Thu Pham

Green Procurement Challenges and Strategy for Sustainability: The case of Fast Retailing

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Author: Thu Pham
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ABSTRACT:

The fast-fashion industry faces significant environmental and social challenges, underscoring the need for green procurement as an essential tool for translating sustainability commitments into measurable results. This thesis analyzes Fast Retailing's green procurement implementation, evaluates the effectiveness of existing strategies and goals, and identifies design actions to bridge the gap between policy intent and portfolio-level outcomes. A qualitative single-case design integrates directed content analysis of corporate disclosures with thematic analysis of semi-structured interviews. A codebook based on theory and refined by the empirical data, in addition to an auditable evidence matrix, organized six themes: materials and product design; carbon and climate commitments; transparency and traceability; human rights and ethical sourcing; procurement governance and strategy; and performance and disclosure quality. This structure facilitates the correlation of numerical indicators with practitioner mechanisms while maintaining traceability.

Findings demonstrate significant progress in contexts with a well-defined measurement framework, defined by stable units and denominators, consistent observation, and external validation. Decarbonisation within owned operations is clear, with an expansion in renewable-electricity contracting and close to completion of recycled-polyester substitution. Environmental compliance at core garment facilities has matured under established wastewater and chemical management standards. In contrast, upstream initiatives are mainly descriptive due to the absence of portfolio denominators: the decarbonization of process heat at fabric mills (Tier-2) is not monitored through a standardized time-series indicator, and wood-based material schemes are documented in policy without consistent quantification of portfolios. Interviews identify these gaps as resulting from capital intensity, jurisdictional and infrastructure limitations, inconsistent data beyond Tier-1, and assurance designs that emphasize pass/fail conformity over process performance.

The study concludes that effectiveness is influenced more by metric design that aligns targets with procurement levers and supplier execution than by the scope of the program. Priority actions include establishing a Tier-2 heat indicator with regular, externally verified reporting; transforming upstream material policies into quantifiable portfolio coverage; and transitioning wet-processing oversight from a binary compliance framework to an intensity-based performance approach. The findings, based on a single-company case utilizing public disclosures and a limited interview sample, support analytic rather than statistical generalization. Future research should broaden the framework to encompass multiple brands, incorporate supplier-level energy data to quantify upstream heat transitions, and evaluate the financial viability of country-specific mill decarbonization pathways.

KEYWORDS: Green procurement, Sustainable supply chain management, Fast fashion, Circular economy, Procurement strategy, Supplier transparency, Sustainability, Fast Retailing

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Abbreviations

SSCM: Sustainable Supply Chain Management

CE: Circular Economy

TBL: Triple Bottom Line

SDG(s): Sustainable Development Goal(s)

GHG: Greenhouse Gas

KPI(s): Key Performance Indicator(s)

YoY: Year-over-Year

CAGR: Compound Annual Growth Rate

TCFD: Task Force on Climate-related Financial Disclosures

CSR: Corporate Social Responsibility

ERM: Enterprise Risk Management

CAPEX: Capital Expenditure

IoT: Internet of Things

RFx: Term commonly used for request-for-X documents (RFP – Request for Proposal)

LTA(s): Long-Term Agreement(s)

ESRS: European Sustainability Reporting Standards

MMCF: Man-made Cellulosic Fibers

RCS: Recycled Claim Standard

GRS: Global Recycled Standard

FSC: Forest Stewardship Council

PEFC: Programme for the Endorsement of Forest Certification

SBTi: Science Based Targets Initiative

HRDD: Human Rights Due Diligence

FOA/CBA: Freedom of Association/Collective Bargaining

H&S: Health & Safety

LTIR: Lost-Time Injury Rate

CAP: Corrective Action Plan

1 Introduction

The first part of this study focuses on the background and significance of the topic, establishing a foundation for a more thorough investigation of its implications in real-world settings. This section outlines key developments in existing research that shape the understanding of the topic and highlights the research gap in the study. In addition, this study presents the research questions and objectives and describes the research structure to provide a clear roadmap, ensuring readers can easily follow the chapters throughout the study.

1.1 Research background

Currently, the fashion industry must confront significant sustainability and ethical production challenges. The environmental consequences of fast fashion have emerged as an urgent concern (Niinimäki et al., 2020). The linear model of fast fashion (production-use-disposal) contributes to ecological degradation throughout the supply chain by increasing consumption and is anticipated to increase by 63% between 2015 and 2030, leading to higher resource use, greenhouse gas emissions, and water pollution (Aponte et al., 2024; GFA and BCG, 2017). To be more specific, the textile production process uses approximately 3,500 chemicals, the dyeing and finishing process of garments accounts for 20% of wastewater, and plastic-microfiber discharges from synthetic garments to water bodies, which have a significant impact on the environment and human health (Aponte et al., 2024; EEA, 2019). Regarding greenhouse gas emissions, fast fashion accounts for 4%-10% of total global emissions (Aponte et al., 2024). Consequently, this production and consumption model contributes to waste, resource consumption, greenhouse gas emissions, and water pollution.

Regarding social and economic aspects, fast fashion often focuses on low-priced products and rapid style changes, resulting in low-quality clothing (Aponte et al., 2024)

and making it unsustainable. Some high-reputation brands use this fast-fashion model, introducing new clothing styles weekly or changing them with the seasons. This model focuses on the younger consumer segment, including Generations Y and Z, who often seek trendy clothing at affordable prices (Mundel et al., 2021; Polajnar & Šrimpf, 2021; Valaei & Nikhashemi, 2017). However, this fast-fashion model often entails social costs, including dangerous working conditions and low wages. As Bick et al. (2018) indicate, the environmental impact of fast fashion is spreading, disproportionately affecting low- and middle-income countries (LMICs). These countries often lack adequate resources and infrastructure to manage waste generated by fast fashion or to reduce workplace risks posed by exposure to toxic chemicals. This model is particularly harmful when discarded garments overload landfills, thereby degrading local ecosystems (Aponte et al., 2024). These figures highlight the critical need for sustainable practices within the fashion industry, intervening at the company level in procurement, production, and overall supply chain strategies to reduce environmental degradation.

Faced with the environmental challenges mentioned, fast-fashion businesses should take timely action to meet the sustainable business goals of the company. This is not only the responsibility of the business itself but also a strategic development need. Procurement strategy is an essential factor in developing the sustainability goals of the company, as consumers increasingly focus on the transparency of materials and ethical sourcing (Anin et al., 2024). It has a direct impact on the environment, which can help reduce waste, lower carbon emissions, and advocate for sustainable practices across the supply chain by aiming for ethical sourcing, environmentally friendly materials, collaboration, and assisting suppliers and lower tiers to ensure that all parties comply with environmental standards (Rupa et al., 2021).

As indicated by Turker et al. (2014), globalization of supply and distribution has become an essential factor in promoting the development of sustainable practices in fast fashion.

Businesses must be more careful in selecting suppliers, choosing suppliers that comply with sustainable conditions, and closely cooperating with suppliers that strictly comply with environmental conditions to help retailers ensure their sustainability goals (Patrick, 2018). In addition, regular monitoring and auditing are necessary to minimize the environmental impacts. According to Seuring and Müller (2008), businesses must regularly assess supplier performance to ensure compliance with ecological standards and to detect potential environmental hazards. These procurement practices help minimize environmental impacts across the global supply chain. Sustainable procurement practices enhance ecological responsibility and foster collaboration among stakeholders to innovate and implement greener solutions throughout the supply chain.

The fashion industry is one of the most resource-intensive industries, especially fast fashion, leading to increased waste and environmental pollution (Niinimaki et al., 2020; Bick et al., 2018). This makes green procurement strategies more important than ever before. Procurement decisions directly affect the use of limited resources, such as raw materials, fresh quarters, land, and energy (Beatriz Garcia-Ortega et al., 2023). Therefore, sustainable procurement practices can help reduce the use of harmful chemicals and plastic microfibers that pollute aquatic ecosystems (Beatriz Garcia-Ortega et al., 2023). According to Fine (2013), companies pay more attention to their reputations for transparency and environmental responsibility than to their choice of low-cost locations and to their focus on sustainable sourcing decisions.

1.2 Problem statement and research gap

However, despite the recognition of the importance of green procurement in previous studies, the existing literature on procurement strategies in the fast fashion industry underscores several research gaps, specifically the need for company-level analyses to explore how individual companies in fast fashion overcome procurement process

challenges and take advantage of opportunities to improve their supply chains. Specifically, Fares and Lebbar stated that the need for smooth processes and cost savings is the main challenge in the fast-fashion industry, noting that many proposed solutions to address these challenges remain unexplored at the company level (Fares & Lebbar, 2019). In addition, the supply chain activities analyzed by Benyoucef and Jain revealed the complexity of selecting, evaluating, and building relationships with suppliers, highlighting the gap in understanding these activities and the challenges that occur in fast fashion companies (Benyoucef & Jain, 2007). The authors therefore suggest that rapid change is characteristic of the fast-fashion industry and that flexible procurement strategies are necessary. However, studies often overlook individual companies' strategies for managing these dynamics (Camargo et al., 2020).

Moreover, more companies are setting sustainability goals, as the fast-fashion industry is characterized by rapid production cycles and significant environmental impacts. However, there is still an essential gap between these goals and actual activities (Stål et al., 2021). Specifically, integrating the three environmental, social, and economic factors into procurement activities is essential in sustainable procurement. However, many companies struggle to translate sustainability supply goals into concrete activities for procurement teams (Kalubanga, 2011; Paul et al., 2024). The lack of specificity may lead to inconsistent implementation of sustainability principles across different levels of the supply chain (Wren, 2022). In addition, there is no clear breakdown of how much of their raw materials are sustainable, and the target for reducing greenhouse gas emissions is not measured or linked to the role of the procurement team. Fast Retailing Company, a significant player in the fast fashion industry, has faced this obstacle. A procurement strategy analysis is necessary to ensure the procurement team, as a key player in the supply chain, aligns its practices with the company's sustainability goals and takes responsibility for their implementation.

Therefore, to address these research gaps, this study proposes to examine Fast Retailing as a case study. This investigation aims to uncover the current challenges Fast Retailing faces in implementing green procurement and to propose practical strategic recommendations to address them. By analyzing Fast Retailing's existing procurement strategy, such as selected suppliers and material sourcing to reduce its carbon footprint, this research aims to identify the best practices in green procurement that Fast Retailing can apply. This case study offers the potential to provide valuable insights and solutions for the fast fashion industry's sustainability challenges.

1.3 Research questions and research objectives

Based on the research background and gaps of the study, the research questions are as follows:

What are the main challenges Fast Retailing faces when implementing a green procurement strategy?

How effective is Fast Retailing's current strategy for minimizing environmental impact and improving supplier transparency?

What strategic practices can help Fast Retailing improve sustainability as it implements its procurement plan?

Through these questions, the objectives of this research are pointed out to provide practical implications for the Fast Retailing company. The study aims to explore the challenges Fast Retailing faces in implementing green procurement, learning about sustainability strategies, and how Fast Retailing is effectively implementing them. Based on this, the research proposes actionable recommendations that align with industry standards and enhance Fast Retailing's commitment to sustainable practices.

1.4 Structure of the thesis

This study was divided into six parts. The first introduction will provide the reader with the current context of the fast fashion industry, including the environmental challenges and consequences it faces, and the importance of sustainable procurement given the severe environmental impacts of the fast-fashion operating model. This section also presents the research gaps, the need for this research paper, the research objectives, the research questions, and the thesis structure. The second part presents an overview of the literature, introducing the definition, characteristics, and importance of green procurement in the fast-fashion industry. In addition, the strategic framework of green procurement is discussed, highlighting sustainability and presenting critical theories on sustainable supply chain management, the triple bottom line, and the circular economy. In addition, transparency and accountability will be discussed, including the importance of supplier data, audit reporting, and traceability. Previous studies on this topic and the gaps that require analysis are discussed at the end of this section. The methodology section introduces the qualitative case study method for this research, which involves interviews with two experts in the fast-fashion industry and the analysis of Fast Retailing's sustainability reports. This method chapter also introduces methods of data analysis, namely directed content analysis of disclosures and thematic analysis of interview data. The findings and analysis chapter will discuss the results of the interviews and report analyses, highlighting key themes that emerge from the data and how they relate to the existing literature on sustainability in fast fashion. The discussion and strategic recommendation chapter synthesizes findings to propose appropriate strategic green procurement to help Fast Retailing improve sustainability. Finally, the concluding chapter contains the findings of the study, mentions the limitations of the research, and suggests areas for future research.

2 Theoretical background

This chapter presents a framework for evaluating Fast Retailing's green procurement practices. This section discusses the evolution of green procurement from merely purchasing environmentally friendly products to adopting a process-oriented approach that integrates environmental criteria, supplier collaboration, and performance measurement into routine sourcing activities. This is connected to the constraints of fast fashion, including cost and speed pressures, multi-tier supply networks, and gaps in data and traceability, which highlight the challenges in operationalizing public sustainability commitments. Ultimately, it connects green procurement to broader frameworks for sustainable supply chain management, transparency, and circular sourcing, demonstrating that procurement is the intersection where these objectives are made enforceable with suppliers. This framework supports the subsequent case analysis of Fast Retailing's disclosures, the functioning of its procurement system across tiers, and the metrics for measuring progress.

2.1 Green procurement

Green procurement is an essential component of sustainability in the supply chain, as companies worldwide are shifting towards environmental protection and reducing emissions that contribute to climate change. The definition of the supply chain evolves rapidly, reflecting advances in science and technology toward ecological protection. The nature of the definition of green procurement is the purchase of raw materials, such as for the production of a company's products or facilities for the company, the purchase of goods, the purchase of services, and works that are sustainable, and minimizing the overall impact on the environment compared to traditional procurement (OECD, 2011). Green procurement includes the organization's procurement methods and procedures that are implemented from an environmentally conscious and environmentally sound perspective to ensure that the products, services, and raw materials purchased not only meet the requirements of quality and price but also comply with sustainability standards

and fulfill the environmental objectives of the organization (Min and Galle, 2001). Sustainability-oriented companies seek opportunities to improve their environment and to reach beyond their internal boundaries (Singh et al., 2019). More specifically, green procurement is not only the basic raw material procurement process but also includes selecting suppliers, proactively setting environmental standards, measuring suppliers' performance using metrics or indicators, and collaborating with suppliers to ensure the company's sustainability goals remain on track (Anin et al., 2024). In addition, modern green procurement not only focuses on green sourcing of products, which involves selecting products that are environmentally friendly, but also on green supply processes, which involve modifying supply chain management processes to reduce environmental impact (Bowen et al., 2001; Michelsen and de Boer, 2009). Green procurement focuses on supplier selection and examines the complete product life cycle, encompassing production, consumption, and post-use disposal (Palmujoki et al., 2010).

Green procurement has become an essential tool for helping organizations minimize environmental impacts. Specifically, it has become an enabler of sustainable business development strategies aimed at optimizing resources and protecting the environment, both internally and throughout the organization's supply chain (Anin et al., 2023; Appolloni et al., 2014). With increased environmental awareness, stakeholder pressure, and the expansion of environmental regulatory requirements, many businesses are integrating environmental practices into their procurement strategies (Chu et al., 2017). Green procurement has also become a strategic tool for preserving the environment while enhancing business performance to meet the business's sustainability goals. Corporate responsibility and corporate environmental awareness are increasingly considered essential requirements for companies because enterprises that focus on social responsibility rather than trade-off costs for sustainability, risk, and public awareness tend to see financial performance increase as customers become more interested in environmentally friendly products (Chu et al., 2017). Therefore, green procurement practices help businesses respond effectively to increased public

awareness and environmental responsibility requirements, helping create a sustainable competitive advantage in the market. A sustainable competitive advantage denotes a long-term benefit that a company has over its competitors by functioning in a more environmentally sustainable way. This may result in enhanced market share and profitability. and to a balance in financial performance (Chu et al., 2017).

Effective green procurement is built on the essential core principles. From an operational perspective, it is necessary to strictly adhere to established environmental codes and standards to ensure the company's products meet sustainable needs. For example, implementing the ISO 14000 environmental management system standards includes standards for the company's internal processes and environment (Ho et al., 2010; Michelsen and de Boer, 2009). This includes understanding the impact of using raw materials to manufacture products and the effect of the product on the final disposal stage. In addition to implementing environmental management system standards, businesses must develop clear environmental policies and procedures (Guo et al., 2020). Regularly assess the ecological impact and document it, and apply accountability measures for non-compliance with sustainability standards in green procurement to ensure continuous improvement and regulatory compliance (Zheng and Wen, 2024).

In addition, the assessment of the life cycle impact of a product is a critical principle regarding green procurement, which helps businesses determine the potential in the product's life cycle that can affect the environment, from the extraction phase of material to the production, use, and disposal phases, to make the right procurement decisions (Ead et al., 2021). According to Sunarya et al. (2023) and Wibowo et al. (2021), this principle emphasizes that businesses should focus more on the long-term costs of environmental responsibility than on the purchase price, and companies should consider incorporating recycling, reuse, and purchase reduction into their procurement planning.

Green procurement refers to integrating environmental responsibility awareness into procurement planning (Min & Galle, 2001). As discussed earlier, supplier evaluation and management is a critical aspect of sustainable procurement; it brings the principle regarding selecting suppliers based on environmental quality standards, ensuring that suppliers are transparent about ecological standards, as well as already obtained related certificates that demonstrate that they are complying with environmental standards (Dahliani et al., 2023). Specifically, this study focused on two main areas. The first is product and raw material selection, which means suppliers must meet environmental standards such as recyclability, biodegradability, and non-toxicity (Junaid et al., 2022). The second is supplier requirements, which require suppliers to undergo internal environmental audits and obtain ISO certification or develop environmental management systems (Wu, 2013). In addition, businesses need to build cooperative relationships with suppliers and support suppliers to improve production processes and ecological capabilities (Bu et al., 2020). Finally, regarding efficient resource use and waste reduction, green procurement involves procuring environmentally friendly, recyclable raw materials. Activities in green procurement involve using energy-efficient technologies, for example, reducing energy use during product manufacturing or extending product life to minimize waste throughout the production cycle. Moreover, reducing the use of materials that impact the environment and promoting reuse or recycling programs are essential factors in this principal aspect (Dahliani et al., 2023).

Green practices help businesses reduce environmental pollution (Zailani et al., 2015) and improve product design and packaging to be more environmentally friendly, thereby reducing waste and energy use in production (Wong, Boonitt, and Wong, 2021), with many positive impacts on the environment. In terms of organizational benefits, Curkovic and Sroufe (2011) stated that it improves the financial performance of the organization by reducing the operational cost of the business. This is done by lowering operating costs through the economical and efficient use of energy and resources (Chu et al., 2017). According to Wanja and Achuora (2020), green procurement involves procuring user-

friendly products that help reduce unnecessary costs in the company's operations, for instance, waste disposal, energy costs, and pollution penalties. Regarding operational benefits, green procurement enhances supply chain efficiency by promoting increased recycling and waste reduction at the production source, thereby improving overall supply chain efficiency (Liu et al., 2024). Specifically, green procurement serves as a tool to develop relationships with suppliers to produce products and services that meet environmental standards. This will enhance the effectiveness of joint R&D, inventory management, and supplier quality, thereby reducing R&D time for environmental protection products and improving inventory and production efficiency (Liu et al., 2024). In addition, green procurement also helps reduce market response time (Noci, 1997). It improves customer satisfaction by guaranteeing that products meet environmental and quality standards, ultimately leading to an enhanced, sustainable competitive advantage in the marketplace.

