developing online marketplaces (Li et al., 2022), we selected Chinese online marketplaces as the research target. To identify and collect data, we first used the “Top 100 Chinese Internet Enterprises with Comprehensive Strength in 2022” as the initial research object, which selected 11 core indicators representing six dimensions, including enterprise size, profitability, innovation capability, growth, risk prevention and control capability, and social responsibility, to evaluate Chinese Internet enterprises’ comprehensive strength index. Next, we screened the top 100 Internet companies to identify those that meet the definition of online marketplaces (operators). Subsequently, we identified the detailed characteristics of each online marketplace, including its main transaction units, sector, and user types. We then conducted an extensive search on the official websites of the sample companies and the statutory information disclosure platform of the Shenzhen Stock Exchange to determine whether they publish ESG reports/sustainability reports (after this, referred to as “reports”). Most of the reports are independent disclosures, with the remaining portion coming from the companies’ annual reports. The reports are generally from January 1, 2021, to December 31, 2022. Thirteen companies were ultimately chosen as the subjects of analysis. Finally, we conducted searches on the official websites of the subjects of analysis, as well as news platforms, to compile post-2021

ESG-related news for these enterprises. Therefore, this study analyzed the latest ESG reports/sustainability reports and associated news over the past 2 years in the Chinese online marketplaces. A total of 25 ESG reports and over 310,000 words of news articles were collected from 13 companies. Notably, JD Logistics and JD Health (both subsidiaries of JD.com) released separate ESG reports. The remaining companies either do not meet the definition of online marketplaces or do not disclose independent ESG reports or comprehensive ESG reports (from annual reports). The detailed information of our data is shown in Table 2.

Data analysis

Our data analysis was largely based on thematic analysis (Braun & Clarke, 2006, 2012). This method allowed researchers to inductively analyze the qualitative data and iterate between data and theories. Four data analysis steps were undertaken.

Step 1: Familiarizing ourselves with the data All the authors reviewed each ESG report and related ESG news several times to grasp its meaning. One member of the research team marked off all 25 ESG reports based on the three dimensions (i.e., environment, social, and governance dimensions) of ESG framework, which helped us divide the data into meaningful chunks for analysis.

Step 2: Identifying the ESG indicators of online marketplaces by generating initial codes This analysis is similar to Strauss and Corbin’s (1998) notion of open coding and Gioia et al.’s (2013) notion of first-order analysis. During this process, one member of the research team coded the ESG reports and news sentence by sentence and compiled the initial coding table. The coding was cross-checked by other members of the research teams. All disagreements were resolved through discussions until consensus was reached. We thus derived a set of initial codes that represented the ESG indicators of online marketplaces (see Table 4 in the Appendix).

Step 3: Identifying the ESG factors of online marketplaces by clustering the initial codes into potential themes In this step, we firstly attempted to use the generic ESG framework to organize the initial codes. We compared the initial codes against the generic ESG framework and matched them with ESG factors that are included in the generic framework. For example, when we coded the ESG reports in Step 2, we derived initial codes such as *organizing charity aid for poverty alleviation, empowering women and disadvantaged, and encouraging participation in market transactions*. These codes were clustered into the theme of *poverty and famine*, which has been included in the generic ESG framework as an important factor (see Table 4 in the Appendix).

Table 2 Overview of research samples and data collection

Number	Online market-places	Main transaction units	Sector	Users' type	The year of ESG reports	Number of pages of ESG reports	Number of words in ESG news
1	Alibaba (Taobao and Tmall)	E-commerce	Commerce	Seller, customer	2022, 2023	352	15,777
2	Meituan	Food, transportation, travel, shopping, and entertainment	Service, entertainment	Seller, customer	2021, 2022	94	60,010
3	JD.com	E-commerce, finance, logistics	Commerce	Seller, customer	2021, 2022	246	19,626
4	Kuaishou	Short video, live streaming, social media, e-commerce	Commerce	Advertiser, seller, content creator	2021, 2022	206	30,708
5	Ctrip	Hotel reservations, transportation, travel	Tourism	Hotels, airlines, railroad companies, consumers	2021	41	27,212
6	Beike, Home Link	House renting, buying, and selling	Service	House owner, tenant	2021, 2022	136	33,464
7	Netease	Games, translation, education	Service, entertainment	Game developers, users, freelancers	2021, 2022	163	19,041
8	Mango TV	Video	entertainment	Copyright owner, user	2021, 2022	106	7107
9	Tongcheng Travel	Hotel reservations, transportation, travel	Tourism	Hotels, airlines, railroad companies, consumers	2021, 2022	149	17,916
10	Liepin	Human resource information	Service	Recruiters, job seekers	2021, 2022	85	18,629
11	Pinduoduo	Commercial retail	Commerce	Seller, customer	2020	54	29,772
12	VIP.com	Brand discount goods	Commerce	Seller, customer	2021	94	28,205
13	BOSS Zhipin	Human resource information	Service	Recruiters, job seekers	2021, 2022	160	36,487
	Total					1886	318,574

We also revealed themes that are not included in the generic ESG framework but specific to online marketplaces. For example, when we coded the ESG reports in Step 2, we derived initial codes such as *providing technical solutions for information and network security*, *establishing management systems for information and network security*, and *contributing to the industry development of information and network security*. These codes were clustered into the theme of *information and network security*, which is not a factor in the generic ESG framework but is particularly important in online marketplaces compared to other industries. By iterating between literature review and data analysis, we confirmed that *information and network security* is a new factor that the generic ESG framework has not covered (see Table 4 in the Appendix).

