GREEN INVESTMENT: HOW SUSTAINABILITY STRATEGIES TRANSFORM RISK INTO LONG-TERM RETURNS

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Abstract

This study examines green investment as a strategic corporate instrument for mitigating environmental, social, and governance (ESG) risks and transforming them into long-term financial returns. Amid tightening global climate regulations and local environmental law enforcement associated with the restoration of the Citarum River Basin, the garment and textile industries in Cimahi City face substantial transition and reputational risks. The study adopts a qualitative approach with a descriptive-analytical case study design. Data were collected through in-depth interviews with key stakeholders, including corporate sustainability managers, representatives of local textile associations, and regulators from the Cimahi City Environmental Agency, supported by content analysis of *sustainability report*s and relevant regulatory documents. Thematic analysis was used to identify internal and external mechanisms through which risks are converted into economic value. The findings indicate that the modernization of green technologies, such as *Zero Liquid Discharge* (ZLD) systems, energy-efficient dyeing machines, and boiler fuel conversion can mitigate legal risks and financial penalties while substantially reducing utility costs through on-site water recycling of up to 60%. Externally, authentic ESG commitments and the adoption of green material certifications serve as a *green passport* for maintaining a position in the supply chains of *global fashion brands* and facilitating access to *green financing* schemes with a lower cost of capital.

Keywords: *Green Investment, Sustainability Strategies, ESG Risks, Textile Industry, Cimahi City.*

A. INTRODUCTION

Global climate change and environmental degradation have evolved from ecological concerns into the greatest existential challenges facing the modern corporate sector. In the Anthropocene, conventional industrial activities based on unrestricted resource exploitation are increasingly reaching their limits and encountering global opposition (Lako, 2015). Environmental crises such as global warming, water scarcity, and severe pollution are no longer regarded as negative externalities detached from corporate balance sheets. Instead, these developments have become tangible business risks that can directly threaten operational continuity and financial market stability (Wardoyo, 2016).

Changes in international and domestic regulatory frameworks have intensified the urgency of this shift in business paradigms. Governments worldwide, including Indonesia through its Net Zero Emission (NZE) commitment, are tightening environmental legislation, introducing carbon taxes, and restricting the activities of high-emission industries (Hermawan & Prabhawati, 2024). These policies generate what is known as transition risk. Companies that are slow to adapt to new green regulations face not only legal sanctions and substantial financial penalties but also the threat of losing their operating permits and encountering opposition from increasingly environmentally conscious local communities (Anugraheni, 2024).

Alongside regulatory pressure, changing stakeholder preferences constitute a powerful external driver. Global investors no longer focus exclusively on short-term financial performance; they now rigorously audit compliance with Environmental, Social, and Governance (ESG) criteria before committing capital (Putra et al., 2017). International financial institutions and banks have begun restricting lending to projects that damage ecosystems. This development creates liquidity risks for conventional companies, as access to capital becomes increasingly expensive and constrained for businesses that disregard sustainability principles (Al-Fadhat & Savitri, 2023).

At the downstream end of the value chain, markets are also experiencing substantial behavioral changes with the emergence of a generation of *green consumers*. Contemporary consumers, predominantly Generation Z and Millennials, show a strong preference for products and brands that demonstrate clear environmental responsibility (Hamizar et al., 2024). Boycotts of products that damage the environment or involve high emissions have become easier to organize in the digital era. Consequently, companies that fail to integrate *sustainability* strategies into their supply chains face potentially devastating reputational risks that can rapidly erode brand equity and sharply reduce market share (Arum et al., 2024).

Although this range of environmental risks may appear threatening, the emerging economic landscape offers promising opportunities for transformation through green investment. Green investment should no longer be narrowly regarded as a *cost center* or a *compliance cost* that reduces profitability (Goeyardi et al., 2024). Instead, investment in environmentally friendly technologies, energy efficiency, and circular waste management should be positioned as a strategic instrument. Such investment enables companies to hedge against future regulatory uncertainty and fluctuations in fossil fuel prices (Ellenasari et al., 2024).

Operationally, sustainability strategies have been shown to convert environmental risks into cost efficiencies and competitive advantage. Reduced energy consumption and the reuse of residual materials within a circular economy significantly lower production costs over the long term (Utomo et al., 2022). Moreover, a commitment to green investment expands corporate access to modern financing instruments, such as *green bonds* and *sustainability-linked loans*, which offer more competitive interest rates than conventional financing (Tajidan et al., 2024).