2.1.1 Green procurement challenges

Green procurement has emerged as a crucial element in implementing sustainable development strategies within enterprises; however, companies face numerous challenges in integrating environmental protection considerations into their operational strategy. Challenges are particularly noticeable in industries characterized by complex supply chains or cost-sensitive environments, where prioritizing speed and price competitiveness often outweighs efforts to mitigate environmental impacts (Nweje & Taiwo, 2025). Large corporations face significant pressure to implement green procurement strategies to minimize environmental effects. The integration of environmentally sustainable practices into procurement and supplier selection is constrained by considerable industry barriers, including insufficient technology, financial constraints, organizational and operational conflicts, and a lack of understanding of sustainability goals in procurement (Ograh, Ayarkwa, & Osei-Asibey, 2022). Many organizations face challenges incorporating sustainability criteria into their supplier

selection processes, primarily due to insufficient knowledge and support. This includes a lack of expertise in evaluating environmental performance and limited access to reliable data regarding the sustainability practices of suppliers (Ograh, Ayarkwa, & Osei-Asibey, 2022). The absence of advanced technology and infrastructure, particularly systems capable of tracking and reporting environmental metrics throughout the supply chain, restricts the efficient implementation of green procurement (Ograh, Ayarkwa, & Osei-Asibey, 2022). Organizations frequently encounter challenges in aligning their operational strategies due to internal conflicts or employee resistance when modifying procurement approaches. This resistance often comes from the retention of traditional practices within the operational framework of the company, which requires adaptations in green procurement to meet organizational objectives (Ograh, Ayarkwa, & Osei-Asibey, 2022). Furthermore, financial barriers represent a significant challenge within the industry, as the higher expenses associated with sustainable procurement could prevent companies from implementing sustainability criteria in their procurement processes. This includes substantial initial investments in materials and technology, particularly when companies face cash flow constraints (Ograh, Ayarkwa, & Osei-Asibey, 2022).

In the fast fashion industry, the linear model of fast fashion (production-use-disposal) significantly contributes to environmental degradation across the supply chain by promoting increased consumption (Aponte et al., 2024; GFA and BCG, 2017). This model operates under a high-volume, cost-reduction strategy, enabling retailers to offer lower prices and boost sales to consumers (Long & Nasiry, 2022). It facilitates rapid commercial growth and strengthens market positioning for businesses; however, green procurement and sustainable practices in the fast-fashion industry face serious obstacles. These challenges primarily stem from the fundamental contradiction between sustainability objectives and the conventional fast-fashion model, which emphasizes rapid production and cost minimization, particularly in the incorporation of environmental considerations into supplier selection and procurement processes (Arrigo, 2020). The fast fashion sector faces increased challenges due to its reliance on synthetic materials and high-volume

production, resulting in substantial greenhouse gas emissions and textile waste (Niinimaki et al., 2020; Bick et al., 2018). Maintaining low prices often requires cost-cutting strategies that have environmental consequences, including ecosystem degradation, resource depletion, and harmful working conditions for workers (Wren, 2022; Bick et al., 2018). The challenges associated with adopting environmentally friendly procurement practices create financial and operational difficulties. Cost-cutting pressures increase the cost of integrating environmental considerations into sustainable procurement strategies, making it harder for companies to achieve competitive pricing.

The complexity of the fast-fashion supply chain poses a significant challenge. Supply chains feature multi-layered structures, extensive outsourcing, and are frequently located in low-cost countries. The characteristics restrict the tracing of raw material origins, monitoring of supplier compliance with sustainability standards, and enforcement of corrective measures when required (Bartnik, 2023). The absence of accountability among intermediaries complicates the procurement function, resulting in a disparity between commitments to sustainability and operational realities of the company (Köksal & Strähle, 2020). Furthermore, variations in consumer demand contribute to the challenges associated with sustainable procurement. The success of the fast fashion industry relies on rapid adaptation to shifts in consumer preferences and emerging fashion trends, requiring companies to reduce the time from design to market to a couple of weeks. The demand for speed conflicts with the slower processes necessary for sustainable procurement, including supplier audits, sustainability certification, and the incorporation of environmentally friendly materials into production (Dhir, 2020; Sutha, 2024). This leads to the overlooking of sustainability criteria to accommodate urgent production timelines for market delivery.

Alongside operational constraints, environmental and social costs pose challenges for the fast-fashion industry. Social costs include increased greenhouse gas emissions from

textile manufacturing and transportation, water pollution from dyeing and finishing processes, and increased textile waste resulting from product lifespans and seasonal style changes (Sahimaa et al., 2023). Social challenges encompass unsafe working conditions for employees, wage violations, and insufficient worker representation in specific manufacturing centers (Bick et al., 2018). Systematic adjustments across the entire procurement and production system must be considered to address these issues, rather than relying on separate initiatives. In the absence of fundamental reform and coordinated industry action, the fast fashion sector may continue to face conflicts between its business model and environmentally friendly procurement principles (Dhir, 2020).

Despite recognition of these challenges at an industry-wide level, there is a lack of research on solutions reflected in the procurement practices of specific fast-fashion companies. Corporate sustainability reports frequently emphasize broad commitments, including reducing greenhouse gas emissions, sourcing sustainable materials, and enhancing supplier transparency; however, companies often fail to provide specific details on how their procurement practices align with these sustainability objectives (Garcia-Torres et al., 2017). Fast Retailing, the parent company of brands including Uniqlo and GU, has established sustainability objectives and has publicly committed to aligning its business and operational strategies with global frameworks, notably the United Nations Sustainable Development Goals (SDGs). However, the public disclosures of the company lack clarity regarding the practical implementation of these commitments by procurement teams (Fraser & van der Ven, 2022). This study addresses the procurement challenges faced by Fast Retailing, evaluates the effectiveness of existing strategies, and identifies possible opportunities for improvement to enhance its sustainability performance.

2.1.2 Risk management in sustainable procurement

Sustainable procurement and risk management are critical components for aligning organizations' strategies with the goal of minimizing environmental and social impacts, particularly within the fast-fashion industry, which is recognized as one of the most environmentally damaging sectors. Sustainable procurement integrates environmental, social, and governance (ESG) criteria into procurement processes and decisions (Basiru et al., 2025). Sustainable procurement must go beyond cost, quality, and delivery speed to include environmental responsibility, ethical labor practices, and the creation of lasting value for society. The integration of ESG principles into procurement requires systematic criteria for supplier selection, life-cycle analysis of goods and services, and the incorporation of sustainable development clauses into procurement contracts (Basiru et al., 2025). The criteria aim to make sure that procurement decisions of a company fulfill its business objectives while promoting corporate responsibility, thereby supporting the sustainability goals of a company of reducing the environmental impact (Basiru et al., 2025).

Ș̦n addition, the relationship between sustainable procurement and risk management is an essential factor that requires attention. Companies face sustainability-related risks, including climate change, water shortages, biodiversity loss, and significant geopolitical instability in their supply regions. The identified risks, if not adequately mitigated, impact financial outcomes, business continuity, and organizational reputation. To address these risks, sustainable procurement uses risk-prevention frameworks to anticipate and mitigate sustainability risks, thereby identifying opportunities to enhance resilience throughout the supply chain (Bâtcă-Dumitru et al., 2022). Finance professionals are integral to improving the transparency of ESG reporting, conducting materiality assessments, and helping create sustainability key performance indicators (KPIs) to ensure that procurement team actions align with an overall risk strategy (Bâtcă-Dumitru et al., 2022).

New technologies are additionally discussed as an essential way to encourage sustainable procurement and risk management. E-procurement is the use of information and communication technology to help companies purchase goods more efficiently and with a lower environmental impact. In particular, e-procurement tools help lower long-term overhead costs, speed up cycle times, and make the procurement process more transparent by automating procurement tasks. Companies may additionally employ technology to include sustainability indicators in the process of evaluating suppliers, keep updated on how effectively suppliers are meeting sustainability standards in real time, and keep track of environmental performance along the entire global supply chain. This helps businesses make the most effective use of their resources and creates an environment for a sustainable procurement ecosystem (Ramkumar & Jenamani, 2015).

Due to the production-use-disposal model, fast fashion is an essential driver of environmental damage, with high levels of pollution and textile waste, in addition to more chemicals being used for coloring and finishing clothes (Aponte et al., 2024; GFA and BCG, 2017). Sustainable supply chain management (SSCM) is needed to reduce these effects throughout the entire lifespan of a product, from design through sourcing materials, production, transportation, use, and finally disposal. Companies in the fast fashion industry have come a long way in implementing sustainable supply chain practices, such as pilot programs for energy-efficient appliances and recycled materials. However, these efforts are still scattered and insufficient to prevent permanent environmental harm; the system as a whole needs to change more deeply (Wren, 2022). The procurement function is particularly crucial for bringing about change and growth. It makes decisions about which materials to use, how sustainable suppliers must be, and how to manage business goals across widely dispersed, multi-level supply networks (Amann et al., 2014).

Changes in the procurement stage can lead to sustainable supply chain management; however, both upstream and downstream stakeholders need to be involved. Upstream, companies need to work with fiber producers, mills, and garment producers to eliminate harmful inputs, add renewable or recycled materials, and make the process less carbon-intensive through activities such as switching fuels in thermal processes or using renewable electricity, while improving process efficiency. Downstream, decisions regarding design and merchandising affect durability, ease of modification, and ease of recycling (Wren, 2022). To be effective, these phases need to be built into supplier contracts, scorecards, and sourcing decisions. Bid criteria and volumes must be aligned with sustainability performance; meanwhile, data and traceability systems must be in place to track Scope 3 air, water, and waste emissions at the supplier and product levels (Wren, 2022). Brands should rethink their product design standards, including the materials used, the styles, and the ways they are built, so that they can lower effects at the point of origin and create circular outcomes, instead of counting on solutions that only work at the end of the product life cycle (Wren, 2022).

Incorporating corporate social responsibility (CSR) into risk control enhances the effectiveness of the purchasing process. Sustainability risks, including climate change and physical threats, resource scarcity, stricter regulations, worker rights abuses, and reputational damage, are becoming increasingly financially significant. According to Macchion (2024), incorporating CSR into enterprise risk management (ERM) helps businesses detect, assess, and prioritize sustainability risks. It additionally assists them in aligning incentives and KPIs, such as connecting buyer bonuses to lowering carbon emissions or supplier transparency milestones. Finally, it helps take advantage of opportunities, including reducing expenses through efficiency, giving priority access to low-impact materials, and establishing brand differentiation. Accounting and finance are critical components in this context: they improve ESG measurement and assurance, enhance materiality analyses, and develop decision-making KPIs that procurement can

use in portfolio strategies. They additionally come up with should-cost models to figure out what a product is genuinely worth, along with doing a total cost of ownership (TCO) analysis (Bâtcă-Dumitru et al., 2022).

In practice, a coherent, sustainable procurement process for fast fashion. First, there are standards and goals, including science-based Scope 3 roadmaps, materials management, and chemical management. Second, there are commercial mechanisms, including long-term agreements with volume commitments and offtake, co-investment funds, or supplier support for decarbonization. Third, there are technologies and data, including e-procurement platforms and traceability, product-level Life Cycle Assessment (LCA), and vendor greenhouse gas/water reporting with verification. Moreover, finally, there is a product strategy that includes designing clothes for long-lasting use and recycling, using different materials, and creating circular business models. When all of these steps are taken together, they can help change procurement from a department focused on compliance to a strategic driver of environmental performance and resilience. This will ensure that procurement decisions align with the company's sustainability and transparency goals, safeguard the brand's reputation, and create lasting value (Wren, 2022; Macchion, 2024).

When applied to Fast Retailing (UNIQLO, GU), the framework shows that procuring is the most crucial way for companies to make their sustainable goals into measurable results across an extensive network of Asian suppliers and short, cost-conscious product cycles. In its public statements, Fast Retailing sets sustainability goals for climate change, materials, and transparency. However, reaching these goals requires the decisions it makes when purchasing goods. For example, it needs category-specific material roadmaps, supplier award criteria that account for environmental performance, long-term off-take agreements or co-investments to help factories become carbon-neutral, and contractual terms that require third-party verification of data for Scope 3 (energy,

water, and waste) metrics. However, sourcing requirements and buyer incentives can be used to make durability, recyclability, and recycled content mandatory when purchasing products, rather than just having them. This can include standards for design and circularity programs such as RE.UNIQLO take-back/repair programs. In this thesis, the concepts of procurement-led SSCM, risk management with CSR, and e-procurement/traceability are used to examine how Fast Retailing currently conducts its operations and identify areas where its goals align with its procurement practices. The study investigates how transparent suppliers are beyond Tier 1, how environmental factors are used in yarn, fabric, and clothing procurement decisions, and how procurement is used to lower emissions throughout the supply chain. Based on this analysis, the study can suggest certain practices for Fast Retailing, including required data at the product and factory levels, procuring with a focus on the environment, and structured supplier support financing. These can help strike a good balance between speed and cost, while also improving supplier transparency. Overall, for the fast fashion industry to be sustainable in its procurement processes, it requires a broad approach that includes risk management, stakeholder collaboration, and innovative technologies to tackle emerging challenges and contribute to achieving the global sustainable development goals.

2.1.3 Green procurement strategies for sustainability

Green procurement strategies serve as crucial mechanisms for enhancing sustainability, particularly within fast-paced retail industries that have particularly affected the environment and society in recent years. Green procurement strategies incorporate sustainability principles into the procurement process to minimize environmental impacts, enhance social responsibility, and ensure the organization's financial viability. The following outlines key strategies for green procurement, offering a comprehensive perspective on how organizations can effectively implement these practices to achieve sustainability goals. Green procurement integrates the sustainability objectives of the

company into daily procurement practices by associating supplier selection, contracting, and performance management with environmental and social results. In the rapidly evolving, cost-sensitive fast-fashion sector, the procurement function is essential for shaping material selections, manufacturing processes, and supply chain incentives to reduce environmental impacts. Belo outlines five interrelated strategic pillars: collaborative partnerships, integrated sustainability criteria, technology-based transparency, circular economy integration, and leadership and culture (Cooper, 2024; Bee & Bhuvaneswari, 2024; Ezekwu, 2025).

To incorporate sustainability into procurement, it is crucial to build relationships with suppliers and other stakeholders. Working jointly can help each party reach its goals while making processes more sustainable (Cooper, M. 2024; Ezekwu, E. 2025). Collaboration between suppliers and stakeholders is an integral part of green procurement that goes beyond transactional procurement. This is because transactional procuring rarely improves environmental sustainability. After all, suppliers often lack funds and new technology and face competing demands from buyers (Giménez & Tachizawa, 2012). In the initial phase, the cooperation mechanisms include setting joint goals and a roadmap. This means working together to set decarbonization, water, and chemical goals at the product and process levels. For example, they could include benchmarks for annual goals and shared responsibility for activities, including dyeing and finishing steam intensity, wastewater parameters, and verified recycled material (Cooper, 2024). Second, mutual investment or support funds, which share the capital expenditure (CAPEX) risks for activities including more effective boilers, thermal electrification, on-site renewable energy, or wastewater upgrades, set up long-term volume or price differentials that are tied to proven savings as a way to pay back the loans (Ezekwu, 2025). Third, capacity building, including shared toolkits, coordinated inspections, collaborative training, and test lines for new materials/chemicals to lower source usage costs (Cooper, 2024). Lastly, preferred supplier programs have multi-year contracts that tie off-take assurances and volume targets to environmental performance

evaluated by a third party (Cooper, 2024; Ezekwu, 2025). In this pillar, measuring common relationship KPIs including kg CO_2e per garment, kWh or MJ per kg of fabric, m^3 of water per kg, the percentage of suppliers who meet their improvement plans, and the percentage of spending on long-term agreements with environmental goals (Cooper, 2024; Giménez & Tachizawa, 2012). These agreements lower the costs of switching suppliers, reduce the risks of capital upgrades through long-term contracts or supplier support, and align incentives so that environmental performance benefits the business. SSCM research shows that evaluating and developing suppliers together is more effective than simply observing them. It is important because it speeds up the sharing of knowledge and new ideas and offers practical environmental benefits (Cooper, 2024; Ezekwu, 2025; Giménez & Tachizawa, 2012).

The second pillar is to ensure that sustainable standards are part of the sourcing process. In this manner, environmental and social success can serve as a formal basis for continuous assessment and awarding of businesses. In practice, this means turning policy into RFx (solicitation choosing supplier documents) standards and requirements, which include elements, including approved recycled inputs and prohibited substances, in addition to process KPIs, including waste and energy/water consumption (Cooper, 2024), and various forms of disclosing information. The second is the drafting of contracts, which involve minimum standards, growth roadmaps, data/guarantee terms, and a bonus-and-discount method connected to evaluated results, connecting renewals of contracts and volumes to performance on sustainability (Cooper, 2024). Meanwhile, it is essential to ensure that all parties inside the company are on the same page. For example, buyer/category manager KPIs should be associated with ESG outcomes, including the percentage of spending on verified recycled materials, the percentage of Tier-2 coverage, and the percentage of contracts that include ESG clauses. This way, sustainability remains a decision-making tool rather than solely an external check (Bee & Bhuvaneswari, 2024). This lifecycle and governance approach to sustainable procurement is documented in international guidelines, including ISO 20400. This

further underscores the importance of including ESG factors in planning, sourcing, and contract management processes (Bee & Bhuvaneswari, 2024; Cooper, 2024; ISO, 2017).

The third core is transparency and control enabled accessible by technology. Ensuring the environment is secure requires methods that involve intensive data processing. E-procurement, IoT, and tracking tools shorten cycle times and lower costs. They further enhance the quality of data used for decision-making and for disclosures (Ramkumar & Jenamani, 2015; Ezekwu, 2025). E-procurement systems can integrate sustainability features into tenders and catalogs, automate seller surveys, track term compliance, and provide dashboards for supplier KPIs (Cooper, 2024; Ramkumar & Jenamani, 2015). Meanwhile, facility-level Internet of Things (IoT), which is made up of monitors that are placed throughout an organization and provide detailed, virtually real-time information on elements including energy, steam, and water, allows users to make quick fixes and specific changes (Ben-Daya, Hassini, & Bahroun, 2019; Ezekwu, 2025). Traceability systems use distinctive material identifiers, chain-of-custody records, and, as needed, blockchain and distributed ledgers to maintain data accuracy at multiple levels. Initial research shows that blockchain can improve provenance and auditability when paired with strong governance (Kouhizadeh et al., 2021). Digitalization improves the performance and visibility of the supply chain. More importantly, new regulations on product-level data, including digital product passports, make procurement-level data structures even more valuable (Cooper, 2024; Ramkumar & Jenamani, 2015; Ben-Daya, Hassini, & Bahroun, 2019; Kouhizadeh et al., 2021).The fourth pillar is sourcing that, through procurement, IoT, and tracking tools, shortens cycle times and lowers costs. They further enhance the quality of data used to make decisions and to share disclosures (Ramkumar & Jenamani, 2015; Ezekwu, 2025). E-procurement systems can integrate sustainability features into tenders and catalogs, automate seller surveys, track term compliance, and provide dashboards for supplier KPIs (Cooper, 2024; Ramkumar & Jenamani, 2015). Meanwhile, facility-level Internet of Things (IoT), which is made up of monitors that are placed throughout an organization and provide detailed, virtually real-

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The fourth pillar is sourcing, grounded on the principles of the circular economy. Most negative environmental impacts stem from design and material decisions. Therefore, procurement is significant for identifying low-impact, recyclable materials, setting recycled-material limits, establishing initial durability and repairability standards, and negotiating deals for end-of-use options, including recovery, resale, repair, and fiber-to-fiber recycling. In particular, material selections include sourcing verified recycled or bio-based feedstocks, using single-material construction so it can be recycled, and using more effective substances that enable closed-loop fiber-to-fiber processes (Ezekwu, 2025). The second part is designed for longevity and repairability, including basic durability standards, care and repair instructions, and easy access to additional parts to help the product last longer (Ellen MacArthur Foundation, 2017). There are also post-life paths that include recycling, reusing, repairing, and remanufacturing, along with quality and organizational standards to maintain the value of the material (Ezekwu, 2025). Finally, sorting paths include incrementally recovered content limits, timelines for removing hazardous chemicals, and provider standards that meet circularity criteria (Cooper, 2024). The textile circularity plan focuses on reducing waste, increasing garment use, eliminating harmful substances, making recycling more cost-effective, and separating growth from raw material inputs. To reach these sustainability goals, details must be provided about the percentage of recycled content by category, the number of wears per item, the rate of returns and repairs, the amount of waste avoided, and the amount of funds spent in circular terms by phase (Cooper, 2024; Ellen MacArthur Foundation, 2017; Ezekwu, 2025).