Step 4: Identifying the mechanisms that explain the specificity of ESG practices in online marketplaces In this step, we attempted to explain the specificity of ESG practices in

online marketplaces based on three mechanisms we identified from the literature, i.e., market transaction mechanism, digital innovation mechanism, and ecosystem participation mechanism. We theoretically connected each specific ESG indicator of online marketplaces with one or more mechanisms (see Table 4 in the Appendix). By integrating these connections, we proposed three propositions to theoretically explain the specificity of ESG practices in online marketplaces.

Findings

The comparison of online marketplaces' ESG factors with the generic framework

Based on an inductive analysis of ESG reports from companies in the online marketplace industry in China, we

identified several ESG factors specific to this context. We compared them to the generic ESG factor framework. Our comparative study revealed that the ESG factors of online marketplaces share some similarities with the generic framework but exhibit distinct features. Table 3 compares the ESG factors of online marketplaces to the generic ESG factor framework, including 16 common factors and four unique factors. The environmental dimension comprises six common factors and no unique factors, the social dimension has five common factors and two unique factors, and the governance dimension has five common and two unique factors. Unique practices of online marketplaces are underlined, while factors not applicable to online marketplaces in the generic framework are marked in italics. As shown in Table 3, the ESG framework of online marketplaces excludes air pollutants and shareholders' rights from the generic ESG framework while including some unique factors such as constructing industry ecology, contribution to national current affairs and policies, intellectual property (IP) protection, and information and network security. This table highlights the role of each ESG factor in the unique context of online marketplaces in China and emphasizes the distinctiveness of online marketplaces' ESG factors.

Environment dimension

In the environmental dimension, both the ESG factor framework for online marketplaces and the generic ESG factor framework focus on factors such as GHG emissions, energy consumption and efficiency, water use and recycling, waste production and management, biodiversity, and ecosystem health, as well as innovation for environment-friendly products and services. For internal purposes, both frameworks reflect that companies can reduce their carbon footprint and GHG emissions by building a green office environment and achieving green operations. For instance, online marketplaces have adopted paperless offices, used renewable energy, reduced energy consumption intensity, and improved energy utilization, paying particular attention to water use and recycling to reduce water consumption intensity. Online marketplace companies also pay attention to the generation and treatment of water pollutants, inorganic pollutants, and hazardous waste. For hazardous and recyclable waste generated during operations, they follow local waste and garbage management regulations and have established management procedures for proper treatment and disposal. Regarding external aspects, biodiversity and ecosystem health are also environmental issues that require attention, and companies have a responsibility to protect biodiversity and promote healthy ecosystems. Environment-friendly product and service

innovation is a strong development driver for companies to protect the environment and is a prominent tool in the online marketplace, facilitating technological and efficient environmental protection from both internal and external sources.

In the environmental dimension, compared to the generic ESG factor framework, online marketplaces and their operators have many special practices that reflect the industry characteristics of online marketplaces and the characteristics of Chinese management practices. Online marketplaces are actively pursuing carbon neutrality milestones through many environmental initiatives described above, such as Netease's 2021 report that states *"In 2021, we made our Smart Carbon Management System an open-source platform accessible by everyone and built the NetEase TianGong Carbon Neutrality Open Source Community. We hope these tools can empower small and medium-sized enterprises with their hardware ecosystems so more enterprises can achieve carbon neutrality. Through these steps, we are contributing to global efforts to achieve carbon neutrality through energy conservation and decarbonization applications."* Additionally, online marketplaces promote carbon neutrality in digital intelligence by creating low-carbon, green, and energy-efficient data centers through technological innovation. Through innovative technology and public welfare forms, they also attract the public to participate in green and low-carbon life and strive to make carbon neutrality accessible to everyone and shared by society, such as *"helping build national and regional networks to educate Chinese citizens about biodiversity conservation and low-carbon living"* (Alibaba, 2022 report); *"calling on Netease game players to join in the philanthropic environmental protection projects"* (Netease, 2021 report); *"improving environmental protection awareness for Kuaishou users"* (Kuaishou, 2021 report); and encourage green goods and packaging to advocate and change consumers' perceptions and behaviors. Notably, "achieving carbon neutrality milestones" does not appear in the generic factor framework. As China is the world's largest carbon emitter in total emissions, the Party Central Committee has proposed to reach the goal of carbon peaking by 2030 and carbon neutrality by 2060, which is a scenario-based practice with Chinese characteristics.