Converting risks into returns requires a strategic reorientation of the company's core business model. Transforming risks into long-term profits involves more than

philanthropy or cosmetic *greenwashing* intended to attract the market (Arti & Sisdianto, 2024). It requires the integration of ESG values into organizational governance, product innovation, and corporate risk management. When sustainability becomes a long-term vision, companies not only mitigate their negative impacts on the planet but also build robust *resilience* against future economic shocks (Fajarina & Soeratin, 2024).

Accordingly, examining how green investment and *sustainability* strategies can transform risks into long-term returns is both essential and timely. Previous research has frequently remained constrained by the dichotomy that treats economic growth and environmental conservation as mutually exclusive. This article re-examines that theoretical limitation to develop a comprehensive understanding of the internal corporate mechanisms for responding to environmental crises. This introduction thus establishes a foundation for explaining the urgency, dynamics, and strategic contribution of green investment to sustainable business practices in the green economy.

B. METHOD

This study adopts a qualitative approach with a descriptive-analytical case study design to explore the implementation of green investment in the garment and textile industries in Cimahi City. Cimahi City was selected as the research site because it is one of West Java's largest textile industry clusters and currently faces stringent environmental regulatory pressures concerning wastewater management and operational emissions (Creswell & Poth, 2018). Informants were selected through *purposive sampling* and included *sustainability managers*, garment factory operations managers, representatives of local textile associations, and officials from the Cimahi City Environmental Agency. Primary data were collected through structured *in-depth interview*s on strategies for mitigating environmental risks and converting them into economic value. These primary data were supplemented by secondary data from corporate sustainability reports, environmental impact assessment (AMDAL) documents, and local regulations governing industrial waste management.

All collected data were analyzed using *thematic analysis*, following Yin (2018), to identify, examine, and report substantive patterns or themes emerging from interview transcripts and written documents. The analysis began with data reduction through verbatim transcription and open *coding* to classify ESG risk categories and the resulting forms of long-term returns. The validity and trustworthiness of the qualitative data were maintained through triangulation, including source triangulation (comparing corporate representatives' statements with those of regulators) and methodological triangulation (cross-checking interview findings against evidence of compliance in secondary documents) (Miles et al., 2014). The thematic findings were then interpreted contextually to map the mechanisms through which investments in green technologies, such as energy-efficient machinery and modern wastewater treatment plants (*WWTP*s), can transform compliance-related risks into competitive advantage for the textile industry in Cimahi City.

C. RESULT AND DISCUSSION

1. Mapping Environmental Risks and Green Investment Implementation in the Textile Industry in Cimahi City

The garment and textile industries in Cimahi City have long been a backbone of the regional economy, while also contributing substantially to local environmental degradation. Field findings indicate that ecological developments in recent years have transformed environmental issues from matters of social responsibility into existential business risks. Corporations in this sector no longer operate in isolation; they now face heightened public expectations and a substantially more restrictive regulatory environment. The initial mapping of operational risks identified wastewater management and carbon emissions as the two most significant vulnerabilities affecting nearly all textile factories in the Cimahi area.

The principal risk identified centers on increasingly stringent environmental law enforcement, particularly following the intensification of the Citarum River Basin restoration program. Environmental authorities, supported by military and civilian task forces, enforce industrial effluent quality standards without compromise. For conventional textile factories in Cimahi that still rely on outdated wastewater treatment systems, this heightened oversight creates immediate legal risks. Companies frequently face administrative sanctions, substantial financial penalties, and enforcement measures involving the unilateral sealing of wastewater discharge channels with concrete, which immediately halt factory operations.

Beyond formal regulatory risks, the textile industry in Cimahi City faces substantial social pressure from communities surrounding industrial areas. Growing public environmental awareness increases the likelihood of social friction whenever there are indications of odor pollution, contamination of residents' well water, or dense boiler smoke. These social and reputational risks manifest as community protests, protracted legal mediation, and adverse publicity in digital media. Such conflicts damage companies' local reputations and disrupt workplace stability, thereby constraining the daily productivity of garment factories.

Governance risks also arise from uncertainties surrounding energy and groundwater supplies in the Cimahi area. Heavy dependence on groundwater for fabric *dyeing* exposes the industry to acute water scarcity as groundwater levels decline across Greater Bandung. Local government decisions to progressively raise groundwater tax rates as a conservation measure directly increase corporate operating costs. This uncertainty is compounded by fluctuations in domestic coal prices, as coal remains the principal fuel for boilers in conventional textile factories.