Ultimately, the culture and leadership of the company decide whether sustainability remains at the time of the award despite time and cost pressures. According to Cooper (2024), if there is no clear leadership commitment, alignment, and incentives, sustainability criteria will weaken when the award is made due to time and cost pressures. Research from SSCM shows that top employees combine practical success with environmental creativity, community involvement, and effective environmental

action (Seuring & Müller, 2008). In reality, the mechanisms at work primarily include governance and incentives, such as management support, the incorporation of ESG into portfolio approaches and investment choices, vendor bonuses aligned with emissions/materials goals, and verified source improvements (Cooper, 2024). The second is capability and change, which includes organized training for purchasers and designers, clear playbooks, communities of practice for widespread learning, and constant management of consequences to avoid “checkbox” behavior (Bee & Bhuvaneswari, 2024). According to Cooper (2024), stability and fairness will lead to greater cooperation and co-investment by setting clear standards and implementing them in supplier business evaluations. According to SSCM research, top performers combine operational effectiveness with environmental innovation, stakeholder engagement, and outstanding business performance. They make sustainability a core decision within procurement instead of just an external adherence exercise (Bee & Bhuvaneswari, 2024; Cooper, 2024; Seuring & Müller, 2008). In general, these approaches work effectively together. Partnerships encourage suppliers to come up with new ideas, contracts, and embedded criteria ensure that all parties know what is expected of them, and trusted incentives are created. Digital tools allow tracking items and using verified data for decision-making and public disclosure. Circular design reduces lifecycle impacts at the source, and management aligns incentives within the organization to make sustainability an essential part of procurement governance. As the fashion industry evolves quickly and costs are important, this combined method offers a helpful way to balance speed with control by treating procurement as an operational driver to reduce measured impact and increase source transparency (Cooper, 2024; Bee & Bhuvaneswari, 2024; Ezekwu, 2025).

2.1.4 Benefits of green procurement

By using factors to reduce environmental impacts in their procurement decisions, companies demonstrate their commitment to being socially and environmentally

responsible across their entire business. This additionally helps them stand out in highly regulated markets. In particular, when procurement demands are turned into auditable supplier data, including examined recycled content, wastewater performance, or health and safety indicators, investors and civil society can trust the quality and credibility of sustainability disclosures. This is accomplished through specified procurement metrics, which lower the risk of reputational damage from supply chain breakdowns and build brand equity over time (Cooper, 2024; Seuring & Müller, 2008; ISO, 2017). In fact, integrating sustainability standards into supply chain governance rather than solely into communications makes activities more legitimate, as all parties can follow the same rules for specifications, bids, contracts, and supplier assessments, rather than one-time efforts that fail to endure (Seuring & Müller, 2008; Bee & Bhuvaneswari, 2024). Companies that ensure their procurement decisions are aligned with clear goals and clear ways to demonstrate progress tend to deliver more reliable ESG results, which boost trust among stakeholders and the business's reputation (Machion, 2024; Cooper, 2024).

Green procurement redefines procurement by emphasizing the entire cost of ownership, redirecting attention from unit pricing to resource efficiency, process dependability, and the mitigation of failure costs across all levels. Finding more efficient material guidelines and cleaner production methods reduces the amount of water and energy used in factories, cuts down on waste and extra work, and makes products last longer. All of these factors lead to lower costs and higher output (ISO, 2017; Seuring & Müller, 2008). Digital tools can help create and improve these effects. In particular, e-procurement can embed environmental attributes directly into catalogs and tendering procedures, reducing processing times and administrative work. Meanwhile, IoT tracking facilities provide virtually real-time visibility, which speeds up corrective action when KPIs exceed contractual limits (Ramkumar & Jenamani, 2015; Ben-Daya, Hassini, & Bahroun, 2019; Cooper, 2024). When organizations use circularity criteria during sourcing, including recycled content, design for disassembly, and take-back or repair contracts, they can

lower their risk of unpredictable input materials and landfill costs while additionally recovering the value of material streams, which improves cost performance further (Ellen MacArthur Foundation, 2017; Ezekwu, 2025; ISO, 2017).

By prioritizing ethical and environmentally friendly procurement, it builds relationships with suppliers, workers, communities, authorities, and investors. In particular, clear ESG standards in RFx documents and contracts, along with fair regulation and performance-based rewards, encourage suppliers to work together over the long term and help drive transformation (Bee & Bhuvaneswari, 2024; Cooper, 2024; ISO, 2017). When unitised internally, verified and comparable source data helps purchasers and designers make better decisions and gets employees more involved by showing company values in their daily work (Cooper, 2024; Seuring & Müller, 2008). Externally, lowering local ecological and social harms can build trust with communities and regulators. In particular, better wastewater quality or safer workplaces might accomplish this. Meanwhile, procurement-standard indicators additionally help investors trust companies and lower their concerns about ESG disclosure risks (Ellen MacArthur Foundation, 2017). As standards for tracking become more stringent, systems that embed quality and data security into the procurement process will help reduce information asymmetries and boost trust across the entire value chain (Kouhizadeh, Sarkis, & Zhu, 2021; ISO, 2017).

In addition to the branding, speed, and trust benefits offered from the beginning, green procurement additionally provides a base for risk management, resilience, and innovative concepts. Organizations are less likely to be affected by disruptions and not to follow the rules when they involve climate, resource, and social compliance risks in their procurement processes and purchasing control decisions (Seuring & Müller, 2008). This additionally provides enhanced supply consistency. Structured programs for supplier development and partnership models give businesses a reason to invest in cleaner technologies and circular business models. These have been associated with

greater long-lasting environmental benefits than monitoring solely (Giménez & Tachizawa, 2012; Cooper, 2024; Ezekwu, 2025). All of these variables shift procurement from an insignificant compliance checkpoint to a key factor in reducing impacts and creating long-term value.

2.2 Transparency and accountability in fashion supply chains

Owing to the rising consumer demand for product origin and transparency about supply chain activities, promoting sustainable practices in the supply chain, especially ethical sourcing, transparency, and accountability in the fast fashion industry, is essential. This requires brands to demonstrate transparency in their production processes and disclose detailed information about the origins of raw materials, workers' working conditions, and the effect on the environment of the supplied products (Rinaldi et al., 2022). Important factors that help companies achieve this goal and meet market demand include supplier data, audit reports, and the ability to trace the origin of products and raw materials. Regarding supplier data, to help businesses assess and identify potential risks effectively in the supply chain and ensure that suppliers comply with ethical and environmental standards, using supplier data is essential because it provides detailed information about the entities involved in the production process, including locations, working conditions, and compliance with labor laws (Aakanksha & Aravendan, 2023; Curran & Nadvi, 2024). This data helps brands ensure that stakeholders in the supply chain are accountable for all their activities related to compliance with ethical and environmental standards, thereby assisting them in monitoring and managing the supply chain more effectively (Papú Carrone, 2020). In addition, audit reporting is an essential component that contributes to transparency in the supply chain. Audit reports provide detailed information about the processes and standards that suppliers must comply with. It provides independent assessments of working conditions, environmental sustainability practices, and other important factors (Cornelius, 2018). Effective audits help brands identify areas of non-compliance and areas for improvement, and ensure

they are operating in accordance with their commitments to customers and communities, thereby advancing sustainability goals throughout the supply chain (Curran & Nadvi, 2024). The integration of traceability is critical to fostering trust among consumers and stakeholders because when implementing traceability systems, companies can accurately provide reliable data on their environmental and social impacts (Rinaldi et al., 2022). Traceability refers to tracking product history, location, and movement throughout the supply chain. This helps stakeholders understand the origins and activities related to raw materials and products in the supply chain, thereby laying a foundation for transparency (Carrone, 2020; Garcia-Torres et al., 2022).

In addition, assessment and ranking tools such as The Fashion Transparency Index, which assesses and ranks fashion brands based on their level of transparency, can act as an enabler, motivating brands to improve their sustainability practices and disclose more information about their supply chains to improve their rankings and brand reputation (Fraser & van der Ven, 2022). This index in the fashion industry can underscore the importance of transparency and accountability across the sector by highlighting the transparency practices of the industry's leading brands, serving as a benchmark for other brands (Madumali et al., 2023). While transparency and accountability are recognized as critical to achieving sustainability goals, the complexity of global supply chains can create significant challenges in integrating these elements into supply chain operational strategies (Malik et al., 2021). This necessitates close collaboration among stakeholders to ensure that every stage of production and distribution is effectively monitored and traced. Therefore, stricter regulations and new data traceability initiatives are needed to help businesses make smarter decisions and reduce their environmental impact (Curran & Nadvi, 2024; Ospital et al., 2022).

2.3 Sustainable supply chain management (SSCM)

Sustainable supply chain management in the fast-fashion industry is a critical approach to addressing the environmental and societal impacts of fast fashion. Fast fashion, with the linear model of fast fashion (production-use-disposal) and characterized by rapid production cycles and large volumes of synthetic garments, contributes to environmental degradation throughout the supply chain, leading to higher resource use, greenhouse gas emissions, and water pollution (Aponte et al., 2024; GFA and BCG, 2017). Therefore, SSCM supports addressing these critical issues by implementing sustainable practices and comprehensive strategies across economic, social, and environmental dimensions throughout the supply chain, from raw material sourcing to disposal (Kusrini & Primadasa, 2018). Sustainable supply chain management is a critical framework that combines different knowledge bases, including stakeholder theory, the resource-based view, and institutional theory (Touboulic & Walker, 2015). Stakeholder theory emphasizes the importance of including all stakeholders in the supply chain in the sustainable development process, from suppliers and regulators to end customers, to create sustainable value for each system member. This theory also indicates that the company should identify and address the requirements of all stakeholders affected by the operations to achieve long-term sustainability (Peng, 2022; Uddin et al., 2023). In terms of the resource-based view (RBV), in the context of SSCM, this theory emphasizes the effective utilization of resources and the optimization of production processes to minimize waste, thereby contributing to environmental protection and enhancing business competitiveness (Uddin et al., 2023). In addition, institutional theory concerns how companies engage with and operate in social and political contexts, which, in turn, influence the implementation of sustainable practices within the supply chain. This theory suggests that companies adopt sustainable practices to comply with social expectations and legal requirements, thus legitimizing their operations (Girisaballa & Bhattacharya, 2016; Peng, 2022).

In the context of sustainability procurement, SSCM is closely related, as it evaluates suppliers to ensure they strictly follow environmental standards. This evaluation includes assessing ecological practices, labor conditions, and overall compliance with sustainability goals (Wren, 2022; Popescu, 2015). Secondly, it provides risk management to identify potential supply chain vulnerabilities that could impact sustainability efforts, such as environmental regulations, overuse of scarce resources, and reputational damage (Bentalha, 2024). Finally, the lifecycle thinking approach involves assessing the environmental effects of products throughout their lifecycles, encompassing raw material sourcing and production through disposal. Specifically, analyzing the effects of the life cycle of the product on the environment encourages companies to change and improve their products to be more environmentally friendly to reduce emissions and waste throughout the entire supply chain (Wren, 2022; Soni & Baldawa, 2023).

Despite growing corporate efforts to embed sustainable supply chain management into operational strategies, achieving sustainability goals remains challenging. Specifically, companies face insufficient engagement of upstream and downstream stakeholders and long-term investments in carbon reduction and energy infrastructure to reduce energy use during production (Wren, 2022). Famous brands in the fast fashion industry, such as Shein and Uniqlo, part of the Fast Retailing Group, have acknowledged the importance of incorporating sustainable practices throughout their supply chains. This integration helps improve their brand image and addresses the increasing consumer demand for environmentally sustainable options and socially responsible products, leading to greater financial benefits (Miranda et al., 2024). Although SSCM in the fast fashion industry is gaining increasing attention and development, further reform is needed to achieve sustainability goals (Wren, 2022; Soni & Baldawa, 2023).

2.4 Circular Economy (CE) in apparel sourcing

The circular economy in the fast-fashion industry represents a transformative strategy that addresses the negative environmental and resource impacts of linear economic models. In terms of resource use, the linear economic model focuses solely on the continuous exploitation of raw materials to produce new products, leading to resource depletion and environmental degradation (Koszewska, 2018). In the traditional linear economic model, products are often consumed rapidly and discarded after a period of use, creating significant waste and putting pressure on ecosystems (Radhakrishnan, 2021; Priyadharshini et al., 2024).

In contrast to the traditional linear system in fast fashion, which follows a production-use-disposal pattern, the circular economy (CE) stands out, focusing on closing the loop (Colucci & Vecchi, 2020). It is designed to restore or regenerate products, raw materials, and processes while promoting environmentally friendly design and integrating sustainable production activities (Bening & Petri, 2024). The circular economy eliminates the concept of “end-of-life” in the company's operation strategy, which refers to products used until they lose value and are discarded directly into the environment. Furthermore, the potential to reduce greenhouse gas emissions through sustainable practices, such as ethical sourcing and carbon management, is highlighted by the role of the circular economy in reducing carbon emissions (Galkaduwa, 2021). This circular economy model closes the loop, creating sustainable value by minimizing waste to the environment and maximizing resource use through recycling, reusing, and extending the lifespan of products and materials as long as possible (Szewczyk, 2017; Radhakrishnan, 2021). The circular economy includes material reuse, which starts with planning to purchase recyclable materials in production (Szewczyk, 2017). Focusing on choosing environmentally friendly materials not only helps to minimize negative impacts on the ecosystem but also promotes sustainable development for businesses in the long term. In addition, the product design phase is essential in the context of the circular economy,

which entails designing products that facilitate easy disassembly and recycling at the end of their life cycle (Szewczyk, 2017).

Although the circular economy has become more popular, benefiting businesses and the environment, many companies still struggle to apply circular economy principles to their production processes. When the circular economy starts with sourcing raw materials, enterprises face challenges in ensuring suppliers comply with circular economy principles because of varying levels of commitment and capacity across the supply chain (Abdelmeguid et al., 2024). This requires companies to establish close relationships with suppliers and develop standards and assessment processes to ensure compliance with the circular economy. In terms of product design, companies should integrate sustainable elements from the early stages, but designing fashionable, trend-driven, sustainable products that meet market needs requires innovation. Costs and complexity can be challenging, as investing in sustainable materials and processes can initially increase production costs (de Aguiar Hugo et al., 2021). Therefore, balancing sustainability and fashion trends requires close collaboration and connection between business departments across the supply chain. It also involves investment in customer surveys and market intelligence to understand consumer needs, preferences, and values related to sustainability, which are crucial to the success of the circular economy in the fast-fashion industry.

Moreover, the complexity of collecting and effectively processing used garments for recycling or reuse poses logistical obstacles. It requires businesses to incur high costs (Abdelmeguid et al., 2024) to build used-garment collection points and invest in technology to develop efficient, high-quality recycling processes for reuse. Despite its limitations, implementing the circular economy model in the fast fashion supply chain mitigates environmental harm. It offers significant economic advantages to businesses by addressing the increasing demand from consumers for environmentally sustainable

products, enhancing brand reputation, reducing costs, and fostering a more sustainable future (Priyadharshini et al., 2024).

2.5 Triple Bottom Line (TBL)

The Triple Bottom Line (TBL) framework evaluates the performance of a company using a holistic approach that considers three dimensions: people, planet, and profit. This framework was introduced by John Elkington in 1997 and is closely related to the fast fashion industry, which is noted for social and environmental problems, including depletion of resources and pollution, labor rights violations (Connell & Kozar, 2017; Singh, 2024). Integrating TBL into supply chain decision-making requires companies to balance all three TBL aspects to achieve sustainability goals. In the fast fashion industry, integrating TBL into supply chain operations strategy involves balancing economic profit with social responsibility and environmental stewardship (Brandon-Jones, 2015; Stuesse, 2017). The TBL framework encourages companies to focus on optimizing social and environmental performance alongside profit growth. This is especially important in the fast-fashion industry, which faces significant challenges due to rapid changes in fashion styles and the exploitation of large quantities of raw materials (Connell & Kozar, 2017; Stuesse, 2017).

To assess best practices across three dimensions, the Data Envelopment Analysis (DEA) method has been proposed to measure supply chain sustainability. Specifically, this tool is practiced as a quantitative measure of the sustainability performance of a company, which is often lacking in traditional Corporate Social Responsibility (CSR) reports (Cortes, 2017). Internal values, market demand for eco-products, and legal requirements drive the integration of sustainability and environmental responsibility into the supply chain strategy. To effectively implement the integration, companies should incorporate

sustainability goals and activities into their core strategies, invest in long-term partnerships, and comply with environmental certifications and standards (Snieska & Valodka, 2019).

Although there is a critical need to implement a comprehensive TBL approach into supply chain decision-making, many companies tend to focus solely on profits and ignore environmental and social responsibilities, thereby failing to achieve or undermining sustainability goals (Arslan & Kisacik, 2017; Snieska & Valodka, 2019). This is partly due to the tendency perspective that sustainability measures are often expensive because of investment in technologies and other aspects, leading to a decrease in the profit margin of the company (Stuesse, 2017; Arslan & Kisacik, 2017). The social dimension of TBL is often the least understood and hardest to quantify, making it difficult for companies to integrate into their sustainability performance metrics (Godfrey et al., 2014). However, sustainability practices are increasingly shown to drive innovation and long-term cost savings, countering the perception that sustainability goals only reduce profit margins (Stuesse, 2017). This indicates that companies that integrate sustainability into their core strategies can find new opportunities to develop products that meet consumer needs, using resources efficiently to save costs for the business (Stuesse, 2017).

In the context of procurement, the TBL holistic approach is increasingly being applied to evaluate procurement practices in the fast-fashion industry. Specifically, to assist in selecting suppliers that combine economic, environmental, and social performance objectives, companies are encouraged to use multi-criteria decision-making methods, such as the Analytic Hierarchy Process (AHP), which helps ensure the balance of sustainability objectives in the procurement process (Godfrey et al., 2014). Aiming to provide a holistic view of the company across all three aspects: people, planet, and profit, sustainability performance is often recorded and reported through corporate sustainability reports or TBL. However, companies face the challenge that these reports

can be qualitative and lack the quantitative rigor needed to ensure the information provided is accurate and comparable, hindering the effectiveness of supply chain decision-making (Caraiani et al., 2018). In addition, to reduce the environmental and social impacts of the supply chain, fast fashion companies have begun to standardize processes to improve the evaluation and quantification of the sustainability performance of suppliers (Singh, 2024). Although the TBL methodology provides a comprehensive model for integrating all three dimensions to help achieve sustainability goals in supply chain decision-making, its implementation in the fast fashion industry is challenging because the focus on rapid production and cost reduction creates an imbalance between profitability and environmental responsibility, however, with the increasing consumer awareness of eco-products and the changing trend towards fashionable and environmentally friendly products, along with stricter legislation, fast fashion businesses may be forced to adopt more sustainable practices that are more in line with the TBL framework.