In the factor of "biodiversity and health of ecosystems," online marketplaces are fully aware of the responsibility of platform operators to intervene in market mechanisms to protect biodiversity by "strictly monitoring and acting to prevent the illegal wildlife trade" (Alibaba, 2022 report) and "prohibit(ing) the sale of animal killing tools, equipment, and accessories that seriously endanger animal safety, including electric fish traps, bird nets, hunting clips, stumble covers, etc." (JD.com, 2021 report). The online marketplace is also promoting the healthy development of a multi-dimensional ecosystem. For example,

Table 3 A comparison of online marketplaces with generic ESG factor framework

Dimension	ESG factors in the generic framework	ESG factors in the online marketplaces
Environment	Greenhouse gas (GHG) emissions	GHG emissions
	Carbon footprint	Reducing carbon footprint and building green offices
	Broken down by scopes 1, 2, and 3 ¹	<u>Achieving carbon neutrality goal</u>
	<i>Air pollutants</i>	
	<i>Emissions of air pollutants</i>	
	Energy consumption and efficiency	Energy consumption and efficiency
	<i>Fossil fuel sectors</i>	Use of renewable energy source
	Energy consumption intensity	Reduction of resources and energy consumption
	Use of renewable sources of energy	
	Water usage and recycling	Water usage and recycling
	Water consumption intensity	Deepening water conservation practices and improving water utilization
	Waste production and management	Waste production and management
	Production of water waste	Comply with local waste disposal standards
	Production of solid waste	Proper disposal and recycling of waste
	Production of hazardous waste	
	Social	Biodiversity and ecosystems health
<i>Presence/operations in geographic areas impacted by soil degradation</i>		Biodiversity conservation in online marketplace transactions
<i>Presence/operations in geographic areas and industries that are particularly dependent on biodiversity and ecosystem services</i>		Ecosystem health development
Presence/operations in protected areas or areas of high biodiversity value outside protected areas		
Operations affecting IUCN Red List species or national conservation list species		
Innovation in environment-friendly products and services		Innovation in environment-friendly products and services
Research and development of low-carbon and other environmental technologies		Building a green digital infrastructure
		Carrying out green public welfare
		<u>Encouraging green goods and packaging</u>
Employee relationships/labor standards		Employee relationships/labor standards
Freedom of association and right to organize		Adherence to equal and compliant employment and protecting employees' rights
Forced and compulsory labor		Competitive compensation and benefits system
Child labor		Systematic training system and talent development path
Equal remuneration		Non-discriminatory workplace and equal opportunity
Training and development opportunities		Healthy, safe, warm, diverse, and dynamic culture and work environment
Discrimination and equal opportunity		
Workplace health and safety		
Supply chain management	Supply chain management	
	Supply chain regulation	
	Supply chain collaboration	
	Supply chain sustainability	
Customer relationships	Customer relationships	
Customer protection and product responsibility	<u>Adherence to a customer-oriented strategy</u>	
Personal data security and privacy	Customer privacy protection and information security	
<i>Rights of customers to obtain information about ESG factors</i>	Innovative digital solutions to meet customer needs	
Quality and innovation in customer relations	Emphasis on customer service	
Poverty and famine	Poverty and famine	
Engagement in poverty reduction/aid programs	Organizing charity aid for poverty alleviation	
Employment opportunities for economically less advantaged groups	Empowering women and disadvantaged	
	<u>Encouraging participation in market transaction</u>	
Community impacts	Community impacts	
Relations with local communities (networks)	Conducting public welfare volunteer activities	
Social impact of products and services	<u>Technology empowered education</u>	
	<u>Provision of products and services suitable for juvenile</u>	
	<u>Helping elders cross the "digital divide"</u>	
	<u>Constructing industry ecology</u>	
	<u>Empowering SME development</u>	
	<u>Leadership in the industry</u>	
	<u>Contribution to national strategies and affairs</u>	
	<u>Support for the Olympic Winter Games Beijing 2022</u>	
	<u>Dedication to nation's rural revitalization strategy</u>	
	<u>Engagement in the fight against public emergencies</u>	

Table 3 (continued)

Dimension	ESG factors in the generic framework	ESG factors in the online marketplaces
Governance	Ethical considerations Codes of ethics and business principles Bribery and corruption Accountability/the rule of law	Ethical considerations Strict compliance with business ethics Anti-corruption Fair competition Abide by the relevant laws
	Strategy and risk management Strategy implementation, operational execution, and monitoring Internal controls and risk management policies and procedures	Strategy and risk management Constructing an effective corporate governance system Sound risk management structure
	Transparency and disclosure Observance of disclosures of information rules and practices	Transparency and disclosure Transparency and timely disclosure of relevant management practices
	Board diversity and structure Discrimination	Board diversity and structure Diversity of board composition <u>Establishment of the commission on sustainable development</u>
	Stakeholder engagement	Stakeholder engagement Stakeholder communication and materiality assessment
	<i>Shareholder rights</i> <i>Creating profits for shareholders</i> <i>Protecting the interests of minority shareholders</i>	<u>IP protection</u> <u>Protection of own IP rights</u> <u>Protection of ecosystem participants' IP rights</u> <u>Raising awareness of IP rights</u> <u>Information and network security</u> <u>Providing technical solutions for information and network security</u> <u>Establishing a management system for information and network security</u> <u>Contributing to the industry development of information and network security</u>

¹ “Scopes 1, 2, and 3 GHG emissions” means the greenhouse gas emissions referred to in point (1) (e) (i-iii) of Annex III of Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds, and amending Directives 2008/48/EC and 2014/17/EU and Regulation (EU) No 596/2014

Note: The unique factors and practices of online marketplaces are underlined, factors not available in online marketplaces in the generic framework are set in italics, and those not specially marked are common factors to both

they are “*helping many creators create high-quality and original content continuously and improve environmental protection awareness for Kuaishou users*” (Kuaishou, 2021 report), working to “*help people have a better chance of living together in a healthy environment with blue skies and thriving ecosystems*” (Alibaba, 2022 report), and building an environmentally sustainable tourism ecosystem (Ctrip, 2021 report).