In response to this complex range of ESG risks, the findings reveal a shift in manufacturing strategies among proactive textile firms in Cimahi. Rather than maintaining a defensive, reactive approach, several corporations have begun adopting green investment as an instrument for long-term risk mitigation. In this context, green investment is defined as the strategic allocation of capital to upgrade production technologies and waste treatment systems in accordance with circular economy principles and carbon efficiency. These measures aim to strengthen operational resilience against future regulatory uncertainty.

The most prominent form of green investment in Cimahi City is the modernization of wastewater treatment plants (WWTPs). The companies examined in the case study have integrated *Zero Liquid Discharge* (ZLD) technology and *Reverse Osmosis* (RO) filtration systems. These technologies allow initially toxic and concentrated dyeing effluent to undergo successive filtration stages until it meets clean-water standards. The treated water is then recirculated into production machinery for subsequent dyeing cycles, creating an integrated, self-sufficient water management system.

In addition to wastewater management, green investment targets the modernization of core production machinery in Cimahi's garment facilities. Replacing conventional dyeing machines with modern low-emission machines featuring a low *liquor ratio* has become an investment priority. These new-generation machines require substantially less water and fewer chemicals to achieve the same fabric color quality. Their adoption dramatically reduces wastewater generation at the source of the production process, thereby easing the burden on downstream WWTP units.

A third form of green investment identified in the field involves fuel conversion in industrial boilers. Recognizing that coal is a major contributor to carbon emissions and a primary target of government carbon taxation, several corporations in Cimahi have switched to boilers fueled by liquefied natural gas (LNG) or biomass derived from solid wood waste. Although this transition requires substantial capital expenditure, the technology dramatically reduces exhaust smoke opacity and significantly lowers corporate carbon footprints while protecting companies from emission penalties.

Interview findings further reveal that *sustainability* strategies extend to environmentally responsible raw material procurement. Garment companies in Cimahi have begun using recycled textile fibers, including *recycled polyester*, and organic cotton with international certifications such as the *Global Recycled Standard* (GRS). These measures respond to the market risk of declining demand for virgin synthetic textiles. Integrating green raw materials ensures that finished products manufactured in Cimahi remain highly relevant amid global sustainable fashion trends.

Nevertheless, the findings acknowledge that the initial implementation of green investment creates internal financial pressures through increased *capital expenditure* (CapEx). Allocating billions of rupiah to technologies that do not directly generate output, such as WWTPs and fuel conversion systems, often provokes intense debate in board meetings. High interest costs on conventional bank loans for environmental projects have also constituted a commercial barrier, slowing the green transition among some medium-sized textile firms in Cimahi.

Nevertheless, post-implementation operational performance data indicate that green investment soon delivers commensurate gains in stability. Companies that have completed the transition to green technologies recorded zero penalties from the Cimahi City Environmental Agency over the past two years. Maintaining a clean environmental compliance record frees management from legal uncertainty, costly

daily fines, and the threat of operating permit suspension, any of which could abruptly disrupt corporate cash flows.

From the perspective of operational sustainability, adopting green technologies has been shown to eliminate vulnerabilities arising from external factors. When public clean-water supplies or groundwater availability decline during the dry season, factories using ZLD water recycling systems can continue operating at full production capacity without interruption. This *operational resilience* represents a tangible outcome of converting resource scarcity risks into reliable and stable production schedules.

In parallel, green investment has positively affected internal working environments and relations with surrounding communities in Cimahi City. The sharp reduction in wastewater odors and dense boiler smoke directly creates healthier working conditions for factory workers. At the same time, eliminating off-site environmental pollution has helped restore relations with neighboring residents, reduce the likelihood of demonstrations, and establish social stability conducive to long-term business growth.

In corporate risk management terms, the findings confirm that green investment functions as an effective *hedging* instrument. By adopting environmental standards that exceed current legal requirements, textile firms in Cimahi have indirectly anticipated environmental regulations expected to become more stringent in the future. This *regulatory resilience* positions them ahead of competitors that continue to rely on conventional production methods.

Taken together, these findings indicate that the textile industry in Cimahi City is now divided into two groups: companies trapped in a cycle of environmental risks because they have failed to adapt, and companies that have secured their business prospects through green investment. The practical implementation of environmentally friendly technologies demonstrates that such investment is no longer merely a public relations exercise. Instead, it constitutes a fundamental business model decision that effectively neutralizes ESG threats and establishes a robust, sustainable operational foundation.