An examination of the theoretical foundations of sustainable supply chain management (SSCM) and its links to the circular economy (CE) and sustainable procurement highlights the importance of understanding how these frameworks integrate to achieve sustainability goals. CE supports SSCM by implementing a practical framework for achieving the Sustainable Development Goals (SDGs) through the integration of sustainability strategies into business operations and production processes, thereby enhancing sustainable business performance and connecting them to specific SDGs (Yaroson et al., 2023). The Triple Bottom Line (TBL) framework, which can be used to evaluate the integration of these strategies, underscores the interconnectedness of environmental, social, and economic dimensions in achieving sustainable procurement and supply chain activities (Ashby et al., 2012). Procurement teams can operate these frameworks by leveraging digital technologies in the modern procurement age, further emphasizing this interconnectedness as they incorporate environmental, social, and economic elements into procurement processes (Jain et al., 2023). Fast Retailing, as a

multinational enterprise, has sustainability goals related to ethical sourcing and environmental responsibility. These goals can be connected to the frameworks in the literature review to improve sustainable business practices. Moreover, there is a research gap in how procurement activities can support sustainability efforts, which highlights the complexity and depth of the topic and the need for more empirical research to analyze procurement strategies that integrate SSCM and CE, thereby promoting sustainability in the fast fashion industry (Negishi, 2021; Jain et al., 2023).

3 Methodology

3.1 Case study rationale and design

This chapter details the research methodology, including data collection techniques, data processing and analysis, and analytical frameworks to address the research questions effectively. In particular, this entails describing the participant selection criteria, interview procedures, and the thematic analysis method utilized to evaluate the gathered data. In particular, this entails describing the participant selection criteria, interview procedures, and the two analytic approaches employed, comprising a directed content analysis of Fast Retailing's corporate disclosures (Table 2) and a thematic analysis of semi-structured interviews.

This study adopted a qualitative case study method to investigate challenges and approaches of Fast Retailing for effectively implementing green procurement practices. This study employed a single-company, embedded case study to examine "how" and "why" green procurement is implemented and with what effects within a real organization, where the phenomenon and its context are intertwined and require multiple sources of evidence. The case is Fast Retailing Co., Ltd.; the unit of analysis is the organizational procurement system of Fast Retailing, with embedded sub-units aligned to six analytic themes (Table 3): (1) sustainable materials & product design, (2) carbon & climate commitments, (3) transparency & traceability, (4) human rights & ethical sourcing, (5) procurement governance & strategy, and (6) performance & disclosure quality. The six themes were developed deductively from the theoretical framework on green/sustainable procurement and SSCM, encompassing ISO 20400, in addition to studies by Seuring & Müller (2008) and Carter & Rogers (2008), and the literature on transparency and assurance (presented in the theoretical framework chapter). They were subsequently operationalized in a codebook featuring inclusion/exclusion rules, indicators, and links to the SDGs. The draft codebook was

tested using Fast Retailing disclosures, and any unclear parts were documented in a decision record. Before complete coding, the definitions were improved, resulting in the final set: sustainable materials & product design, carbon & climate commitments, transparency & traceability, human rights & ethical sourcing, procurement governance & strategy, and performance & disclosure quality. This approach ensured a solid theoretical basis and a way to trace the steps from theory to code to the evidence matrix. The evidence base combines semi-structured interviews with Fast Retailing procurement and sustainability professionals (primary data) and a directed content analysis of corporate disclosure (Table 2), as a result, these sources support explanation building of how/why green procurement is enacted at Fast Retailing and the effects observed. This case study method helps examine the complex dynamics and contextual factors that influence procurement processes in the fast-fashion industry (Zainal, 2007). In terms of business management, the case study technique facilitates the analysis of the development and transformation processes of an organization, presenting practical applications for comprehending management issues (Cherkaoui & Oudrhough, 2024). One of the significant advantages of the case study technique is its capacity to deliver an in-depth understanding of a phenomenon, including its complexities and context. This makes it appropriate for addressing "how" and "why" questions (Case Study Research, 2023; Patnaik & Pandey, 2029). As a result, the case study approach, which focuses on Fast Retailing, allows for an in-depth examination of the procurement activities and sustainable strategies adopted in the operation of the company. From there, discuss the specific challenges and opportunities that the company confronts when implementing sustainable development initiatives.

Table 1. Secondary documents

No.	Document (exact title)	Year/ Edition	Type	Source (file/ URL)	Key content
1	**Year-end Report**	FY2023/ 24	Annual / Year-end	https://www.fastretailing.com/eng/ir/library/pdf/yearen	Current-year governance and program status (e.g., supplier-list disclosure,

	2023/24 (ENG)			dreport202408_eng.pdf	ZDHC wastewater compliance, circularity/RE.UNIQLO updates, product-origin transparency).
2	**TCFD Report (ENG)**	2024	Climate / TCFD report	https://www.fastretailing.com/eng/sustainability/environment/pdf/FastRetailingTCFDReport_eng.pdf	Climate-risk governance, strategy, and targets; decarbonization pathways; notes that KPIs are consolidated in the Sustainability Data Book.
3	**Sustainability Data Book (ENG)**	FY2024 (latest)	KPI data book (Excel)	https://www.fastretailing.com/eng/sustainability/report/excel/FastRetailingSustainabilityDataBook_eng.xlsx	Quantitative KPIs: Scopes 1–3 emissions, renewable electricity %, energy, water, waste, supplier audits, grievance cases, materials shares (e.g., recycled/low-GHG).
4	**Forest & Materials Procurement Policy (ENG)**	2025	Procurement / materials policy	https://www.fastretailing.com/eng/sustainability/products/pdf/forest_materials_policy_en.pdf	Expectations for wood-based/MMCF sourcing, no-deforestation, Canopy alignment; requirements for sustainable materials.
5	**Group Responsible Paper Procurement Policy (ENG)**	2025	Procurement policy	https://www.fastretailing.com/eng/sustainability/environment/pdf/FastRetailingGroupResponsi	Zero-deforestation stance; recycled/FSC content requirements; actions for shopping bags/printed materials.

				blePaperProcurementPolicy_en.pdf	
6	**Products Procurement policy page**	2025	Corporate web page	https://www.fastretailing.com/eng/sustainability/products/procurement.html	Public procurement principles and supplier-responsibility expectations; links to detailed policies.
7	**Environment Management hub**	2025	Corporate web hub	https://www.fastretailing.com/eng/sustainability/environment/management.html	Central landing for climate/environment governance documents, TCFD, and data resources.

The case study includes semi-structured interviews with Fast Retailing procurement managers and sustainability experts, in addition to content analysis of secondary data, including sustainability reports and initiatives of the company (Cooper, 2024; Talyka et al., 2024). The study improved the reliability and validity of its conclusions by collecting data from two main sources, including both primary (semi-structured interviews) and secondary data (sustainability public reports) (Table 2). The primary data comprises semi-structured interviews with Fast Retailing procurement and sustainability professionals, designed to elicit process mechanisms, implementation rationales, and perceived barriers or enablers from practitioners directly responsible for green procurement activities. The secondary data draws on official corporate documents of Fast Retailing which provide contextual and documentary support for the analysis: the Sustainability Data Book (KPI series, system boundaries, coverage), the TCFD Report (targets, climate-risk governance, strategy, supplier-program design), the Year-end Report 2023/24 (organizational context, program status, oversight structure), and procurement/supplier-responsibility policies that codify rules and standards (Table 2). Two-source (semi-structured interview and public reports) configuration supports construct validity, internal validity (explanation building that links mechanisms such as

material switching and supplier decarbonization to observed outcomes), and reliability (a documented codebook, evidence matrix with page-sheet anchors, and a maintained decision log) (Appendix 2). Data provenance is preserved through an audit trail that records document versions, extraction locations, and interview metadata, enabling the replication of coding and the verification of all quantitative indicators used in the analysis. Given the significance of focal firms as drivers of sustainable value creation in global, complex supply chains, this study focuses on sustainability reports, primarily those linked to procurement by Fast Retailing, one of the largest fast-fashion retailers. This investigation is a significant assessment of the fast-fashion industry.

This study adopts an abductive research approach that combines deductive and inductive reasoning. While six preliminary themes were developed deductively from the theoretical framework on green procurement and SSCM, these themes were refined and expanded inductively through analysis of the empirical data. In management and organizational research, abductive designs are critical for identifying and comprehending organizational phenomena in the context of digitalization and disruptive transformation (Bamberger, 2019). While inductive techniques are frequently criticized for lacking rigor, an abductive stance allows researchers to iterate between prior theory and emerging evidence to create relevant discoveries or develop themes without being limited by established theoretical frameworks (Pina, Cunha & Rego, 2019). This approach is practical in fields that demand new perspectives and frameworks, such as management. Furthermore, it is helpful in sustainability research, which examines the intricate interrelationships among environmental, social, and economic factors that must be explored holistically. According to Pina, Cunha, and Rego (2019), it facilitates the development of new ideas and offers a comprehensive analysis of how businesses can adjust to transformations in the modern work environment. This method explicitly supports the exploratory nature of the study, in which findings emerge from a thorough examination of sustainability reports, procurement policies, and disclosure documents to identify the challenges Fast Retailing faces in implementing green procurement and

to present the strategies the company uses to enhance its environmental performance. The study also evaluates how procurement contributes to achieving corporate sustainability goals, identifies unexpected challenges, and accurately describes the approaches and practices employed in sustainable procurement.

3.2 Sample Selection: The Fast Retailing Company

Fast Retailing Co. Ltd is regarded as a prominent participant in the fast-fashion sector, which is known for its short production cycles and substantial market impact (Rizaldy & Supiansyah, 2023). Fast Retailing Company, renowned for its iconic Uniqlo brand, was an obvious option for examining its sustainable procurement practices through its annual reports, in order to present an actionable framework for the procurement team to address apparent gaps in sustainability objectives and actions.

The company was selected based on the following criteria. Firstly, the sample was drawn from a fashion retailer that publishes its annual and sustainability reports in accordance with the United Nations Sustainable Development Goals (SDGs). The SDGs establish a comprehensive framework for addressing multiple areas of sustainability, including environmental preservation, social equity, and economic growth, all of which are crucial to transforming the fast fashion industry (Thakker & Sun, 2023; Cai & Choi, 2020). Evaluating how companies prioritize these goals enables an examination of how they incorporate sustainability into their procurement operations, which is critical for lowering their environmental footprint and improving their social impact (Paul et al., 2024; Basiru et al., 2025).

Furthermore, the fast fashion sector is facing a greater need to implement sustainable supply chain management approaches, as evidenced by industry leaders' efforts to shift to more sustainable procurement strategies (Wren, 2022). By analyzing organizations that adhere to the SDGs, researchers can uncover best practices and gaps in current

procedures, giving valuable insights for establishing effective procurement frameworks. Secondly, consider the features of a fast-fashion firm. The involvement of Fast Retailing in the fast fashion industry, which is characterized by short production cycles and significant environmental and social impacts, makes it a suitable case for investigating responsible procurement strategies. Thirdly, consider the worldwide presence and impact of a company. This emphasizes the importance of the company in researching how multinational firms might align economic objectives with environmental and social responsibilities. By choosing Fast Retailing for this analysis, the thesis examines how the company manages challenges and opportunities, offering insights into developing effective procurement strategies that balance profitability with ethical and sustainable practices. This analysis can serve as a strategic guide for other companies seeking to align business objectives with environmental and social responsibility, thereby contributing to global sustainable development goals.

3.3 Data collection

3.3.1 Primary data: Semi-structured interviews

In terms of the semi-structured interview, its flexibility and depth in studying complex themes make it well-suited for researching "Green procurement challenges and strategy for sustainability: The case of Fast Retailing". Semi-structured interviews, in particular, allow researchers to explore predefined and researched topics while uncovering unexpected areas that may arise during the interview process, accomplished through a combination of both organized and unorganized formats (Cooper, 2024). This technique allows researchers to acquire a complete picture of the sustainable landscape, identify common themes, and identify variances by gathering information and communicating with interviewees across industries and levels (Chkanikova, 2016). Specifically, with the participation of multiple stakeholders such as procurement professionals, sustainability managers, or supply chain executives, each will provide unique insights and knowledge

into green procurement challenges and strategies, contributing to the development of improvement and innovation strategies that more rigid data collection methods may not capture (Cooper, 2024; Reynolds, 2024). In addition, semi-structured interviews make it easier to explore subjects including regulatory compliance, supplier involvement, and the strategic value of sustainability, all of which are critical to understanding green procurement challenges and potential solutions (Cooper, 2024). This method encourages the study of dynamic and contextual factors impacting sustainable supply chain management, such as the role of third-party verification and the establishment of private eco-branding initiatives (Chkanikova, 2016). Semi-structured interviews provide valuable insights into how organizations such as Fast Retailing can leverage their unique position in the supply chain to drive sustainability transformation and gain a competitive advantage since they facilitate a thorough analysis of the interactions between organizational culture, leadership commitment, and sustainability goals (Wright et al., 2025; Vadakkepatt et al., 2021). Furthermore, the flexibility of semi-structured interviews allows researchers to tailor questions to interviewee responses, resulting in an in-depth comprehension of the particular challenges and opportunities Fast Retailing faces in implementing green procurement strategies (Cooper, 2024; Reynolds, 2024). Overall, this approach is well-suited to capturing the complex reality of sustainable procurement in the fast-fashion sector, providing valuable qualitative insights that may drive strategic decision-making and policy development (Adhikari et al., 2019; Bag, 2017).

Table 2. Summary of interviewees

No	Title	Age	Years in the Industry	Company
1	Sustainability Manager	34	8+ years	Fast Retailing
2	Procurement Manager	32	6+ years	Fast Retailing
3	Procurement Specialist	30	5+ years	Fast Retailing
4	Procurement Specialist	25	3+ years	Fast Retailing

Table 1 summarizes the interviewees and lists them in the order they were interviewed. Microsoft Teams was used to conduct the interviews, and audio recordings were made with the consent of participants for transcription purposes and to improve the validity

and rigor of the analysis. The interviews ranged from 30 to 45 minutes and were all conducted in English. Additionally, notes were gathered following each interview. In terms of format, the interviews were semi-structured, with a pre-developed set of questions focusing on the core themes of the study based on the research questions, which included green procurement strategies and challenges, supply chain transparency, sustainable development strategies, and procurement risk management.

3.3.2 Secondary data

The secondary data content analysis provided insights into operational realities, challenges, and strategic gaps in implementing environmental goals across Fast Retailing's complex supply chains. The analysis of annual reports was employed, supplemented by qualitative data from expert interviews. Annual report documents were presented in Table 2, including the Sustainability Data Book, TCFD report, Year-end Report, and procurement/supplier responsibility policies, were coded according to this scheme to extract evidence on procurement strategies, environmental performance indicators, supplier management mechanisms, and sustainability programs.

Content analysis is one of the most essential research techniques in the social sciences because it facilitates "reliable and trustworthy inferences from data to their content" by analyzing data in a particular context through the lens of the meanings people assign to them (Krippendorff, 1989). The unobtrusive nature of content analysis makes it well-suited for strategic management research (Morris, 1994) by allowing the researcher to study values, perspectives, and intentions, in addition to a large number of declarations and statements by senior managers and executives, which are frequently unreachable or difficult to obtain (Turker & Altuntas, 2014). Therefore, content analysis of annual reports is a research method that can examine sustainability activities and strategies of companies in the fast fashion industry, including Fast Retailing. This study analyzed secondary data using content analysis to rigorously assess the content of public reports (Table 2) from the Fast Retailing company and identify themes, patterns, and disparities

in its commitment to green practices and its actual procurement operations. This analysis helps determine how Fast Retailing addresses environmental and social issues and whether its disclosed activities align with its public sustainability commitments.

The research process employing content analysis was organized into five separate stages (Appendix 2): a theory-based approach to choosing the dimensions and categories for analysis; a method of descriptions and coding for each type; document analysis; editing and extraction of the place of findings; report of results (Finfgeld-Connett & Johnson, 2012) (Figure 1).

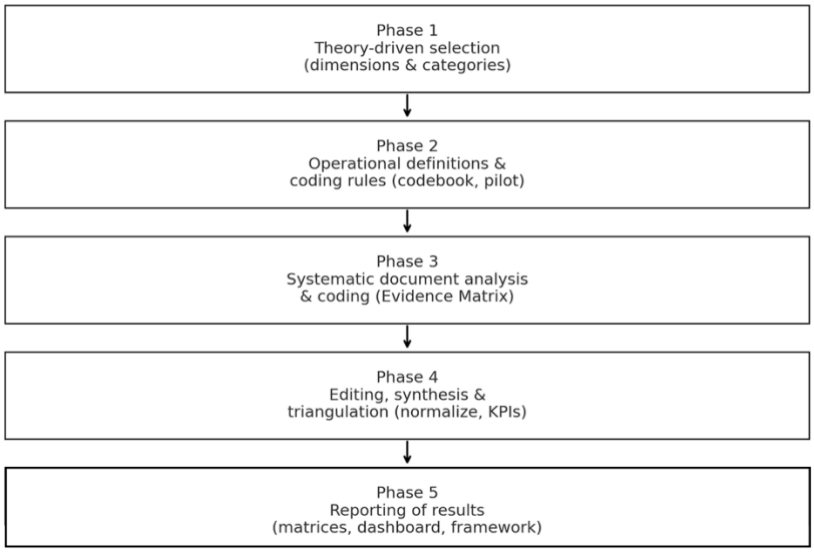

Figure 1. Content-analysis process

Phase 1: Theory-driven selection of dimensions and categories

Six themes were identified from existing literature on green and sustainable procurement and supply chain management. These themes encompass sustainable materials & product design, carbon & climate commitments, transparency & traceability, human rights & ethical sourcing, procurement governance & strategy, and performance & disclosure quality, to be incorporated into the draft code book (Appendix 2). The draft codebook was subsequently pilot-tested on Fast Retailing disclosures to finalize the

keywords and indicators. Compliance with the Sustainable Development Goals (SDGs) has been accomplished by using a target-level mapping that associates each theme with specific SDG targets, including SDG 12.7 on sustainable procurement, SDG 12.6 regarding corporate sustainability reporting, SDG 13.2 focused on climate integration, SDG 8.8 addressing labor rights, SDG 5 related to gender equality, and SDG 6.3 concerning water and chemical quality. Theoretical foundations support this decision and align with empirical evidence from Fast Retailing, which cites the United Nations Sustainable Development Goals in its sustainability website and corporate reports, including language related to materiality assessments and descriptions of environmental programs. The SDGs serve as a policy framework for interpretation, enhancing construct clarity, external validity, and comparability in the coding of procurement strategies, performance indicators, supplier-management mechanisms, and sustainability activities of Fast Retailing.

Phase 2: Operational definitions and coding rules for each category

A codebook was developed to define each category, specifying its inclusion and exclusion criteria, typical indicators, and source expectations. For each code (Picture 1):

Definition of the indicator and its unit: "Scope 3 Category 1 tCO_2e, absolute; baseline FY2019".

Tags for evidence types (Policy / Plan / Quantitative / Outcome): serve to differentiate between intent and performance.

Rules regarding boundaries and coverage: including distinctions between group and brand, in addition to own operations compared to Tier-1 and Tier-2/3 classifications.

Alignment with Sustainable Development Goals (SDGs): including specific goal and target identifiers, along with relevant keywords for efficient retrieval.