Synthesizing the above research findings, we propose the following proposition:

Proposition 1: *Compared to general enterprises, when online marketplace enterprises pursue the environmental dimension of sustainability goals, they have unique advantages in utilizing ...*

1a. *the market transaction mechanism, i.e., advocating the transaction of environmentally friendly products and services and prohibiting environmentally hazardous ones.*

1b. *the digital innovation mechanism, i.e., building green digital infrastructures and providing technology-enabled green solutions for sustainable operations and environmental protections.*

1c. *the ecosystem participation mechanism, i.e., engaging ecosystem participants (suppliers, consumers, manufacturers, distributors, etc.) and other stakeholders in collaborative environmental protection activities.*

Social dimension

Moving on to the social dimension, both the ESG factor framework for online marketplaces and the generic ESG factor framework focus on factors that extend from the company itself to society. At the company level, both frameworks prioritize the company’s relationship with its people, as reflected in employee relationships and labor standards, as well as the company’s impact on its upstream and downstream through supply chain management. At the external user level, the frameworks focus on the company’s relationship with its customers, particularly how it helps the

underprivileged, reflecting a broader community impact. The online marketplace also focuses on the impact of the broader social network through constructing industry ecology and supporting national current affairs and policies. The two factors are included in social impact, but we categorize them as special since they have unique attributes to online marketplaces with many practices' characteristic of these platforms.

Regarding employee relationships and labor standards, both frameworks prioritize employee rights and welfare. When providing systematic training for employees, the company focuses not only on professional skills but also on training in business ethics, information, and network security awareness. They attach importance to talent cultivation, offering each employee the opportunity to receive training and development. For example, "Beike has established a career development system for employees, consisting of a 'professional development channel' and 'management development channel,' along with a Promotion Management Policy to regulate its grade management system" (Beike, 2021 report). Discrimination and equal opportunities are also the main points of concern for this factor. Furthermore, in addition to ensuring a healthy and safe workplace, online marketplaces also focus on creating a warm, diverse, and dynamic culture and work environment. For example, Alibaba cares deeply about the health, well-being, comfort, and safety of its employees and their families and works on many fronts to safeguard those. This aspect is not mentioned in the generic framework.

Regarding supply chain management, there are no specific indicators for this factor in the generic framework. For online marketplaces, supply chain management is divided into three aspects. The first aspect is supply chain regulations. Online marketplace operators have developed a standardized bidding process, carried out supplier classification access and management according to the characteristics of each product and service, and assessed the environmental performance of suppliers to implement business integrity, information disclosure, and risk management to achieve compliance management. The second is supply chain collaboration. Online marketplaces actively and positively communicate with suppliers to obtain their support and also share the experience and tools accumulated by the company in sustainable operations to help partners develop. Lastly, regarding supply chain sustainability, enterprises set green procurement standards and green qualification requirements for suppliers while creating green storage, packaging, and logistics systems to promote supply chain emission reduction. The above three aspects provide specific explanations for the indicators of the factor of "supply chain management" in the generic framework, which, in turn, complements the generic framework.

Regarding customer relationships, both frameworks mention personal data security and privacy, and online marketplaces focus on providing technical solutions to protect customers' privacy and data security. For example, "We strive to build trust in digital commerce by leveraging its industry-leading technology and capabilities, including secure user privacy protection and data security, to gain the long-term trust of consumers, customers, and other stakeholders" (Alibaba, 2021 report). Regarding product responsibility, online marketplaces are constantly innovating and updating their products and services, striving to explore and meet users' needs in all aspects. For example, "NetEase Yaotai is an immersive metaverse service platform. In contrast to traditional video conferencing, it creates a vivid environment for participants. Users can change the look of their avatars during the conference and make avatars mirror their facial expressions" (Netease, 2021 report). "By providing digital solutions for the entire chain of renovation, the Smart Construction Site project helps service providers improve inspection efficiency and better serve customers" (Beike, 2021 report). To maintain customer relationships, online marketplaces are even more focused on user experience, tracking user feedback, and actively responding to complaints and questions for help. In addition, the generic framework also mentions that customers have the right to receive information about ESG factors, which is not mentioned in online marketplaces' customer relations. However, online marketplaces often mention that they are customer-oriented and focus on improving user experience. For example, "JD.com always adheres to the original intention of 'customer first' to provide consumers with considerate and privileged services" (JD.com, 2021 report). The generic framework does not mention this "customer first" operational philosophy.

In the realm of poverty and famine, both frameworks focus on aid efforts aimed at reducing poverty. These include organizing poverty-relief charitable assistance and empowering marginalized groups such as women and disabled individuals by providing them with employment opportunities. Moreover, online marketplaces also encourage impoverished regions to engage in market mechanisms, fully leveraging their local strengths. This is achieved through the sale of distinctive agricultural products, promoting the revival and preservation of intangible cultural heritage and establishing unique cultural tourism zones. These strategies collectively tackle poverty at its roots. For example, "Since the end of 2021, Meituan have launched the 'Agricultural Produce Direct Sourcing' programme, cooperating with large-scale agricultural enterprises and agricultural bases to increase the direct sourcing of high-quality agricultural products from the source area to help high-quality agricultural products reach the community directly and increase farmers' income at the same time" (Meituan, 2021 report).