2. Mechanisms for Transforming Risk into Competitive Advantage and Long-Term Profitability

The theoretical analysis of the field findings confirms that green investment is more than a defensive response to regulatory requirements; it represents a strategic reorientation capable of transforming a *cost center* into a new driver of economic value (Cakranegara, 2021). This phenomenon can be explained through the *Resource-Based View* (RBV), whereby corporate capabilities for integrating environmentally friendly technologies function as strategic assets that satisfy the criteria of being *Valuable, Rare, Inimitable,* and *Non-substitutable* (VRIN) (Hidayat, 2023). Textile firms in Cimahi City that have independently completed this transition no longer regard environmental compliance simply as an operating expense, but as an investment in *intangible assets* that strengthens their bargaining position in domestic and international markets.

The transformation of risk into long-term returns operates through two interacting pathways: *internal cost efficiency* and *external market repositioning*. Internally,

investment in *Zero Liquid Discharge* (ZLD) water recycling technology dramatically changes corporate utility cost structures. Although initial capital expenditure is substantial, reductions in groundwater use of up to 60% generate a measurable *return on investment* over the medium term. Consistent reductions in utility costs increase gross profit margins, providing greater pricing flexibility amid intense competition in the global garment industry.

Furthermore, energy efficiencies achieved by converting coal-fired boilers to natural gas or biomass provide financial protection against unpredictable fossil fuel price fluctuations. Over the long term, textile corporations in Cimahi with substantial energy independence and high water efficiency will be more resilient to macroeconomic shocks, including the potential introduction of government carbon taxation schemes. The reduction in operating costs through resource efficiency provides empirical evidence challenging the longstanding academic assumption that sustainability strategies necessarily compromise corporate financial profitability.

Externally, a commitment to green investment serves as a *green passport* for local textile firms seeking to enter and remain in the supply chains of *global fashion brands*. International markets, particularly the European Union and the United States, have introduced stringent ESG audit standards for garment vendors in developing countries through regulations such as the *Corporate Sustainability Due Diligence Directive* (CSDDD). With certified green infrastructure in Cimahi, companies automatically eliminate the risk of commercial contract termination (*buyer retention risk*) that frequently affects conventional factories continuing to discharge polluting waste.

This external competitive advantage is reinforced by companies' ability to reach a new market segment: *green consumers* willing to pay premium prices for ethically produced and environmentally friendly fashion. Textile companies in Cimahi using GRS-certified recycled fibers can offer international buyers a distinctive *value proposition*. This shifts their position from readily replaceable producers of low-cost garment commodities to long-term strategic partners whose sustainability commitments align with those of global brands.

Table 1. Transformation of ESG Risks into Long-Term Returns in the Textile Industry in Cimahi City

ESG Dimension	Initial Risks & Potential Financial Losses	Green Investment Implementation (Technology)	Efficiency & Value Conversion Mechanisms	Financial Impacts & Long-Term Returns
Environmental	Legal sanctions involving the sealing of wastewater discharge channels with concrete (Citarum Task Force); daily fines; extensive production *downtime*.	WWTP modernization using *Zero Liquid Discharge* (ZLD) & *Reverse Osmosis* technologies.	Reducing groundwater dependence by up to 60% through on-site *water recycling*.	Lower monthly utility costs; avoidance of legal fines; reliable production schedules during the dry season.

Environmental	Rising energy costs due to coal price fluctuations; potential future carbon emission tax penalties.	Conversion of coal-fired boilers to liquefied natural gas (LNG) or biomass.	Reduced exhaust smoke opacity and a smaller carbon footprint through *source reduction* upstream in production.	*Hedging* against carbon regulatory risks; long-term energy cost stability.
Social	Community conflicts in Cimahi due to odor/discoloration pollution; worker demonstrations over unhealthy working conditions.	Replacement of conventional dyeing machines with low *liquor ratio* machines; elimination of hazardous chemicals.	Minimizing toxic residues from the outset of production; creating cleaner factory working environments.	Higher labor productivity; elimination of conflict management costs (*social cost reduction*); stronger *brand image*.
Governance (Governance & Markets)	Termination of commercial contracts (*buyer churn*) by international fashion brands following failed ESG compliance audits.	International green material certification (e.g., *Global Recycled Standard* / GRS).	Compliance with global supply chain regulations (such as the EU *CSDDD*); access to *green consumer*s.	Stable long-term contracts; access to premium markets offering higher profit margins.
Financial Governance	High interest rates on conventional bank loans; limited liquidity for capital expenditure (CapEx) expansion.	Transparent sustainability performance reporting (*Sustainability Report*).	Meeting banks' green taxonomy criteria for creditworthiness assessments free from environmental risk.	Exclusive access to *green financing* and *sustainability-linked loans* at more competitive interest rates.