The codebook went through pilot testing on a limited sample of Fast Retailing documents, ambiguities were documented in a decision log, and definitions were refined prior to comprehensive coding**.**

Picture 1. Draft codebook

Phase 3: Systematic document analysis and coding

The disclosures of Fast Retailing, including the Sustainability Data Book, TCFD report, Year-end Report 2023/24, procurement, and supplier-responsibility policies, were analyzed using the finalized keyword dictionary. Relevant passages, tables, and figures were extracted directly into an Evidence Matrix with exact references (document name, page or sheet/row). Each item was subsequently categorized and assigned an evidence-type tag. Quantitative items were recorded, including value, unit, baseline year, latest year, target, and assurance/verification status.

Phase 4: Editing, synthesis, and extraction of the place of findings
Coded items went through sorting and normalization (including units, year labels, and boundary notes) and were aggregated by theme to produce a thematic evidence pack. Year-over-year change, CAGR, and progress-to-target (reduction achieved divided by reduction required from baseline) were calculated for KPIs (Appendix 2). Narrative items were synthesized into mechanism statements, such as “supplier RE programs to Cat.1 reductions,” each of which was attached to source anchors. Furthermore, triangulation was conducted, ensuring at least two independent sources for each claim, prioritizing

one quantitative source (TCFD for target/scope, Year-end for governance narrative, Data Book sheet for numeric progress).

Phase 5: Reporting of results

The findings were presented in three formats: first, a challenge matrix (RQ1) that summarizes thematic gaps; second, an effectiveness dashboard (RQ2) illustrating KPI trajectories and disclosure quality; and third, a strategy framework (RQ3) that translates challenges into actionable practices. Each result table maintains traceability to the Evidence Matrix through policy, plan, quant, and outcome tags, in addition to page and sheet anchors. The codebook, decision log, and reproducible spreadsheet calculations support reliability.

In particular, the research strategy was to gather data through semi-structured interviews with Fast Retailing procurement professionals, concentrating on their experiences and insights into sustainable procurement practices. This provides foundational insights into operational realities, challenges, and strategic gaps in implementing environmental goals throughout complex supply chains. The data was then transcribed and coded to generate themes, and then reinforced with a thematic content analysis of the publicly disclosed sustainability reports of Fast Retailing, procurement policies, and carbon footprint data for identifying emerging, key themes and patterns related to sustainable procurement practices and challenges within the fast fashion industry, specifically focusing on the approach of Fast Retailing. Integrating the two data sources allows a better understanding of the alignment, misalignment, and gaps between the sustainability goals of the company and its actual procurement practices. In addition, this method allows for a thorough evaluation of the problems and strategies for adopting sustainable procurement, such as incorporating eco-friendly products and eliminating greenhouse gas emissions throughout the purchasing process (Talyka et al.,2024).

The study content analysis procedure (Figure 1) consists of two successive analytical steps. The initial phase (related to Objective 1.a) consists of coding procurement and sustainability reports of Fast Retailing to identify important green procurement concerns. The second stage (related to Objective 1.b) assesses the effectiveness of current approaches using an SDG-based evaluation and a target-performance gap analysis. Based on the results of these assessments, Objective 2 presents strategic suggestions and a gap analysis approach to improve procurement sustainability. To be more specific, the first part (leading to Objective 1.a) is a thematic analysis of procurement-related disclosures of Fast Retailing, such as annual reports, sustainability data books, and policy disclosure. This stage focuses on coding the content into six core sustainability themes: sustainable materials and product design; carbon and climate commitments; supply chain transparency and traceability; human rights and ethical sourcing; procurement governance and strategy; and performance and disclosure quality. This process produces a challenge matrix that identifies important procurement constraints and gaps in sustainable performance.

The second stage (which leads to Objective 1.b) includes a target-performance gap analysis and SDG-based coding to align procurement strategies of Fast Retailing with SDG 5 (Gender Equality), 8 (Decent Work and Economic Growth), 12 (Responsible Consumption and Production), and 13 (Climate Action). This codification approach divides company actions into risk-avoidance and opportunity-enhancing strategies, assessing the efficiency of sustainability initiatives of Fast Retailing in terms of reducing environmental impacts and boosting supply chain transparency.

Based on the findings of the previous two assessments, Objective 2 presents strategic suggestions. The findings of the second stage, which include a target-performance gap analysis and an SDG-based evaluation, underpin these recommendations. Figure 1

summarizes the combined results and depicts an integrated research content analysis structure that links theme classification, SDG evaluation, and strategic analysis.

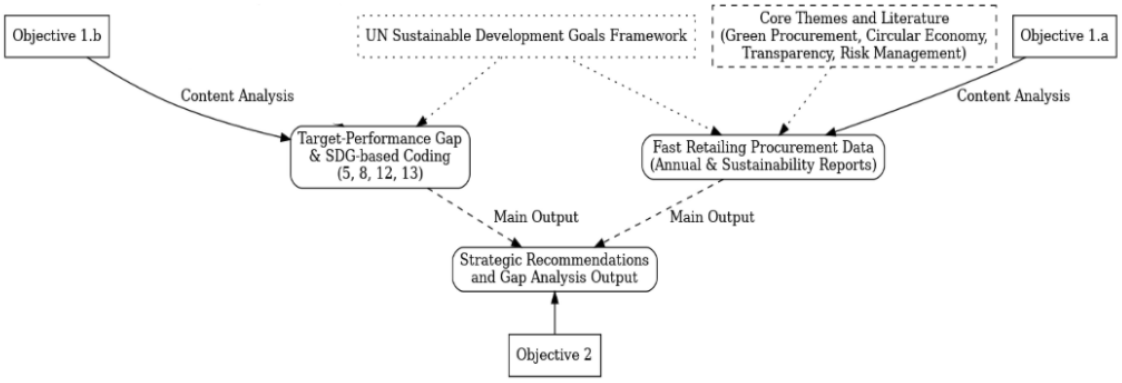

Figure 2. Research Contentr Analysis Framework

Objective 1.a. Procurement Data and Sustainability Theme Analysis: Identifying Green Procurement Challenges

Subject of analysis: Annual reports, sustainability data books, and TCFD disclosures, raw material procurement policy (2019–2024).

Unit of analysis: Core sustainability themes: Sustainable Materials and Product Design, Carbon and Climate Commitments, Supply Chain Transparency and Traceability, Human Rights and Ethical Sourcing, Procurement Governance and Strategy, Performance and Disclosure Quality.

Content analysis process: A directed content analysis was conducted on all Fast Retailing procurement and sustainability disclosures. Relevant parts from business reports were methodically extracted using keywords such as procurement, supplier, raw material, emissions, recycled, audit, human rights, and traceability. These data were classified into major themes and compared with literature-based challenges in green procurement, including sustainable materials and product design, carbon and climate commitments, supply chain transparency and traceability, human rights and ethical sourcing,

procurement governance and strategy, and performance and disclosure quality. An investigation of gaps was conducted to identify areas where procurement methods of Fast Retailing lack transparency, have inadequate environmental performance measures, or do not provide enough supplier monitoring.

Coding reliability: The initial coding was implemented using a keyword technique, which was then iteratively refined through manual review to ensure correctness and consistency across documents. Peer-reviewed research on the difficulties of green procurement served as a validation layer.

Main result: a challenge matrix that combines primary related procurement difficulties of Fast Retailing and matches them with the sustainability challenges across the industry.

Objective 1.b. SDG-Based Evaluation and Target-Performance Gap Analysis

Subject of analysis: Sustainability targets and performance metrics of Fast Retailing, as reported in the Sustainability Data Book and TCFD Report.

Unit of analysis: SDG-linked procurement actions and KPIs, including Scope 3 emissions, recycled material targets, and supplier audits

Content analysis process: Coding based on SDGs (SDG 5, 8, 12, 13), reported procurement activities were divided into risk-avoidance activities, such as preventing labor exploitation or carbon-intensive sourcing, and opportunity-enhancing activities, such as circular design and supplier incentives. The declared targets of the company, for example, 50% recycled materials by 2030 and 20% Scope 3 reduction by 2030, were compared to the most recent performance data, resulting in a gap investigation between target and performance. Inconsistencies between strategy and performance were reported, showing areas where the present method of Fast Retailing falls short of measurable progress or transparent reporting.

Main results: A dashboard displaying procurement performance of Fast Retailing, including progress toward climate action, sustainable material adoption, and supply chain transparency.

Objective 2. Strategic Recommendations

Subject of analysis: academic studies on sustainable procurement

Content analysis process: A gap analysis was conducted to identify leading procurement and supply-chain sustainability practices from the disclosures. To produce strategic suggestions, industry insights from leaders were also mapped to the gaps at Fast Retailing (as defined in Objectives 1. a and 1.b).

Main results: A suggestion framework for significant impact procurement methods.

3.4 Data Analysis

Two qualitative analytical techniques were utilized, corresponding to the two data streams. The interview transcripts were analyzed using thematic analysis, which involved the stages of familiarization, coding, assembling codes into themes, in addition to examining themes in the context of the research questions. This enabled the identification of recurrent perspectives on problems (RQ1), the evaluation of the perceived efficacy of current actions (RQ2), and the provision of suggestions for enhancing procurement governance or metrics (RQ3). The documentary material, identified as secondary data, was analyzed using directed content analysis, employing a codebook based on six themes from the theoretical framework: sustainable materials, carbon and climate, transparency and traceability, human rights and ethical sourcing, procurement governance, and performance and disclosure quality. Each disclosure item was categorized by evidence type (policy, plan, quantitative KPI, outcome) and by supply-

chain boundary (own operations, Tier-1, Tier-2/3) to facilitate subsequent comparison with interview themes.

Analyzing the two datasets concurrently, with interconnected codes, provides a more comprehensive understanding: the content analysis reveals the formal structure of green procurement at Fast Retailing, while the thematic analysis assesses the extent of implementation, identifies challenges in obtaining numerical indicators, and discusses constraints that account for the absence of KPIs. The following subsection of the methodology chapter presents the detailed step-by-step procedure.

3.4.1 Thematic analysis

Primary data collection includes conducting semi-structured interviews with four experts specializing in sustainable procurement and fashion supply chain management at Fast Retailing Co., Ltd. Interviewees are selected for their expertise and knowledge of sustainability projects in the fashion business. The semi-structured technique is flexible, allowing respondents to address difficulties and strategies in depth while assuring that all relevant subjects, such as supplier involvement, reduced emissions, and traceability, are included. Ethical issues are carefully considered: all participants provide informed consent, and confidentiality is maintained throughout the study.

Interviewees were allowed to answer questions freely based on their professional expertise, job experience, and personal viewpoints. The follow-up or extension questions were provided as needed to capture emerging themes throughout the interviews. The questions were rearranged for clarity and logic, and unnecessary questions were removed. The final list of questions is included in Appendix 1. Following the interviews, the audio recordings were correctly transcribed and reviewed for

correctness. The transcripts were then manually processed using Atlas.ti tool and classified based on the study questions, allowing for theme synthesis and comparison among participants. The data were evaluated to discover repeating trends and insights into the challenges, effectiveness, and strategic practices of the green procurement strategy of Fast Retailing. However, while qualitative interviews offer a range of perspectives and the opportunity to identify emerging themes, they also have significant limitations. The number of interviewees was limited, and their perspectives may reflect specific areas of expertise or personal experience within the fashion supply chain. Furthermore, all participants were from the private sector, with no representation from NGOs or regulatory authorities, which may restrict the diversity of perspectives gathered.

3.4.2 Content analysis

The secondary analysis of data for this study relied on publicly available documents obtained from corporate websites and third-party platforms. The annual and sustainability reports of Fast Retailing (Table 2), including the year-end report 2023/24, Task Force on Climate-related Financial Information Disclosures report (TCFD report), in addition to policy guidelines such as the Forest and Materials Procurement Policy and Sustainability Data from 2022 to 2024, were obtained in PDF format and the PDF files (Table 2) was then converted to editable text to allow for systematic analysis and qualitative coding. A keyword search was conducted utilizing terms derived from the theoretical framework and research questions, including procurement, supplier, traceability, audit, Scope 3 emissions, recycled materials, carbon footprint, certification, circularity, human rights, and transparency. To address hidden content and variations in business terminology, synonyms and related terms, including partner factory, vendor, carbon neutrality, and energy efficiency, were incorporated. Text segments with these phrases were retrieved, coded, and grouped into theme matrices using Microsoft Excel and Word. All documents were manually obtained from the official sustainability site of Fast Retailing (Environment Management hub and Products/Procurement page) (Table

2). Word and synonym sets gathered from the literature and research questions were used with Word's Advanced Find and Excel filters. Relevant passages were organized into a structured evidence matrix, accompanied by citations indicating file and page or sheet references. Numeric KPIs were imported manually from the Sustainability Data Book (Table 2). Year-over-Year (YoY) changes, Compound Annual Growth Rate (CAGR), and progress-to-target were computed using spreadsheet formulas and verified against the original tables (Appendix 2).

The directed content analysis employed a theory-driven approach. A provisional codebook (Appendix 2) was developed based on the literature on green procurement, sustainable supply-chain management, circular-economy sourcing in apparel, transparency and accountability in fashion supply chains, and triple-bottom-line (TBL) theories. This study included insights on barriers to green procurement, risk management in sustainable procurement, and strategic procurement for sustainability. The a priori coding dimensions included: (1) sustainable materials and product design; (2) carbon and climate commitments; (3) supply-chain transparency and traceability; (4) human rights and ethical sourcing; (5) procurement governance and strategy; and (6) performance and disclosure quality.

The following coding framework (Table 3) was used to analyze the sustainability annual reports and procurement policies of Fast Retailing. It combines key themes from literature with the United Nations Sustainable Development Goals (SDG 5, 8, 12, 13). Six themes were derived from established work on green/sustainable procurement and SSCM (including ISO 20400 sustainable procurement; Seuring & Müller, 2008; Carter & Rogers, 2008), transparency and accountability in fashion supply chains, circular-economy design, and the triple-bottom-line, to be added in the draft code book (Appendix 2). The draft codebook was then pilot-tested on Fast Retailing disclosures to finalize the keywords and indicators (Appendix 2). SDG alignment was implemented through a target-level mapping that links each theme to specific SDG targets, including

SDG 12.7 (sustainable procurement), SDG 12.6 (corporate sustainability reporting), SDG 13.2 (climate integration), SDG 8.8 (labor rights), SDG 5 (gender equality), and SDG 6.3 (water/chemical quality). This choice is both theoretically grounded and empirically consistent with the reports of Fast Retailing: the company references the United Nations Sustainable Development Goals in its sustainability website and corporate reports (including materiality assessment language and environmental program descriptions). Accordingly, the SDGs function here as a policy framework for interpretation, improving construct clarity, external validity, and comparability when coding procurement strategies, performance indicators, supplier-management mechanisms, and sustainability activities of Fast Retailing. This framework categorizes risk-avoidance and opportunity-enhancing actions for each category, guaranteeing external reliability.

Layer A: Core Thematic Dimensions

Following a preliminary analysis of Fast Retailing's sustainability disclosures, six major themes were identified: Sustainable Materials and Product Design; Climate and Carbon Commitments; Supply Chain Traceability and Transparency; Ethical Sourcing and Human Rights; Governance and Strategy for Procurement; Quality of Performance and Disclosure.

Layer B: SDG Alignment

A UN Sustainable Development Goals (SDG) lens was used to supplement the theme analysis, with particular attention paid to SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). The actions pointed out in reports of Fast Retailing were classified as either opportunities for enhancing, for example, encouraging circular sourcing or supplier empowerment, or risk-avoidance (preventing labor abuse, lowering emissions). With this approach, the disclosures align with globally recognized sustainability goals.

Table 3. Coding framework based on literature and SDGs (adapted from UN General Assembly, 2015).

Theme	Key Codes / Indicators	Relevant SDG(s)
Sustainable materials & product design	Recycled/low-impact materials; certified inputs (RCS/GRS/FSC/PEFC/MMCF); eco-labels; durability/repair services; take-back/remake; circular design features.	SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action)
Carbon & climate commitments	GHG targets & governance (Scopes 1–2 market-based, Scope 3 Cat.1); base-year & target-year values; supplier decarbonization/SBTi; renewable electricity; energy efficiency.	SDG 13
Supply chain transparency & traceability	Public supplier/factory lists (tiers); audit coverage & results, CAP remediation; grievance mechanisms; product origin/digital traceability; disclosure of monitoring systems	SDG 8 (Decent Work and Economic Growth), SDG 12
Human rights & ethical sourcing	HRDD; no forced/child labour; FOA/CBA; H&S (LTIR); grievance-remediation outcomes; fair/living wage programs; gender equity & non-discrimination.	SDG 8, SDG 5 (Gender Equality)
Procurement governance & strategy	RFx sustainability criteria/weighting; contract clauses; supplier scorecards & partnerships/LTAs; incentives & penalties; e-procurement/data; committee oversight	SDG 12
Performance & disclosure quality	Completeness of KPIs (baseline, boundary, target); external assurance; reconciliation to data book; restatements; on-track/needs-acceleration flags	SDG 12

To guarantee analytical rigor, multiple approaches were used throughout the investigation. Data triangulation was used by referencing multiple sources, including corporate disclosures, peer business reports, and independent indexes, including the Fashion Transparency Index.

In this study, triangulation was implemented across sources and methods, including semi-structured interviews with Fast Retailing procurement and sustainability

professionals (to elicit implementation mechanisms, barriers/enablers, and exception handling), and auditable secondary evidence drawn from the company's official disclosures (Table 2). Specifically, the disclosure set used for cross-validation comprises the Sustainability Data Book (year-over-year KPI series), the TCFD Report (targets, scope, climate-risk governance and strategy), the Year-end Report 2023/24 (governance narrative and program status, and procurement/supplier-responsibility policies (Forest & Materials Procurement Policy, Group Responsible Paper Procurement Policy). To mitigate single-source bias, each coded claim is corroborated by at least two independent sources, with a preference for including one quantitative source. In the Evidence Matrix (figure 2), every item is tagged by evidence type (Policy / Plan / Quant / Outcome), making the mix of policy, program, numeric indicator, and realized result transparent.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Doc	Section/Page	Exact Excerpt / KI	Theme	SDG Tar	KPI Type	Unit	Baseline	Baseline	Current	Current	Target Y	Target V	Tier (Ow	Evidenc
Sustainability Data Book (ENG)	E-07 (Materials)	Recycled polyester sl	Sustainable mat	SDG 12	Recycled po	%	2022	15.5	2024	47.4	2030		Supply cha	Quant
Sustainability Data Book (ENG)	E-07 (Materials)	Ratio of materials wi	Sustainable mat	SDG 12; SD	Low-GHG m	%	2022	5.1	2024	18.2	2030	50	Supply cha	Quant
Fast Retailing TCFD Report (ENG)	Products / Materials (	To reduce GHG emiss	Sustainable mat	SDG 12; SD	Materials a	%					2030		Supply cha	Policy/Plan
Year-end Report 2023/24 (Fast Retailing)	Metrics and targets - (	ZDHC wastewater st	Supply chain trai	SDG 6; SDG	ZDHC waste	% factories	2022	99.9	2023	99.7	2030		Tier-1/2 su	Outcome +
Year-end Report 2023/24	Product areas (p. 21)	Working to switch to	Sustainable mat	SDG 12; SD	Materials substitution roadmap				2024		2030		Supply cha	Policy/Plan
Year-end Report 2023/24	Product areas (p. 21)	Using recycled polye	Sustainable mat	SDG 12	Product imp	Product groups			2024	Dry-EX; Fluffy Fleece; Waist bags (re			Supply cha	Outcome (ir
Year-end Report 2023/24	Advancement of RE.UI	RE.UNIQLO STUDIO r	Sustainable mat	SDG 12	Circularity i	Stores	2024		2024	45	2024	>60	Group oper	Outcome +

Picture 2. Sample Evidence Matrix

Table 4 presents the relationships among the research topics, data sources, analytical methodologies, and anticipated outcomes, demonstrating how the content analysis and thematic analysis methods systematically fulfill the goals of this study.