“In response to the national campaign to alleviate poverty, Vipshop created its V-Love Workshop initiative: an e-commerce, charitable platform focusing on the rejuvenation and preservation of intangible cultural heritage” (VIP.com, 2021 report). *“At the same time, by making full use of local cultural brands and actively developing rural tourism, Tongcheng Travel implemented the rural revitalisation strategy to achieve the goal of cultural and tourism industry recovery under the ‘Specialities + Tourism + Poverty Alleviation’ model”* (Tongcheng Travel, 2021 report).

In terms of community impact, Online marketplaces have introduced the concept of “philanthropy for everyone,” encouraging other eco-participants besides corporate employees to participate in public welfare volunteer activities. For example, *“We are honored to leverage the great influence of the online game industry and call on our game players to join in our philanthropic environmental protection projects”* (NetEase, 2021 report). Meituan continues to promote the “Public Welfare Merchant Programme,” which integrates public welfare into the daily business behavior of merchants. The online marketplace also utilizes technology to empower education. *“NetEase has built a comprehensive public welfare education system to help the poor”* (Netease, 2021 report), and *“we have initiated a series of projects including our ‘Rural Education Plan’ and ‘Vocational Training Plan,’ which have given 610,000 rural teachers and students additional training”* (Alibaba, 2022 report). The online marketplace has its own unique approach to caring for the elderly and minors. As a platform for a huge amount of content, the online marketplace pays particular attention to the physical and mental health of minors and provides products and services suitable for minors. For example, *“A ‘minors’ mode has been launched in the product design of ‘Mango TV’ APP. In this mode, users can select video content suitable for minors to watch and read, and there will be no user portrait and advertising for minors”* (Mango TV, 2021 report). The online marketplace is also committed to caring for people with depression and supporting children with autism so that technology has a temperature. Moreover, the online marketplace is particularly focused on helping elders cross the “digital divide” and experience the convenience of life brought by technological innovation. It is building a barrier-free network. For example, *“a ‘senior mode’ on several of our apps incorporates an enlarged display font and a special interface for senior users, greatly improving the ease of use”* (Alibaba, 2022 report). *“We utilize the platform and technical capabilities to create products and services suitable for people with special needs and meet the travel needs of special groups such as the elderly and the disabled”* (Tongcheng Travel, 2021 report).

Regarding constructing industry ecology, it is more able to reflect the role that online marketplaces assume as leading technology-based companies and the social value they

create. Therefore, we consider this factor to be special. In this factor, companies belonging to online marketplaces help more SMEs complement and strengthen their chains, enhance their innovation capabilities, and strengthen their development momentum through a series of services and specific initiatives. With the power of the platform, SMEs can meet consumers’ personalized needs by developing and producing high-quality, distinctive, and sophisticated goods. Finally, by sharing superior technologies and key resources, online marketplaces can enhance the overall development of the industry, establish industry standards, promote industry progress, and drive the future sustainable development of the industry. For example, *“We are strongly committed to sharing our resources and expertise with the industries we are engaging in so we can grow together. In 2021, NetEase carried out broad cooperation programs and schemes to promote common development”* (NetEase, 2021 report).

Regarding supporting national current affairs and policies, the online marketplace supports the Olympic Winter Games Beijing 2022 through public welfare, technology, and supply chain. In terms of public welfare impact, *“Kuaishou coordinated the Green Winter Olympics Youth Charity Action, Charming Winter Olympics Knowledge Dissemination Docent Campaign, and Youth Healthy Growth Volunteer Project. These activities enabled volunteers to promote the Winter Olympics and Olympics knowledge while promoting basketball and sports knowledge”* (Kuaishou, 2021 report). In terms of technical support, Alibaba Cloud helped the Beijing Winter Olympics to be fully on the cloud and supported the security of digital facilities for the Winter Olympics to complete the security emergency response promptly. In terms of supply chain support, JD.com built a green, intelligent, efficient, and safe integrated supply chain to ensure the success of the ice and snow event. Online marketplaces also actively respond to “digital business to promote agriculture” and develop the rural digital economy to help rural revitalization. For example, *“We have deployed its platform resources to provide digitally powered and integrated management of rural value chains and is trying to find areas where it can support local businesses in operations or market access. This includes support in sourcing, production, logistics, sales, and other links along the value chain”* (Alibaba, 2022 report). Online marketplaces also use digital technology to engage in the fight against public emergencies, which can support the normal functioning of the business ecosystem in times of crisis and better respond to social needs. Since the epidemic, online marketplaces have given full play to their digital power in business, finance, and logistics and have fully invested in material procurement, livelihood protection, and technology to help fight the epidemic. *“It also shared technologies to improve disaster forecasts, coordination, and recovery, seeking to promote broader societal resilience”* (Alibaba, 2022 report).

Synthesizing the above research findings, we propose the following proposition:

Proposition 2 *Compared to general enterprises, when online marketplace enterprises pursue the social dimension of sustainability goals, they have unique advantages in utilizing ...*

2a. *the market transaction mechanism, i.e., providing market-based solutions to address grand societal challenges such as poverty alleviation, women empowerment, and disability assistance.*

2b. *the digital innovation mechanism, i.e., providing innovative digital solutions for customers and important social issues such as eliminating the digital divide, helping COVID-19 prevention and control, and providing technical support for the 2022 Beijing Winter Olympics.*

2c. *the ecosystem participation mechanism, i.e., empowering small and medium participants within the ecosystem to build businesses, improve capabilities, and create value.*

Governance dimension

In the governance dimension, both the ESG factor framework for online marketplaces and the generic ESG factor framework focus on business ethics, strategy and risk management, transparency and disclosure, board structure and diversity, and stakeholder engagement. Companies should have their own codes of conduct and business principles in the internal governance process and adhere to compliance, anti-monopoly, anti-money laundering, anti-fraud, and anti-unfair competition. Also, companies should comply with the rules and practices of information disclosure.