Theoretically, this transformation can also be analyzed through *Stakeholder Theory*. Integrating green investment has been shown to balance the interests of diverse stakeholders, from regulators and local communities to financial investors. Harmonious relations with the Cimahi City Environmental Agency and surrounding communities minimize the *social costs* typically associated with environmental conflicts. Eliminating potential litigation and community demonstrations creates a stable and supportive working environment, enabling management to devote internal resources fully to product innovation and market expansion rather than to resolving reputational crises.

From a modern financial management perspective, robust ESG compliance significantly enhances corporate credibility with global financial institutions and domestic banks. The banking sector is expanding its *green financing* portfolios by offering incentives such as lower interest rates and longer loan tenors for projects that support carbon neutrality. Textile firms in Cimahi with clean environmental track records have greater access to these green lending schemes. The resulting reduction in the *cost of capital* provides essential liquidity advantages for future business expansion and further machinery modernization.

In terms of risk mitigation, green investment acts as a *hedging* instrument against future regulatory uncertainty, thereby strengthening *regulatory resilience*. The government is expected to continue tightening industrial effluent quality standards in pursuit of its *Net Zero Emission* target. Companies in Cimahi that have adopted green technologies exceeding current regulatory requirements will not need to undertake costly emergency investments when new legislation is enacted. This regulatory preparedness protects corporations from unexpected operating cost shocks and positions them ahead of domestic competitors that continue to delay their green transition.

This discussion also highlights the importance of visionary leadership, or *green transformational leadership*, in facilitating the conversion of risks into returns. Successful transformation depends heavily on top management's commitment to rejecting cosmetic *greenwashing* and pursuing genuine investment. When sustainability values are internalized within organizational culture and operational risk management systems, resistance from finance departments to high initial capital expenditure (CapEx) can be reduced through a shared understanding of projected, more stable long-term cash flow returns.

The findings also demonstrate the applicability of the *Porter Hypothesis* at the local level in Cimahi City. Stringent environmental regulations associated with the restoration of the Citarum River Basin have been shown to stimulate internal innovation rather than undermine the textile industry. Regulatory pressure compels factory engineers and managers to develop manufacturing methods that use fewer chemicals and less water and energy. Innovation triggered by these external pressures ultimately improves overall production efficiency and creates previously unavailable competitive advantages.

Nevertheless, the discussion critically emphasizes that a successful green transition requires support from an integrated industrial ecosystem. Small and medium-sized textile firms in Cimahi often face capital constraints that prevent them from adopting their own modern WWTPs. It is therefore important to promote collaborative green investment models, such as shared wastewater treatment facilities or local tax incentives provided by the Cimahi City Government. Coordinated public–private cooperation can accelerate the development of a globally competitive green textile industry cluster.

At the macroeconomic level, the transformation of Cimahi City's textile cluster provides an important blueprint for restructuring national manufacturing in the green economy. The success of a small number of corporations in converting ecological risks into profits demonstrates that financial profitability and environmental conservation can advance together. This pattern challenges the outdated dichotomy that economic development must come at the expense of environmental quality, while offering a new direction for the sustainability of labor-intensive industries in Indonesia.

D. CONCLUSION

This study concludes that green investment and *sustainability* strategies are effective strategic instruments for transforming environmental, social, and

governance (ESG) risks into long-term financial returns and competitive advantage for the textile industry in Cimahi City. Stringent regulations associated with the restoration of the Citarum River Basin and green compliance audit requirements in the global fashion market no longer constitute threats that undermine business operations; instead, they act as catalysts for innovation. By modernizing technologies through *Zero Liquid Discharge* (ZLD) systems, water-efficient dyeing machines, and boiler fuel conversion, textile corporations in Cimahi have mitigated legal sanction risks, eliminated financial penalties, and built robust *operational resilience* against resource scarcity and future regulatory shocks.

Furthermore, the transformation of risk burdens into sustainable profits occurs through the integration of economic value at both internal and external levels. Internally, green investment generates substantial utility cost efficiencies through reduced water consumption and greater energy stability, directly widening corporate profit margins. Externally, authentic ESG compliance and the adoption of international green material certifications provide exclusive access to premium global supply chains and bank *green financing* schemes with a lower *cost of capital*. Thus, this study challenges the longstanding dichotomy and establishes that sustainability strategies are no longer a *cost center*, but a form of long-term productive investment essential to business continuity in the green economy.

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