Table 4. Overview of research questions, data sources, and analytical approach

Research Question	Key Data Sources	Analytical Method	Expected Output
RQ1. What are the main challenges Fast Retailing faces when implementing a green procurement strategy?	**Primary:** Semi-structured interviews with 4 practitioners (Sustainability Manager; Procurement Manager/Specialists). **Secondary:** Annual (2024) & Sustainability Reports (2022–2024); TCFD Report; Forest & Materials Policy.	**Thematic analysis (interviews):** inductive coding, challenge categories (policy to practice gaps, supplier capability, data/traceability, chemical management, cost/risk trade-offs). **Directed content analysis (docs):** SDG-based coding (SDGs 5, 8, 12, 13) to corroborate/challenge interview claims.	Challenge matrix outlining procurement gaps, with triangulated evidence (illustrative quotes and document citations) and priority rating (impact, controllability).
RQ2. How effective is Fast Retailing's current strategy at minimizing environmental impact and improving supplier transparency?	**Primary:** Interviews on implementation status, governance, bottlenecks, data boundaries/assurance, and exception handling. **Secondary:** Sustainability Data Book (KPI series); TCFD targets.	**Target–performance analysis (docs):** progress-to-target, YoY/CAGR; disclosure evaluation (boundary, assurance, metric quality). **Mechanism tracing (interviews):** link practices (materials switching, supplier programs, renewables) to outcomes; validate reasons for shortfalls/variance.	Effectiveness dashboard: progress relative to emissions objectives, transparency rating, supplier performance assessment
RQ3. Which strategic practices can help Fast Retailing improve sustainability when implementing its	**Primary:** Interviews on feasibility, enablers, and change-management requirements (capability building, incentives, contracts, systems). **Secondary:** Academic literature (green	**Strategy mapping:** synthesize interview-derived enablers with literature-backed levers; assess resource/complexity and expected impact.	Framework for strategic suggestions bridging issues to implementable practices

procurement plan?	procurement, SSCM, CE).		

This content analysis approach enables the methodical identification of procurement difficulties (RQ1) of Fast Retailing, the assessment of its existing performance and transparency (RQ2), and the development of focused solutions for enhancing sustainability (RQ3). The results of this research underpin the gap analysis and strategy suggestions outlined in the following chapters.

4 Result

This chapter employs a cohesive mixed-evidence design, consisting of (i) a directed content analysis of Fast Retailing's public documents, including the Sustainability Data Book, Year-end/TCFD texts, and policy files, resulting in unitised indicators and codified programme evidence; and (ii) a thematic analysis of semi-structured interviews that clarifies mechanisms and constraints that are not apparent in the documents. All extractions were organized into an auditable Evidence Matrix, with a document or sheet/page anchor to ensure traceability. Coding adheres to a theory-based codebook structured around six procurement themes: (Theme 1) Sustainable materials and product design; (Theme 2) Carbon and climate commitments; (Theme 3) Supply-chain transparency and traceability; (Theme 4) Human rights and ethical sourcing; (Theme 5) Procurement governance and strategy; (Theme 6) Performance and disclosure quality. This structure ensures that evidence is traceable from source to claim. Numeric series are uniformly regarded as unitised, bounded measures (0–1 shares or ratios with specified 2030 end-states). In contrast, policy and programme contents are qualitatively coded with reference to the document sheet or page.

The results are organized into three analytical sections: a content analysis of corporate disclosures, a thematic analysis of stakeholder interviews, and a comparative synthesis of both evidence streams of data. Each section contributes to the comprehensive analysis of the three research questions, with results systematically organized according to these questions. The structure of the results chapter is outlined below.

The first section is the analysis of corporate disclosures: RQ1 (challenges) is examined through the mapping of transparency breadth and data quality (Theme 3, Theme 6) and the identification of structural measurement gaps in upstream decarbonisation and deeper-tier material verification. Decarbonisation efforts at Tier-2 fabric mills are

currently not tracked by a unitised, repeatable KPI for process-heat change. Additionally, Theme 4, which addresses human rights and ethical sourcing, is documented qualitatively through grievance and remediation processes, indicating a level of transparency but lacking quantifiable portfolio KPIs. RQ2 (effectiveness) is addressed through quantitative outcomes and alignment with 2030 targets, encompassing Scope 1+2 reduction, renewable electricity share, and portfolio materials substitution (Theme 2, Theme 1), in addition to compliance maturity across supplier tiers (Theme 3). RQ3 (strategic actions) is formulated by connecting the documented practice system (targets to procurement levers to supplier execution; Theme 5) to portfolio-normalised outcomes (Theme 2, Theme 1). This involves synthesising areas where disclosure currently facilitates progress toward the target, in contrast to those where only qualitative assurance is feasible (Theme 6). The aim is to reconstruct the procurement-to-performance process and identify where metric design, particularly a Tier-2 heat KPI, could bridge the evidence-to-performance gap. Each subsection presents figures and tables with clear references to the Evidence Matrix to ensure auditability.

The second section is a thematic analysis of semi-structured interviews: This section presents stakeholder mechanisms and constraints using the identical six-theme codebook. Findings are structured according to the research question. RQ1 identifies the challenges associated with upstream decarbonisation at Tier-2 fabric mills (Theme 2) and highlights the limitations of deeper-tier traceability and scheme verification (Themes 1, 3, 6). Additionally, Theme 4 - Human rights & ethical sourcing is examined descriptively through the lens of grievance/remediation maturity to provide context for the extent of transparency. RQ2 addresses the perceived drivers of the Scope-2 step-change and the scaling of rPET. At the same time, RQ3 explores feasibility assessments for a Tier-2 heat KPI, portfolio denominators for upstream schemes, and enhancements in assurance design, linking Theme 5 (Procurement governance & strategy) with Theme 6.

The third section is comparative synthesis: The chapter concludes with a comprehensive presentation that correlates each disclosure construct with its corresponding interview-generated mechanism, categorizing instances of convergence, for instance, Scope-2 abatement discussed through renewable-electricity contracting; high ZDHC compliance understood as “at saturation”. Moreover, divergence, for instance, credible Tier-2 heat projects documented by practitioners yet lacking time-series, unitized KPIs in the public domain. This comparative step integrates the two streams without overlap: disclosures serve as the quantitative anchor, interviews provide causal context and feasibility checks, and any gaps are documented as metric design demands. The synthesis addresses RQ3 (strategic actions) by delineating the sequence from targets to procurement levers, supplier execution, and portfolio outcomes. It additionally identifies areas where new measurements, particularly a Tier-2 heat KPI, and portfolio denominators could bridge the evidence-to-performance gap. All subsections and tables reference the Evidence Matrix to ensure auditability.

Measurement design and computation: This involves the ability to compute progress toward a target and plot paths when a disclosure includes a unit, a denominator, and a 2030 end-state. For the “to-100%” series, including renewable electricity share, rPET portfolio share, and ZDHC conformance, progress is calculated as current divided by 1.00. Progress in reducing Scopes 1 and 2 compared to FY2019 is calculated as the |current reduction| divided by the |target reduction|, with the target set at -0.90. Standardization options, such as market-based Scope 2 and distinctions between portfolio and facility boundaries, adhere to the conventions outlined in the Sustainability Data Book and are documented in the Evidence Matrix. For instances where a portfolio denominator is not disclosed, including product-origin breadth, FSC/MMCF verification, Tier-2 heat transition, it is recorded as the presence of policy/assurance or milestones, and analyzed qualitatively in the transparency heatmap and practice-maturity tables. Consequently, these data points are descriptive rather than computable in relation to progress toward the target.

In this Results chapter, “shares” and “ratios” are presented on a 0–1 bounded scale to facilitate comparability and pacing assessments: A value of 0 indicates that none of the portfolio meets the criterion, while a value of 1.00 signifies that the end-state is completely achieved. Examples consist of the proportion of electricity aligned with credible renewable energy instruments (0–1), the percentage of polyester produced from recycled PET (0–1 with a target of 0.50), and the share of core facilities adhering to Zero Discharge of Hazardous Chemicals (ZDHC) standards (0–1). The bounded scale allows for the calculation of distance-to-target as (1.00 − current) or, in the case of rPET, (0.50 − current), facilitating precise year-on-year pacing. Supplier tiers encompass finished-goods factories (Tier-1), fabric mills (Tier-2), and additional raw-material levels (Tier-3+).

In brief, the results indicate a significant reduction in materials within the Scopes 1+2 boundary, aligned with a substantial shift in renewable electricity contracting; a near-target share of rPET at the materials level; and substantial compliance with ZDHC standards at Tier-1/2 factories. The most significant residual gap to 2030 is found upstream in Tier-2 heat, where there is no disclosed unitised time-series KPI. Deeper-tier material schemes (FSC/MMCF) exist as policy and assurance but lack quantification within the portfolio. The observed disparities reflect the measurement design: when a denominator and pace are present, claims can be quantified as progress toward a target; in their absence, claims remain entirely descriptive.

Table 5. Glossary of scopes, tiers, and evidence types used in the Results chapter

Term	Short definition (use inline as a footnote if needed)
Scope 1/2	GHG from fuels on site (Scope 1) and purchased electricity (Scope 2); progress reported as a ratio vs FY2019 to a –0.90 end-state.
Tier-1/2/3+	Supplier layers: Tier-1 (cut-and-sew); Tier-2 (fabric mills, dyeing/finishing—process heat); Tier-3+ (fibres/paper).
Unitised KPI	Metric on a bounded 0–1 scale or a ratio with a clear denominator and a stated 2030 target; supports progress-to-target calculation (see formulas in Appendix 2).
Non-unitised evidence	Policies, milestones, or counts without a stable denominator; used qualitatively (e.g., product-origin breadth, FSC/MMCF coverage).

Table 6. Mapping constructs (scopes, tiers, shares) to themes and research questions

Construct (measured/assessed)	**operational definition**	**Boundary / Tier or Scope**	**Primary data indicator(s)**	**Primary theme(s)** used	**Research Question matched**
Own operations / Tier-1 / Tier-2 / Tier-3+	Supply-chain levels: FR operations; finished-goods cut-and-sew; fabric mills; fibre/raw-material tiers		Topic-by-tier heatmap (audit coverage, ZDHC, product origin, FSC/MMCF, grievances)	T3 Transparency & traceability	**RQ1, RQ2**
Scopes 1+2 **reduction vs FY2019** (ratio to −0.90 by 2030)	Scope 1: Direct emissions from owned/controlled operations	**Scopes 1+2** (owned operations boundary for Scope 2: market-based)	Numeric KPI (unitised ratio); Time series in Climate/Emissions sheets	**T2** Carbon & climate; **T6** Performance & disclosure quality	**RQ2** effectiveness (environmental impact); **RQ3** governance→outcome pacing
	Scope 2 (market-based): Purchased electricity with		Numeric KPI (unitised ratio); Electricity sheet + market-based totals		

	contractual instruments				
	Scopes 1+2 ratio vs FY2019: Portfolio reduction ratio (negative value indicates reduction); 2030 target −0.90		Management KPI (unitised ratio)		
Renewable-electricity share (0–1 scale)	The fraction of total electricity consumption matched to credible renewable instruments within Scopes 1+2 (1.00 = 100%) on a 0-1 scale	**Own operations**	Numeric KPI (unitised share); RE share series	**T2**, **T6**	**RQ2**, **RQ3**
rPET portfolio share (0–1 scale, target 0.50)	Portfolio share of polyester made from recycled PET, scaled 0–1 with 0.50 target	**Portfolio (all brands)**	Numeric KPI (unitised share); E-07 Materials sheet (Data book)	**T1** Materials & product design; **T6**	**RQ2**, **RQ3**

ZDHC wastewater conformance	Share of core garment facilities conforming to ZDHC wastewater standard (0–1 share); Factory-level environmental compliance at wet-processing sites	**Tier-1 / Tier-2**	Numeric KPI (bounded share)	**T3** Transparency & traceability; **T6**	**RQ2** (compliance maturity), **RQ3** (factory-level controls)
Audit/monitoring coverage (S-04a in Sustainability Data book)	Governance oversight of supplier sites	**Tier-1 / Tier-2**	Numeric KPI (computable share)	**T3**, **T6**	**RQ3** (practice cadence); **RQ2** (governance maturity)
Product-origin breadth (customer-facing feature)	Downstream transparency shown to consumers	**Own + T1**	Qualitative (programme/milestone; not unitised)	**T3**, **T5** Governance & strategy	**RQ1** (challenges) **RQ2** (traceability depth), **RQ3** (practice presence)
FSC/Controlled Wood (paper/pack)	Policy/assurance presence for paper/pack and cellulosics; no portfolio denominator in review window	**T2–T3+**	Qualitative (policy/assurance "in force")	**T1**, **T5**, **T6**	**RQ1** (challenges) **RQ2** (materials verification), **RQ3** (policy->outcome gap)
MMCF/ Canopy (cellulosic fibre)		**T2–T3+**	Qualitative (policy/assurance "in force")	**T1**, **T5**, **T6**	**RQ1, RQ2**, **RQ3,**
Grievance transparency (S-10) / serious-issue audit & remediation (S-04b)	Social risk detection and remedy disclosure	**Own + T1–T3+**	Qualitative (counts/cases; no stable denominator)	**T3**, **T6**	**RQ1** (challenges) **RQ2** (limits of quantification)
Tier-2 heat transition KPI	Upstream decarbonisation at fabric mills	**Tier-2**	**Missing** as a time-series in review window	**T2**, **T5**, **T6**	**RQ1** (challenges) **RQ2** (locus of gap), **RQ3** (metric design need)

4.1 Content analysis

4.1.1 Main challenges in implementing green procurement

Analysis of disclosures of Fast Retailing reveals four ongoing challenges that affect the capacity of the company to implement green procurement on a large scale: (1) The rate of upstream decarbonization in fabric mills (Tier-2), (2) limitations of multi-tier transparency and traceability beyond Tier-1/2, (3) obstacles in material scaling when transitioning to recycled or verified inputs, and (4) issues related to data quality, frequency, and assurance outside of major programs. Quantitative evidence indicates significant advancements in various areas while also highlighting the existing gap to 2030. The reduction ratio for Scopes 1 and 2 has achieved –0.694 compared to FY2019, against a target of –0.90, representing approximately 77% of the required reduction. Renewable electricity usage in operations is at 0.676 on a 0–1 scale. The share of rPET has increased from 0.155 to 0.474, with a target of 0.50 by 2030. Additionally, ZDHC wastewater conformance among core factories stands at 0.997, indicating maintenance near 100% compliance. The figures, combined with the governance narrative presented in the Year-end and TCFD reports, along with the supplier-responsibility policies, outline the challenges faced by procurement.

Upstream decarbonization at fabric mills (Tier-2)

(Analyzing Theme 2: Carbon & climate commitments with support from Theme 3 and Theme 5; quality caveats from Theme 6.)

The residual distance to the 2030 Scopes 1+2 target is predominantly found upstream at Tier-2 fabric mills, rather than within owned operations, as indicated by the climate and procurement disclosures. The quantitative series central to this analysis is the

Scopes 1 and 2 reduction ratio of the company compared to FY2019. Values reported decreased from –0.082 in FY2021 to -0.457 in FY2022, and further to -0.694 in FY2023, relative to a target of -0.90. The FY2023 value indicates approximately 77% of the necessary reduction toward the end-state (|-0.694|/|-0.90| ≈ 0.77), resulting in a remaining ratio gap of 0.206 to 2030 (Figure 3) (Theme 2).

The absolute series presented with this ratio indicates a consistent trend. Scope 1 emissions decreased from 12,295 tCO_2e in 2019 to 9,558 tCO_2e in 2023, while Scope 2 emissions (market-based) reduced from 298,566 tCO_2e in 2019 to 85,502 tCO_2e in 2023 (Figure 4, Figure 5). In the same context, the share of renewable electricity in owned operations is 0.676, equivalent to 67.6% on a 0-1 scale. The data illustrate significant advancements in owned operations regarding electricity procurement and efficiency, indicating that the remaining challenge to achieve -0.90 primarily lies beyond the direct facilities of the company (Theme 2, Figures 4, Figure 5).

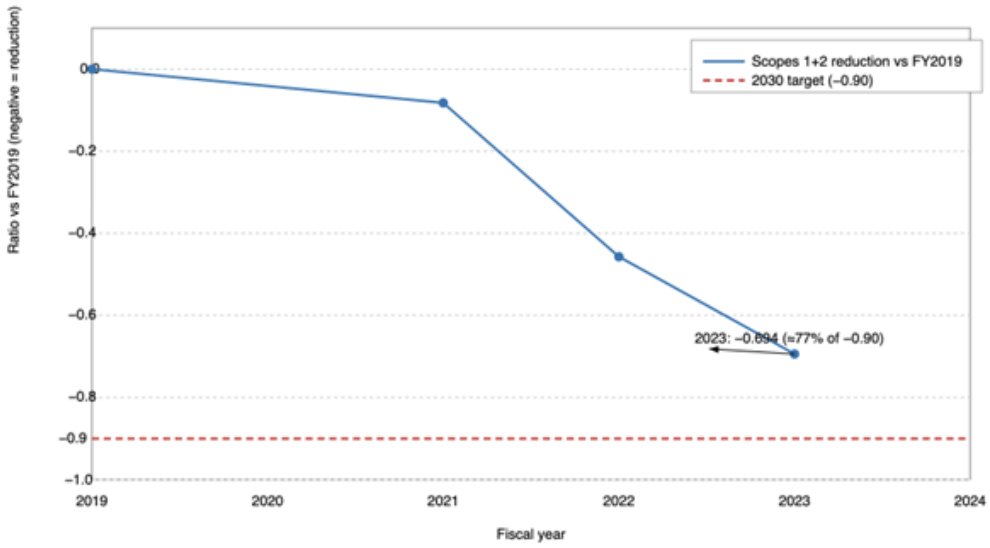

Figure 3. Scopes 1+2 reduction vs FY2019 (2019-2024) with the -0.90 target line. *Notes: Values are ratios vs FY2019; negative denotes reduction. FY2023 equals -0.694 (≈77% of -0.90).*

The renewable-electricity share for Scopes 1+2 is reported at 0.676 on a scale a 0-1 scale. When evaluated against a target of 1.00, the figure indicates a progress of 67.6% and a remaining balance of 0.324 share-points. According to a descriptive linear analysis for FY2025–FY2030, the expected average increase is approximately 0.054 share-points annually, aligning with the necessary rate to address the electricity segment of the gap (Theme 2).

Environmental compliance in garment factories is similarly mature. In FY2023, ZDHC wastewater conformance was approximately 0.997 on a 0–1 scale at Tier-1/2. The metric, being unitised and seasonally repeated, serves as a high-frequency indicator of process control, comparable to electricity in relation to climate performance (Theme 3, Theme 6).