In terms of risk management, online marketplaces conduct risk control through a clear risk management structure, comprehensive audit coverage, and a tight risk management system, thus achieving stable business operations. Regarding external participants, online marketplaces emphasize that the skills, industry experience, background, and gender of board members are fully considered to ensure optimal and diverse board composition. The board members have expertise in multiple fields, including communications technology, investment, finance, business administration, law, and social sciences, and all have extensive industry experience and are committed to improving corporate decision-making with a more comprehensive and integrated perspective and outlook.

Moreover, it is crucial to communicate with stakeholders, understand their demands through various channels, and take measures to respond reasonably. Through extensive communication with stakeholders, priority substantive

issues to be addressed can be identified, and key strategic objectives for sustainable development can be formed.

Compared to the generic ESG framework, there are several unique practices that characterize the ESG governance of online marketplaces and their companies. For instance, in terms of governance structure, online marketplaces continuously optimize their governance structure by establishing a sustainable development commission to better practice ESG concepts and strategies and improve the company's competitiveness for sustainable development. Additionally, the governance of online marketplaces also focuses on governance related to data and information security, which are not mentioned in the generic framework, such as information and network security, and IP protection. We believe these factors have the characteristics of online marketplaces and cannot be ignored in their governance, so we categorize them as special factors.

In terms of information and network security, this factor is particularly prominent in online marketplaces compared to other industries. Online marketplaces have a very high user traffic base, and once an event affects information and network security, it can cause serious consequences. For example, “*We have built a full range of data security capabilities from physical computer rooms to IaaS (Infrastructure as a Service), where we control the security risks through securing the storage, network, and computing, and then our PaaS (Platform as a Service) and SaaS (Software as a Service) layers to create a trustworthy and secure environment*” (Alibaba, 2022 report). Online marketplaces also have a well-established security infrastructure and a comprehensive security management structure and system to support efficient and orderly network security management. Online marketplaces also strive to raise public awareness of information and network security, participate in and promote the development of industry standards, and help build a security ecology for the industry. For example, “*Alibaba Cloud launched China's first Data Protection Initiative with six security capabilities recognized by global authorities*” (Alibaba, 2022 report). “*JD.com works closely with ecological partners for a trustworthy security infrastructure to continuously tackle information security problems*” (JD.com, 2021 report).

Regarding IP protection, the Second Plenary Session of the 20th Party Congress mentioned the need to strengthen the optimization and adjustment of institutional responsibilities in IP and improve the IP management system. This factor is also a key concern for online marketplaces. Through the analysis of the report, it is found that online marketplaces not only focus on protecting their own intellectual property, continuously improving their IP management system, setting up a professional IP team, respecting research and development achievements, and encouraging continuous innovation but also respect other parties' IP. They protect

the legal rights of IP rights holders through measures such as user agreements and platform IP protection mechanisms. Online marketplaces also strive to raise awareness of IP rights among employees, consumers, and merchants.

Synthesizing the above research findings, we propose the following proposition:

Proposition 3 *Compared to general enterprises, when online marketplace enterprises pursue the governance dimension of sustainability goals, they have unique advantages in utilizing ...*

3a. *the market transaction mechanism, i.e., strictly complying with business ethics during the transaction and preventing unethical behaviors, such as monopoly and unfair competition.*

3b. *the digital innovation mechanism, i.e., providing innovative technical solutions for information and network security and establishing related managerial systems.*

3c. *the ecosystem participation mechanism, i.e., protecting the intellectual properties of their own and other ecosystem participants.*

In addition, it is worth noting that we found no mention of two important factors, “air pollutants” and “shareholders’ rights,” in the ESG reports of online marketplaces. Only very few ESG reports have briefly mentioned shareholder-related issues, so we excluded the factor of “shareholder rights” from our previous analysis as it is not generally accepted by internet companies in China. We believe this may be due to the imperfection of the Chinese market system. China’s market economy reform has only lasted for 40 years. During the transition from a planned economy to a market economy, Chinese companies faced problems such as poorly defined property rights, weak awareness of shareholders’ interests, and a lack of systems to protect their legal rights and interests. These issues may explain why the “shareholder rights” factor is not widely accepted in the Chinese context (Xu & Yang, 2010). The absence of “air pollutants” may be due to the industry attributes of online marketplaces, which do not belong to polluting industries and therefore do not involve air pollutant emissions.

Discussion and conclusion

Unique characteristics of the online marketplace and mechanisms for sustainability

In this study, we explored the implementation of ESG strategies in the online marketplaces in China in 2022 and the

factors that characterize ESG practices in the online marketplaces compared to the generally prevailing ESG framework by conducting a content analysis of ESG reports in the online marketplaces and integrating these factors into a descriptive framework.