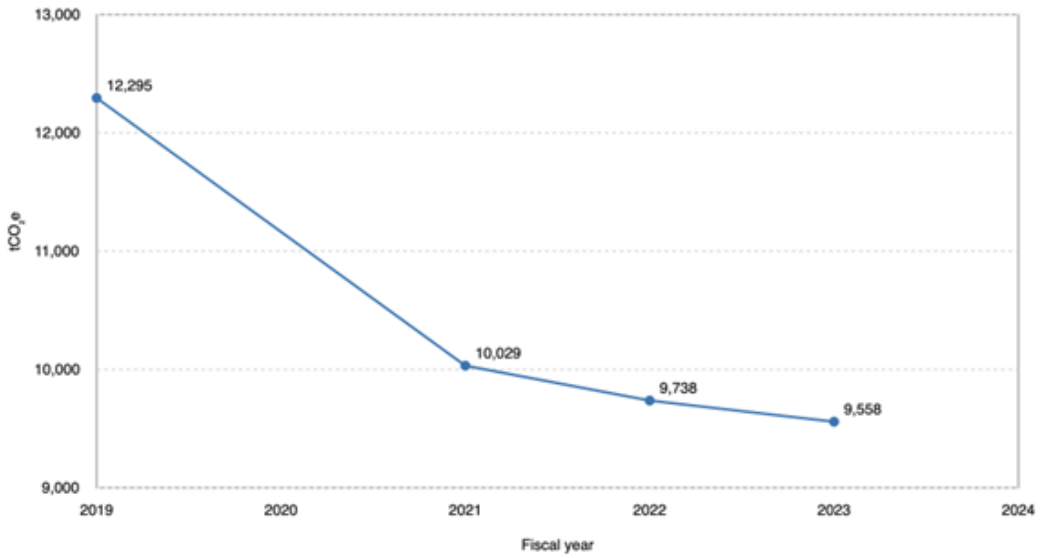

Figure 4. Scope 1 (tCO_2e), FY2019–FY2023.

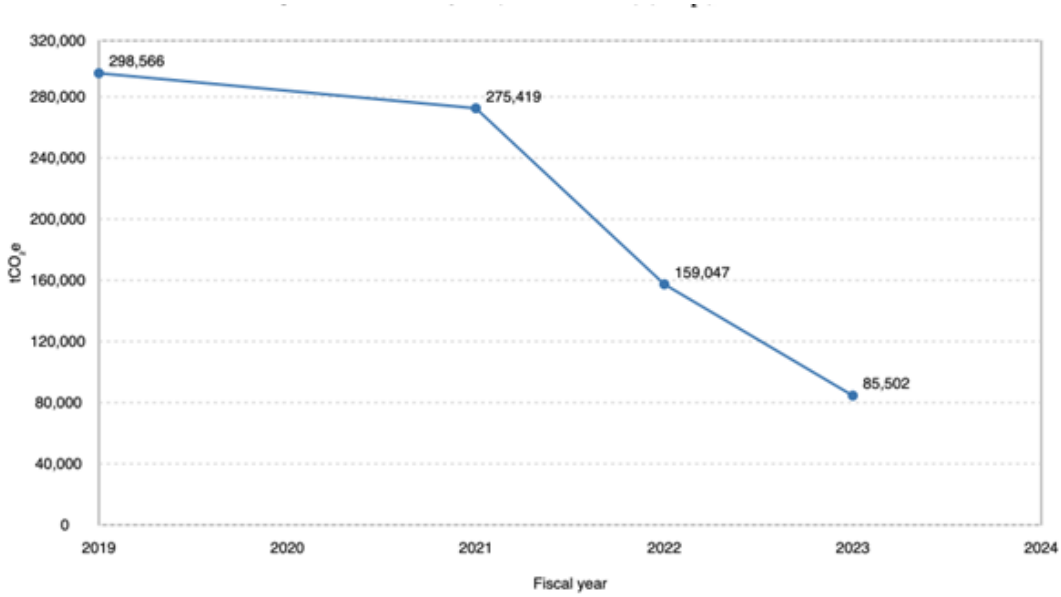

Figure 5. Scope 2 (market-based, tCO_2e), FY2019–FY2023.

The accompanying narrative consistently depicts Tier-2 mills as heat-intensive, multi-country assets that depend on continuous, high-temperature thermal energy for their dyeing and finishing processes, which is supplied by boilers and steam. The Year-end and TCFD sections outline a systematic governance framework for these suppliers, including quarterly evaluations with primary partner factories, tailored country plans, and Higgs-based assessments, demonstrating consistent oversight. Evidence of similar maturity is evident in environmental compliance at primary garment factories: ZDHC wastewater conformance is reported at 0.997, indicating 99.7% compliance at the time of assessment. The degree of conformity is both unitized and frequently observed (seasonal), making it a significant indicator within the dataset. The documents do not provide a unitized, time-series KPI that distinguishes Tier-2 fuel switching or non-fossil steam share. Progress at Tier-2 is reflected in the record via program evaluations and assessments, rather than through a portfolio-level coverage metric similar to renewable electricity or ZDHC.

The progression of the ratio movement (-0.082 to -0.457 to -0.694), the significant reductions in Scope 1 and Scope 2 absolutes (Figures 1 and 2), the 0.676 share of renewable electricity in owned operations, and the 0.997 ZDHC conformance among core factories collectively illustrate a straightforward results narrative. Owned operations levers are progressing, compliance at primary factories is approaching its maximum, and the remaining Scopes 1 and 2 burden is primarily found in Tier-2 thermal energy transitions. The review period emphasizes upstream decarbonization through governance evidence, as Tier-2 is highlighted in governance passages but not standardized as a coverage or intensity KPI.

Three recurring mechanisms in the disclosures clarify the slower pace of mill decarbonization compared to owned operations electricity, and the persistence of the residual Scopes 1 and 2 gap at Tier 2. Initially, technology and capital intensity are critical factors; mill reduction typically requires replacing equipment (including industrial heat-pump/heat-recovery systems and high-efficiency stenters) or transitioning to biomass or biogas fuels. These projects are significant investments, involving extensive engineering lead times and potential downtime for dyeing and finishing lines. The feasibility is additionally influenced by local fuel markets and grid reliability, which exhibit significant variation across production regions (Theme 5). Milling technology and capital expenditure.

Second, geographic heterogeneity and infrastructure: the partner-factory footprint encompasses various jurisdictions characterized by differing fuel prices, grid factors, biomass supply chains, and permitting regimes. A single corporate objective can lead to varying site-level feasibility and returns on investment even within the same brand umbrella. Third, the measurement boundary and visibility are defined as follows: the company's climate accounting framework presents the Scopes 1 and 2 ratio as the primary metric for 2030 performance, whereas supplier energy is predominantly

categorized under Scope 3 Category 1. In practice, the Scopes 1+2 ratio serves as a useful group-level indicator for climate progress; however, it fails to distinguish the proportion of Tier-2 heat that has transitioned from fossil fuels. The publicly available data for mills is primarily governance-focused (reviews, assessments) rather than centered on key performance indicators (unitized coverage or intensity). The company provides detailed disclosures of mature, unitized compliance and process metrics at Tier 1/2 (Theme 3), including ZDHC wastewater conformance at approximately 0.997, and outlines Higg-based assessments, along with quarterly reviews conducted with core partner factories (Theme 5). Currently, there is an absence of publicly available time-series key performance indicators that specifically isolate Tier-2 heat transition, such as "% steam from non-fossil" or "% Tier-2 output under a verified heat-transition plan. The measurement gap restricts understanding of the locations and frequency of upstream reduction activities—national preparedness and authorization.

The governance layer is thoroughly detailed. The TCFD and year-end passages outline targets aligned with the Science Based Targets initiative (SBTi), provide country-specific transition frameworks, conduct risk screenings, and establish a quarterly review schedule with key partner factories. This architecture indicates execution discipline and establishes a framework for planning and monitoring energy transitions at mills. The Data Book reflects governance through established KPI families across various domains, including renewable electricity and ZDHC wastewater, each standardized and measured consistently. KPI design and measurement.

The distinction with Tier-2 energy lies not in a lack of oversight, but in the absence of a public, standardized KPI to measure mill-level heat transition equivalently. The disparity in measurement depth accounts for the numerical representation of climate progress in electricity (0.676 share) and EHS compliance (0.997 conformance). In contrast, Tier-2 progress is presently demonstrated through program cadence and assessment

coverage. Governance cadence compared to data depth. A pacing interpretation can be derived directly from the ratio series without imposing prescriptive assumptions. The remaining distance of 0.206 from -0.694 (FY2023) to -0.90 (2030), when evenly distributed over seven years, results in an implied linear catch-up of approximately 0.03 ratio-points annually. This figure illustrates the extent of annual movement aligned with a linear trajectory towards the end-state, given the existing parameters of Scopes 1+2 reporting. Given that absolute values for Scope 1 and Scope 2 have significantly decreased, specifically, Scope 2 (market-based) by approximately 213,000 tCO_2e from FY2019 to FY2023, the documents suggest a focus on non-electric thermal energy at Tier-2 as the primary factor influencing any additional changes in the ratio.

Finally, the evidence gathered across themes clearly represents deliverability, as depicted in the company's materials. The owned-operations pathway for electricity procurement and efficiency is progressing as planned, and factory compliance with ZDHC is approaching saturation. Tier-2 energy is consistently highlighted in narrative formats, including country plans, quarterly reviews, and Higg-based assessments; however, it remains unquantified as a share or intensity KPI in the public domain during the review period. Analysis of the data reveals that the primary limitation in reaching the –0.90 Scopes 1+2 target by 2030 is the decarbonization of heat at the mill level within Tier-2. This is supported by qualitative evidence from governance practices and quantitative metrics, including the Scopes 1+2 ratio progression from -0.082 to -0.457 to -0.694, a renewable electricity share of 0.676, and ZDHC conformance at 0.997. Financing and procurement strategies.

To preserve traceability, Table 9 reproduces the corresponding rows of the evidence matrix used for this subsection (Theme 2: Scope 1, Scope 2 (market-based), Scopes 1+2 ratio vs FY2019, renewable electricity share; Theme 3: ZDHC conformance). These rows provide the numeric anchors and illustrate the contrast between mature compliance metrics and the current lack of a time-series KPI for Tier-2 fuel switching.

Table 7. Evidence Matrix

Doc	Sheet/Page	KPI	Baseline Yr	Baseline	Current Yr	Current	Target Yr	Target	Unit	Notes
Sustainability Data Book (ENG)	Climate (E-03)	Scopes 1+2 reduction vs FY2019 (market-based S2)	2019	0	2023	–0.694	2030	–0.90	ratio (vs 2019)	FY2020 & FY2024 not published → plotted as gaps
Sustainability Data Book / Year-end 2023/24	Climate (E-03)	Scope 1 absolute emissions (Group stores & offices)	2019	12,295	2023	9,558			tCO_2e	Directional decline; no separate Scope-1 target disclosed
Sustainability Data Book / Year-end 2023/24	Climate (E-03)	Scope 2 absolute emissions (market-based)	2019	298,566	2023	85,502			tCO_2e	Market-based accounting
Sustainability Data Book (ENG)	Energy (E-05)	Renewable electricity share (own operations)	2022	0.424	2023	0.676	2030	1	share (0–1)	To-100% share
Sustainability Data Book (ENG)	Chemicals (E-08)	ZDHC wastewater conformance (core garment factories)	2022	0.999	2023	0.997	2030	1	share (0–1)	Mature conformance KPI
TCFD Report 2024 / Year-end 2023/24	Governance	Quarterly reviews with core partner factories; Higg-based assessments			2024	Narrative evidence			Policy/Outcome	Delivery system for supplier transitions; no Tier-2 heat KPI

Multi-tier transparency and traceability limits

The data of this section is primarily derived from Theme 3 - Supply-chain transparency & traceability, supported by context from Theme 5 - Procurement governance & strategy (review cadence and Higg-based assessments), Theme 1- Sustainable materials & product design (scheme-level requirements for paper/pack and MMCF), and Theme 6 - Performance & disclosure quality (completeness and assurance). Disclosures were categorized by tier, including own operations, Tier 1, Tier 2, and Tier 3+, and by topic, including public supplier list, audit/monitoring coverage, ZDHC wastewater

conformance, product-origin features, FSC/Controlled Wood verification, and MMCF/Canopy verification. In each tier×topic cell, the predominant evidence modality was categorized as numeric (a unitized KPI or value), qualitative (policy/program text without a unitized denominator), or not present in the reviewed documents. The outcome is an "evidence landscape" rather than a performance score (Figure 6, Table 7, Table 8, and Themes 3, 5, 1, and 6). Numeric entries refer to those that provide a computable denominator, including S-04a audit/monitoring coverage and E-08 ZDHC conformance, which is reported on a 0-1 scale with a baseline of 0.999 in FY2022, a current value of 0.997 in FY2023, and a target of 1.00 by 2030. Programme items that do not include a portfolio denominator, such as product-origin rollout and FSC/MMCF verification requirements, are classified as qualitative.

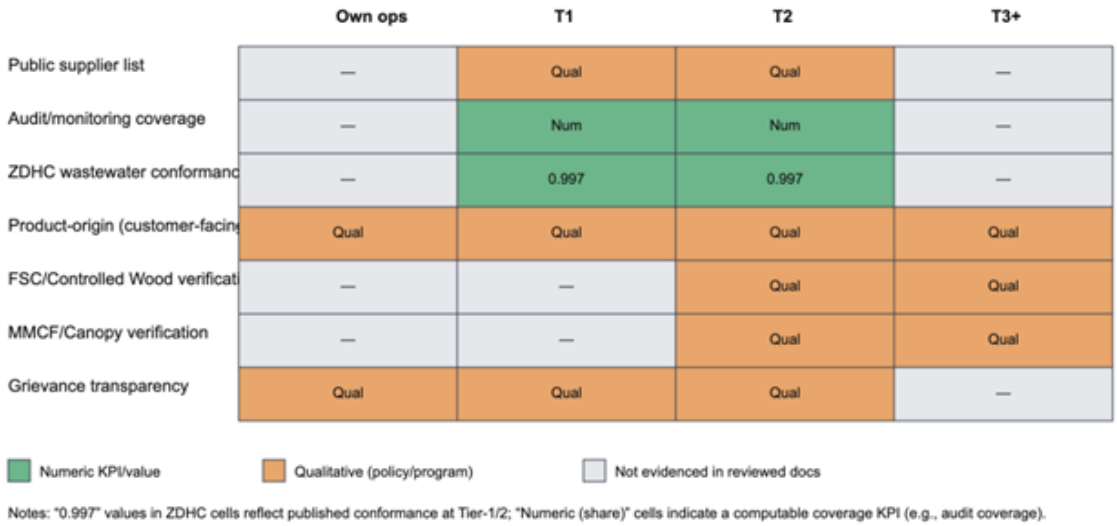

Figure 6. Transparency by tier (Own/T1/T2/T3+) across topics (public list, monitoring coverage, ZDHC, product origin, FSC/MMCF).

Regarding the documented pattern, numeric evidence is focused in Tier-1/2 for audit and monitoring coverage (S-04a) and for facility compliance with ZDHC (E-08), with values constrained to [0,1] and approaching the upper limit (0.997 in FY2023). In contrast, the public supplier list and product origin are presented as aspects of the disclosure scope or program implementation that lack portfolio share within the review period. Product origin has been documented as rolled out

since SS2023, with a milestone set for 2025 in the Year-end Report (p. 19) (Figure 6, Table 8, Themes 3 and 5). FSC/Controlled Wood and MMCF/Canopy are policy and assurance requirements; however, they do not have accompanying portfolio coverage shares, and thus are categorized as qualitative at T2–T3+ (Figure 6, Table 8, Theme 1).

Table 8. Matrix crop of evidence rows (audit trail)

Topic (Evidence Matrix)	Own ops	T1	T2	T3+	Source (Doc; sheet/page)
Public supplier list	—	Qualitative (disclosed list)	Qualitative (partial coverage note)	—	Sustainability Data Book; S-05 (Supply Chain Disclosure)
Audit / monitoring coverage	—	Numeric (share)	Numeric (share)	—	Sustainability Data Book; S-04a (Supply-chain KPIs)
ZDHC wastewater conformance	—	0.997	0.997	—	Sustainability Data Book; E-08 (Chemicals) - baseline 0.999 (2022), target 1.00 (2030)
Product-origin (customer-facing)	Qualitative	Qualitative	Qualitative	Qualitative	Year-end Report 2023/24; p. 19 (roadmap/milestone, rollout since SS2023)
FSC / Controlled Wood verification (paper/pack)	—	—	Qualitative	Qualitative	Group Responsible Paper Procurement Policy; Action plan & progress (p. 2)
MMCF / Canopy verification (fiber)	—	—	Qualitative	Qualitative	Responsible Product Policy: Wood-based & Forest-derived Materials; Policies & KPIs (p. 2)

Table 8 presents the specific matrix rows that inform the coding: S-05 supplier list (qualitative at T1–T2), S-04a audit/monitoring coverage (numeric share on a scale of 0–1 at T1–T2; current value sourced directly from S-04a), E-08 ZDHC conformance (numeric at T1–T2; values ranging from 0.999 to 0.997 to 1.00), Year-end report (p. 19) product-origin rollout (qualitative, 2025 milestone), and the paper and wood-fiber policy items (qualitative at T2–T3+). This crop facilitates the independent replication of the map, regardless of the complete matrix.

Two categories of disclosures support Tier-1/2 transparency throughout documents. The structural transparency of a designated public supplier list for garment manufacturing facilities is evident in the Sustainability Data Book, specifically in sheet S-05 (Supply Chain Disclosure). The item is qualitative in the coding as the list is presented in terms of disclosure scope rather than as a portfolio ratio with a standard denominator. Secondly, facility conformance is quantitatively reported through ZDHC wastewater compliance on the E-08 (Chemicals) sheet. Values are standardized on a 0–1 scale, with a baseline of 0.999 (FY2022), a current value of 0.997 (FY2023), and a target of 1.00 (2030) (Sustainability Data Book E-08), indicating a well-established measurement series. The audit and monitoring coverage for S-04a is expressed as a share (0–1) and is thus categorized as numeric at Tier-1 and Tier-2. The precise current share should be directly referenced from the S-04a sheet and regarded as the principal quantifiable indicator for assessing depth. Figure 6 illustrates the distribution of items across Tier-1 and Tier-2, which are represented by numeric or qualitative fills; ZDHC is indicated numerically in both tiers. Source lines are presented in Tables 7 and 8.

Downstream product traceability is a customer-facing feature related to product origin, introduced in SS2023, with a 2025 milestone noted in the Year-end Report 2023/24 (p. 19). The disclosure focuses on the scope, specifically the presence of the program and anticipated milestone timing, instead of reporting a KPI related to the percentage of SKUs with visible origin. The heatmap indicates that this topic is qualitative across all tiers, demonstrating the lack of a unitized denominator despite the program's active status. Upstream scheme-level verification is documented for two materials systems. The Group Responsible Paper Procurement Policy outlines FSC/Controlled Wood requirements for paper and packaging (Action plan & progress, p. 2). The Responsible Product Policy: Wood-based & Forest-derived Materials (Policies & KPIs, p. 2) outlines the verification expectations for fibres as set by MMCF/Canopy. Both disclosures affirm the presence of requirements and assurance-style processes; however, neither provides

coverage shares categorized by supplier or product scope for the reviewed periods. Figure 6 presents qualitative fills for these topics at T2–T3+(Theme 1 and Theme 6).

Regarding transparency in grievance and monitoring processes. Narrative evidence exists regarding grievance transparency and monitoring processes, such as grievance systems and references to monitoring methodologies. However, standardized metrics that allow for direct comparison by tier, including the percentage of suppliers covered by grievance mechanisms or the percentage of cases resolved by tier, are not consistently reported in a time-series format across the reviewed documents. The relevant cells are represented as qualitative (Own/T1/T2) and are not evident at T3+ in the heatmap (Themes 3 and 6).

Coherence across documents and characteristics of series: Numeric indicators, when disclosed, demonstrate distinct measurement properties, including firstly the conformance share (E-08 ZDHC), which is constrained within the range of [0, 1], with defined baselines for 2022, current metrics for 2023, and targets set for 2030. The values approach the upper limit (0.997–1.000), suggesting a level of measurement maturity rather than an assessment of performance. Secondly, Audit and monitoring coverage (S-04a) is organized as a share and aligns conceptually with a target of 1.00; however, the published time-series values (by tier and period) are less clearly presented in the reviewed excerpts compared to ZDHC. Consequently, the heatmap represents S-04a numerically, while the evidence-anchor table directs readers to the specific sheet for precise value extraction. Thirdly, the public supplier list serves as a disclosure scope rather than a ratio. Within the coding scheme, it retains a qualitative nature despite the quantitative content of the list, as no inventory-level denominator is included in the text, such as factories listed / total in scope.