There are many ESG-related disclosure standards issued by international authorities, three of which are more commonly used. Firstly, the concept of ESG originates from responsible investment, and the environmental aspects that investors consider when following the PRI include climate change, circular economy, biodiversity, forests, and deforestation. Social aspects include human rights, decent work, diversity, equity, and inclusion, while governance aspects include board structure, executive compensation, tax equity, and responsible political participation. Therefore, disclosing the above ESG issues and reporting on corporate sustainability have become necessary ways for companies to respond to external investors’ concerns (Eccles et al., 2014; Khan et al., 2016).

Secondly, the GRI of the Global Sustainability Standards Board is the most widely used sustainability reporting standard in the world (Darnall et al., 2022), covering topics ranging from biodiversity to taxation, waste to emissions, diversity, and equity to health and safety. There are already several academic studies related to the GRI criteria (Darnall et al., 2022; Lokuwaduge & Heenetigala, 2017; Luo & Tang, 2022).

Finally, in addition to the two criteria mentioned above, the 17 Sustainable Development Goals proposed by the UN member states in 2015 are also a key element of corporate ESG disclosure that can affect corporate ESG performance (Khaled et al., 2021). The goals address global challenges, including poverty, inequality, climate change, environmental degradation, and peace and justice.

To facilitate comparison with existing ESG factor frameworks, this paper uses the ESG factor framework mentioned in the EBA report, which synthesizes several internationally commonly used ESG frameworks and standards and can be used as a generic international ESG factor framework for comparative analysis. After content analysis of the ESG reports of online marketplaces, we found that there are common factors as well as unique features between the ESG factor framework of online marketplaces and the generic ESG factor framework. The online marketplace fully reflects its industry characteristics as well as the management characteristics of Chinese companies in the process of ESG practice.

First, online marketplace activities transform many non-market-based transactions into market-based transactions (Standing et al., 2010), and more suppliers enter the marketplace, reducing transaction costs while increasing market efficiency (Malone et al., 1987). ESG practices in online marketplaces, on the other hand, reflect more non-economic

values under the market mechanism. On the environmental side, online marketplaces encourage the supply of green goods, hoping to change consumers' perceptions and behaviors through the platform and influence them to consume responsibly. On the social side, poor people participate in the e-commerce ecosystem and are able to benefit from the online marketplace, an IT-supported, market-based approach to poverty alleviation that is effective and self-sustainable (Li et al., 2019).

Second, information systems and technology have been the subject of close attention in online market research (Albrecht et al., 2005; Standing et al., 2010), and the integration of powerful information networks into the business environment has had a profound impact on the nature of management between buyers and sellers in the marketplace (Grover & Ramanlal, 1999). ESG practices in online marketplaces are also characterized as technology-driven, with both innovative digital technologies and rich industry insights. On the environmental front, online marketplaces are actively innovating environment-friendly products and services and are market leaders in all metrics. On the social side, online marketplaces adopt digital technology to support rural revitalization, help social disasters, and use technological innovation to bring a more convenient and better way of life to the whole society. In terms of governance, online marketplaces pay particular attention to the "side effects" of technology, such as information leakage, cyber risks, and improper protection of IP rights. The large user base is an important reason why online marketplaces pay particular attention to data and information security (Zha et al., 2022).

Third, online marketplaces are characterized as platform enterprises with multiple stakeholders participating in their business and life, and ecosystems are different forms of complementarities (Jacobides et al., 2018), and online marketplaces engage in ESG practices by promoting participant ecologies. Although online marketplaces act as intermediaries connecting both buyers and sellers, their ESG practices involve multiple parties and radiate more widely. By engaging stakeholders from different social backgrounds, ESG practices reflect different values (Barrett et al., 2016). On the environmental side, online marketplaces spread the concept of low carbon and environmental protection through the form of public welfare and attract more people to participate in low-carbon living, including new users in addition to active users of online marketplaces. In the social aspect, the online marketplace focuses not only on the company's own level, such as employees and suppliers, but also on the external user level, such as customers, and the wider industry ecology and social network. The scope of radiation includes marginalized groups such as women and children, the elderly, and disadvantaged groups, but also includes remote areas, small- and medium-sized enterprises, the

entire industry, and other large ecologies, enabling the online marketplace to take a larger range of social responsibility.

Finally, the effective operation of ESG is related to the level of national development, the state of society, and cultural habits, in addition to the company's own factors. Now that China has become a global innovation leader in developing and testing various new digital services (Li et al., 2022), the ESG practices of Chinese online marketplaces are of great research significance.

In the past few years, China has released a series of top-level designs on carbon peaking, carbon neutrality, common prosperity, and rural revitalization, which have become guidelines for companies to create value beyond business. Several topics in the ESG field are highly compatible and resonate with them. In terms of the environment, online marketplaces use technology to help with the green transformation of economic and social development, comprehensively improving resource utilization efficiency and deeply integrating digital technology with all aspects of carbon emissions to help enterprises achieve their carbon neutrality goals. In the social aspect, rural revitalization and stable employment are both national priorities. Online marketplaces improve the urban–rural gap by expanding the e-commerce market, helping to revitalize the rural value chain, revitalizing talents, and revitalizing medical care. Online marketplaces also expand their services to remote areas, allowing disadvantaged groups and relatively less developed areas to share technological dividends and promote employment. At the governance level, online marketplaces do not focus on the rights of shareholders but instead put customers first in their business philosophy (Xu & Yang, 2010).

Based on the above characteristics and the three sets of propositions given in the research findings section, this paper finally comes up with a mechanical model for online marketplaces to achieve sustainability through ESG, as shown in Fig. 1.

Theoretical contributions and practical implications

The theoretical contributions of this study are two-fold. Firstly, in ESG research, this paper presents a comprehensive overview of the unique factors and practices in online marketplaces. By doing so, it complements and expands the existing generic ESG framework, enabling researchers to better understand and contextualize ESG practices in the context of the online marketplace. This approach is particularly important given the distinct characteristics and challenges that online marketplaces face in terms of sustainability.

Secondly, this paper contributes to the study of online marketplaces by elucidating the mechanisms through which they achieve sustainable development by fulfilling

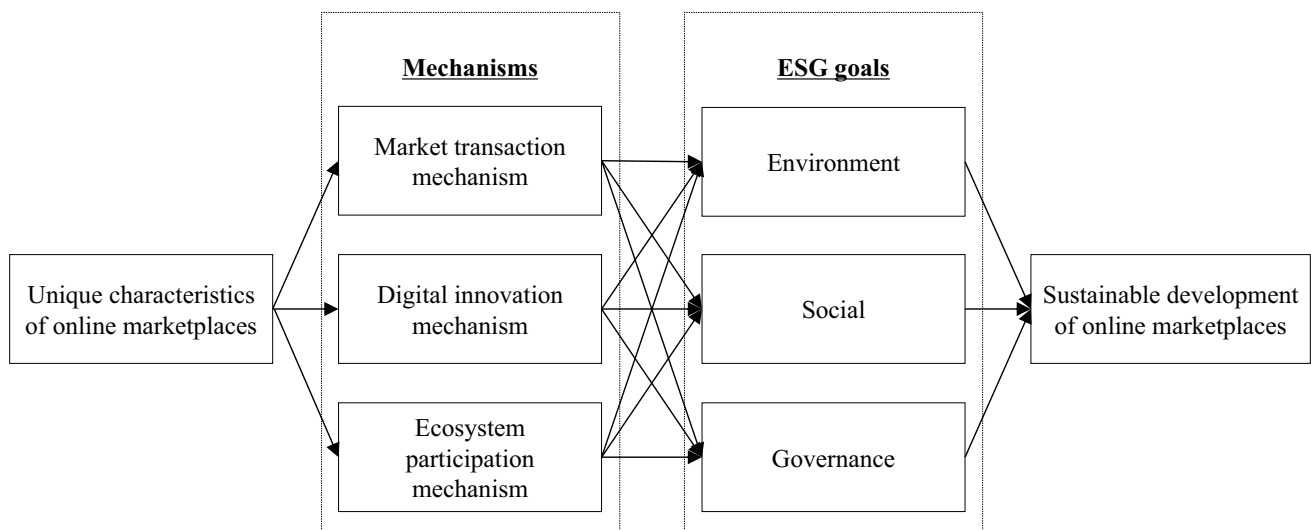


Fig. 1 The mechanisms for online marketplaces to achieve sustainability

ESG goals. It emphasizes the non-economic values that online marketplaces generate and their critical role in enhancing competitiveness and achieving sustainable development. Specifically, this paper highlights the importance of social and environmental sustainability for online marketplaces and demonstrates how online marketplaces can contribute to the common prosperity and rural revitalization goals of the Chinese government. Furthermore, it provides evidence that online marketplaces can contribute to reducing carbon emissions and promoting green development with digital technology.

Overall, the theoretical contributions of this paper are significant because it provides a deeper and more contextualized understanding of ESG practices and their impact on sustainable development in the online marketplace context. By highlighting the unique practices of online marketplaces, this paper provides a roadmap for future research to build upon and further develop our understanding of ESG practices and their implications for sustainable development.

In terms of practical implications, this paper offers several contributions. Firstly, it extends the ESG framework for online marketplaces by analyzing the content of existing ESG reports from leading companies. This framework can provide effective references for the ESG development and evaluation of latecomers, enabling them to achieve their sustainable development goals more precisely. Secondly, partners in the online marketplace ecosystems can also use this framework to evaluate their own ESG development direction and achieve a mutual benefit and win-win situation. Finally, the research results of this paper provide a practical framework and theoretical reference for all stakeholders to evaluate the ESG development

of enterprises. These insights can be used to guide the development of future ESG strategies and help companies and stakeholders to prioritize and manage ESG risks and opportunities.

Limitations and future research

While this study is based on ESG reports from Chinese companies, it is important to note that the authors did not provide an in-depth discussion within the Chinese context. A significant amount of cross-country evidence suggests that corporate ESG performance and perceptions are influenced by cultural and social contexts, leading to potential variations in ESG practices across different social and cultural contexts. Given the distinct cultural contexts and institutional arrangements between China and other countries, there are likely to be differences in the conceptual understanding and factor delineation of ESG among individuals and organizations.

Therefore, it is crucial to conduct localized research based on China's unique context, explore and identify ESG factors specific to China, and construct an ESG research framework that is suitable for the social context of China to promote ESG research in China. Future research should focus on identifying the unique ESG factors in the Chinese context and developing an ESG framework that accurately reflects the Chinese context. This will allow for a more precise evaluation of ESG development and performance in Chinese companies and enhance our understanding of how cultural and institutional factors influence ESG practices.

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Data Availability The data that support the findings of this study are available from the authors upon reasonable request.

Declarations

Conflict of interest The authors declare no competing interests.

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