Governance cadence facilitates transparency: The TCFD Report and Year-end Report outline quarterly evaluations with primary partner factories and the implementation of Higgs-based assessments. Within the coding framework, these statements are regarded as governance evidence that effectively supports the implementation of supplier transparency and data collection. Their qualitative nature remains due to the shortage of a standardized denominator, such as the share of suppliers reviewed per quarter, aligned with the transparency topics.

Figure 6 presents a tier×topic heatmap that summarizes the pattern of evidence modality. Among the 28 potential cells, encompassing seven topics distributed across four tiers, 4 cells (14%) provide numeric evidence, 13 cells (46%) are qualitative, and 11 cells (39%) lack evidence in the reviewed documents. In terms of tiers, own operations exhibit 0 numeric, two qualitative, and five entries without evidence; Tier-1 presents two numeric, three qualitative, and two entries without evidence; Tier-2 is the most comprehensive, containing two numeric and five qualitative entries, with no cells lacking evidence; Tier-3+ displays zero numerithree, three qualitative, and four entries without evidence. Numeric evidence is primarily focused on audit/monitoring coverage (S-04a) and ZDHC conformance (E-08) during T1–T2, with ZDHC reporting a current share of approximately 0.997 in FY2023, relative to a target range of 0–1. The public supplier list and product origin are qualitative across tiers; FSC/Controlled Wood and MMCF/Canopy are qualitative at T2–T3+; grievance transparency is qualitative at Own/T1/T2 and lacks evidence at T3+.

Table 8 presents the precise source rows from the evidence matrix unitised to generate the heatmap, thereby enhancing auditability. The crop indicates: S-05 (public supplier list) is coded qualitative at T1–T2; S-04a (audit/monitoring coverage) is coded numeric at T1–T2 with a share on a 0–1 scale; E-08 (ZDHC) is coded numeric at T1–T2 with a baseline of 0.999 (FY2022), current value of 0.997 (FY2023), and a target of 1.00 (2030);

the Year-end Report p. 19 entry detailing product-origin rollout and a 2025 milestone is coded qualitative; and the two policy rows, including Paper Policy (p. 2) for FSC/Controlled Wood and Wood-based & Forest-derived Materials (p. 2) for MMCF/Canopy are both coded qualitative at T2–T3+ due to the absence of reported portfolio coverage shares for the review window.

Table 9 presents the document–sheet/page crosswalk that links each heatmap cell to its authoritative source, unit, and, where applicable, baseline, current, and target values. Series exhibiting explicit measurement properties include the E-08 ZDHC conformance line, which ranges from 0 to 1, with values of 0.999, 0.997, and 1.00, and the S-04a audit coverage share, also ranging from 0 to 1, with a conceptual target of 1.00; the current value is sourced directly from S-04a. Disclosure-scope items, specifically the S-05 supplier list and the product-origin programme from the Year-end Report, are presented with qualitative status to indicate their function as breadth indicators instead of key performance indicators (KPIs). Verification items related to FSC/Controlled Wood and MMCF/Canopy are aligned with their respective policy documents and documented qualitatively for the review period.

Table 9. Matrix crop of evidence rows

Doc	Section / Sheet (page)	KPI / Evidence	Tier(s)	Unit	Baseline Year	Baseline	Current Year	Current	Target Year	Target	Evidence type	Notes
Sustainability Data Book (ENG)	S-05 (Supply Chain Disclosure)	Public supplier list coverage (garment factories)	T1–T2	disclosure scope	**2017**	—	**2024**	**Disclosed**	—	—	Qualitative / Disclosure	Treat as disclosure breadth; no portfolio share published
Sustainability Data Book (ENG)	S-04a (Supply-chain KPIs)	Supplier audit / monitoring coverage	T1–T2	**share (0–1)**	2021	—	2024	—	**2030**	**1**	Numeric (KPI)	Pull exact share from S-04a and compute **Progress = Current/1.00**
Sustainability Data Book (ENG)	E-08 (Chemicals)	ZDHC wastewater conformance (core garment factories)	T1–T2	**share (0–1)**	**2022**	**0.999**	**2023**	**0.997**	**2030**	**1**	Numeric (KPI)	Use as primary numeric "conformance" KPI for transparency depth
Year-end Report 2023/24	p. 19	Product-origin feature (customer-facing)	Retail / Downstream	scope	**2023**	rollout	**2024**	ongoing	**2025**	milestone	Qualitative (program)	If SKU share later disclosed, add as numeric series
Group Responsible Paper Procurement Policy	Action plan & progress (p. 2)	FSC / Controlled Wood requirement (paper/pack)	T2–T3	policy/ outcome	—	—	**2024**	in force	**2030**	maintain / expand	Qualitative (policy/outcome)	Verification mechanism; no portfolio share disclosed
Responsible Product Policy: Wood-based & Forest-derived Materials	Policies & KPIs (p. 2)	MMCF / Canopy verification requirement	T2–T3	assurance/ policy	—	—	**2024**	in force	—	—	Qualitative (assurance)	Annual declarations / third-party checks; no % coverage disclosed

Source mapping involves the process of linking data from one source to another, facilitating the identification and tracing of information across different contexts. Table 9 presents a comprehensive mapping of each heatmap entry to its corresponding document, sheet/section, page, unit, and, where applicable, baseline, current, and target values. Series exhibiting explicit measurement properties encompass E-08 ZDHC (share 0.999 in FY2022, decreasing to 0.997 in FY2023, with a target of 1.00 by 2030) and S-04a audit coverage (share on a scale of 0–1; conceptual target set at 1.00; current value to be directly obtained from S-04a). Disclosure-scope items, such as the S-05 supplier list and product origin in the Year-end Report, along with policy and assurance items like FSC/Controlled Wood and MMCF/Canopy, are documented as qualitative for the review period. Figures 6, Table 8, and Table 9 collectively indicate that measurement depth is most significant at Tier-1/2, whereas Tier-3+ and product-origin topics are recorded in policy documents rather than quantified as portfolio shares in the reviewed files.

Integration of the evidence framework: Tier-1 and Tier-2 are defined by high evidential density, incorporating at least one established numeric KPI (ZDHC conformance) alongside supplementary coverage-style indicators (S-04a). In contrast, Tier-3+ topics concerning material origin and verification (FSC/Controlled Wood; MMCF/Canopy) and customer-facing product origin are driven by policy or programmatic frameworks and are qualitative in the reviewed disclosures. The row–column asymmetry in 6, which indicates numeric depth at facility conformance and qualitative breadth for deeper tiers and product origin, reflects established differences in measurement modality instead of a subjective assessment of effectiveness.

Materials scaling and portfolio substitution

Data for this subsection is derived from Theme 1 - Sustainable materials and product design, utilizing quantitative data from the Sustainability Data Book E-07 (Materials) sheet, alongside supporting policy documentation from the Group Responsible Paper Procurement Policy and the Responsible Product Policy: Wood-based and Forest-derived Materials. The measurement framework differentiates between unitised portfolio shares (0–1) and policy/assurance items, which do not have a portfolio denominator. Among the reviewed materials indicators, recycled polyester (rPET) is the sole item presented as a time-stamped, unitised KPI; FSC/Controlled Wood and MMCF/Canopy are specified as requirements/assurance instead of portfolio shares. Figure 7 illustrates the rPET series; Table 10 presents the matrix rows that support the coding; Table 11 specifies the specific document anchors and units.

The quantitative evidence regarding materials substitution is located in the E-07 (Materials) sheet of the Sustainability Data Book. The sheet presents recycled polyester (rPET) as a standardized portfolio share (0–1), accompanied by timestamps and a defined long-term target, making it appropriate for numeric scaling analysis. The rPET series exhibits a significant increase throughout the observed period. The rPET

proportion of the portfolio increases from 0.155 in FY2022 to 0.474 in FY2024 (unit: share, 0–1), with a 2030 target of 0.50. The absolute gain from FY2022 to FY2024 is 0.319, corresponding to 31.9 percentage points on a 0–100 scale. The FY2024 level, set against the end-state, constitutes 94.8% of the target (0.474/0.50). The total uplift required to meet the target, framed as "uplift completed" relative to the baseline, is 0.345 (0.50 − 0.155). Of this, 0.319 has been achieved, indicating that approximately 92–93% of the necessary uplift has been realized by FY2024. Only 0.026 share points are needed to achieve the target level. In FY2023, a modest premium was incurred to mitigate supply risks; however, by FY2024, this premium decreased as vendors secured post-consumer streams (Figure 7, Theme 1).

An elementary pace check explains the temporal aspect of the residual gap. The distribution of the remaining 0.026 across six fiscal years (FY2025–FY2030) results in an implied linear increment of approximately +0.0043 share points annually. If progress were to pause for one year and subsequently be distributed over five years, the resulting implied increment would increase to approximately +0.0052 per year. The required annual change is minimal relative to the historical uplift observed from FY2022 to FY2024. The annualised growth of the share over the two observed intervals is approximately 74–75% per year, calculated as [(0.474/0.155)^(1/2) − 1]. This indicates the rate of increase in the portfolio proportion associated with recycled polyester, rather than reflecting a cost or a physical growth rate in volume (Figure 7, Table 10).

The rPET metric, being a portfolio ratio, requires interpretation that acknowledges its dual sensitivity to (i) the increase in recycled content within products that stay within the polyester category, and (ii) adjustments in the portfolio denominator as category mixes change. The figure indicates portfolio substitution instead of a direct assessment of the absolute tonnage of recycled fiber. The evidence's strength is derived from unit coherence (share 0–1) and the inclusion of baseline, current, and target values, which

collectively facilitate a formal progress-to-target calculation and pace assessment. A limitation is the limited time series available in the Data Book during the review period; intermediate-year values, such as FY2023, are not necessary for the calculations above but would enhance the resolution of the path's shape (linear, convex, or plateauing) (Figure 7, Theme 1).

The evidence structure for alternative material schemes differs significantly from that for rPET. Table 10 illustrates the matrix rows unitised for coding, indicating that FSC/Controlled Wood (as referenced in the Paper Procurement Policy, p. 2) and MMCF/Canopy verification (as specified in the Wood-based & Forest-derived Materials policy, p. 2) are outlined as requirements/assurances in the policy documents and are additionally addressed narratively in E-07. However, portfolio coverage shares for the review period are not disclosed. As a result, these schemes are classified as qualitative rather than quantitative items in the evidence matrix. Their presence suggests that verification systems exist; however, without a unitised denominator, they do not facilitate a progress-to-target calculation similar to rPET. Auditors can verify documents; however, transforming this into portfolio coverage requires developing SKU-level mapping, which is currently in progress (Table 10, Table 11, Theme 1).

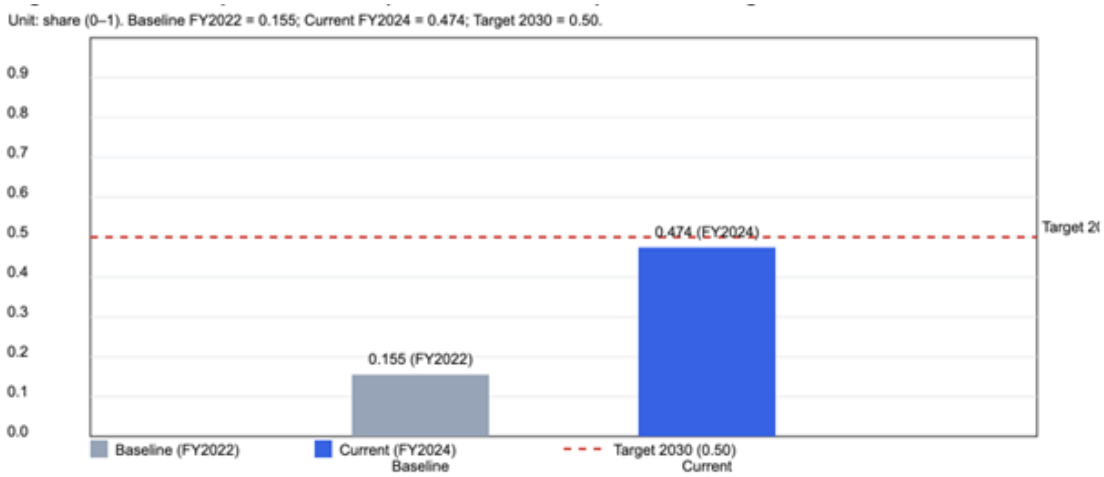

Figure 7. rPET portfolio share increased

The observed scaling behavior is attributed to rPET being the sole material indicator in the review set documented as a portfolio share, with baseline, current, and target values within the same measurement framework. The matrix crop derived from E-07 and presented as Table 10 indicates the specific row unitised for coding: unit = share (0–1); baseline year = 2022; baseline value = 0.155; current year = 2024; current value = 0.474; target year = 2030; target value = 0.50. The bar-plus-target visual (Figure 7) displays three points. The caption should indicate that the FY2024 level is 0.474 on a 0–1 scale, with the dashed line at 0.50 representing the 2030 target. The remaining gap should be labeled as 0.026 for clarity. The unit represents a portfolio share, thus the series monitors category-level substitution within the polyester segment of the range rather than the total tonnage of recycled fiber.

Conversely, the other materials-related items examined during the review period-FSC/Controlled Wood requirements for paper/packaging and MMCF/Canopy verification for cellulosic fibers, are represented in the disclosure document as policy/assurance requirements, without an associated portfolio denominator. The evidence matrix categorizes these rows as qualitative (policy in force; assurance expected), rather than as unitized KPIs. Table 10 presents a cropped audit trail that

identifies the specific sources: FSC/Controlled Wood as outlined in the Group Responsible Paper Procurement Policy (Action plan & progress, p. 2) and MMCF/Canopy as detailed in the Responsible Product Policy: Wood-based & Forest-derived Materials (Policies & KPIs, p. 2). Both rows include "in force" or similar terminology for FY2024; however, neither specifies the portfolio coverage percentage for the review period.

Table 10. Cropped E-07/material policies; rPET is unitised (0–1), FSC/MMCF

Topic / KPI	Doc / Section (sheet or page)	Unit	Baseline Yr	Baseline	Current Yr	Current	Target Yr	Target	Evidence
rPET portfolio share	Sustainability Data Book → **E-07 (Materials)**	share (0–1)	2022	0.155	2024	0.474	2030	0.5	Numeric
FSC / Controlled Wood requirement (paper/pack)	**Group Responsible Paper Procurement Policy** → Action plan & progress (p. 2)	policy/outcom	—	—	2024	in force	2030	maintain	Qualitative
MMCF / Canopy verification requirement	**Responsible Product Policy: Wood-based & Forest-derived Materials** → Policies & KPIs (p. 2)	assurance/poli	—	—	2024	in force	—	—	Qualitative

Table 10 presents a compilation of the three materials entries, along with their corresponding document–sheet/page anchors and units, thereby clarifying the modality differences. The table presents the share series for rPET, indicating Baseline = 0.155 (FY2022), Current = 0.474 (FY2024), and Target = 0.50 (2030). The table indicates the "policy/assurance requirement, in force (FY2024)" for FSC/Controlled Wood and

MMCF/Canopy, with a note stating "no portfolio share disclosed in period." This comparison is significant for interpretation, given that it indicates that numeric scaling evidence is primarily found in rPET, while other material transitions are recorded qualitatively within the review period (Table 10, Theme 1).

The sole unitised, time-stamped KPI within the materials portfolio during the review period is the recycled polyester (rPET) share from the E-07 Materials sheet. The rPET share increased from 0.155 in FY2022 to 0.474 in FY2024, compared to a target of 0.50 for 2030. The absolute uplift is +0.319 share points, representing approximately 92–95% of the total uplift needed to transition from baseline to target (0.50–0.155 = 0.345). The remaining gap to target is 0.026, with a progress-to-target ratio of 0.474/0.50, approximately 0.948. A straightforward linear pace analysis suggests that to close the residual during FY2025–FY2030, an average increase of approximately 0.004–0.005 share points per year would be necessary, a figure that is minimal compared to the two-year improvement already recorded. The policy files for FSC/Controlled Wood (Group Paper Procurement Policy) and MMCF/Canopy (Responsible Product Policy: Wood-based & Forest-derived Materials) outline the verification requirements applicable in FY2024; however, they do not provide information on portfolio coverage shares for the reviewed period. As a result, quantitative scaling evidence is primarily focused on rPET, whereas other material transitions are documented through policy and assurance instead of quantified in portfolios. Figures 7 and Table 10 illustrate these results, while Table 11 presents the document–sheet/page anchors and units.

The integration of the three artefacts elucidates the findings for Theme 1 in this subsection. The magnitude and pacing of rPET's portfolio shift are apparent: the category increased from 0.155 to 0.474 over two fiscal years, with 0.026 share points remaining to be closed by 2030. This represents a minor incremental requirement compared to the observed change, under any possible pacing assumption. The

measurement disparity across materials is apparent: the polyester category offers a unitized, auditable KPI that facilitates progress-to-target calculations, while credibility requirements and verification schemes substantiate paper/pack and MMCF but do not provide portfolio-level quantification in the Data Book for the assessed period. This section documents significant, quantifiable category-level substitution within polyester and policy-verified, though inconsistent progress for other materials during the review period, as illustrated by Figure 7, Table 10, and Table 11.

Table 11. Materials evidence; rPET (unitised share 0–1), FSC/MMCF (non-unitised)

Doc	Section / Sheet (page)	KPI / Evidence	Tier(s)	Unit	Baseline Year	Baseline	Current Year	Current	Target Year	Target	Evidence type	Notes
Sustainability Data Book (ENG)	E-07 Materials	Recycled polyester (rPET) share of portfolio	Group / portfolio	share (0–1)	2022	0.155	2024	0.474	2030	0.5	Numeric (KPI)	Category-level portfolio share; use for trend and progress-to-target
Group Responsible Paper Procurement Policy (ENG)	Action plan & progress (p. 2)	FSC/Controlled Wood requirement (paper/pack)	T2–T3+	policy/ outcome	—	—	2024	in force	2030	maintain/ expand	Qualitative (policy)	Requirement/assurance stated; no portfolio share in period
Responsible Product Policy: Wood-based & Forest-derived Materials	Policies & KPIs (p. 2)	MMCF/Canopy verification requirement	T2–T3+	assurance/ policy	—	—	2024	in force	—	—	Qualitative (assurance)	Verification requirement; no portfolio share in period

Data quality, cadence, and assurance outside flagship programs

The present section specifies the measurement properties of the indicators unitised within the evidence base, focusing on the unitization of each variable with an identifiable denominator, the frequency of observation, and the presence of an assurance mechanism as cited in the documentation. The coding lens is based on Theme 6 (Performance & disclosure quality) and integrates operational KPIs derived from Theme 1 (Sustainable materials & product design) and Theme 3 (Supply-chain transparency & traceability).

In the analyzed files, three KPI families exhibit the most robust measurement characteristics, as they are defined as normalized ratios on a 0–1 scale and are monitored at a specified frequency. Initially, ZDHC wastewater conformance (Chemicals sheet E-08) is presented as the proportion of assessed facilities that satisfy the criteria of the program. The latest value is 0.997, indicating that 99.7% of evaluated sites met the standard throughout the cycle. This bounded ratio, characterized by a specific denominator and periodic testing, operates as a mature numeric KPI (Figure 8, Table 10, Theme 6). The market-based renewable electricity share for Scopes 1 and 2 is an internal portfolio metric, reported at 0.676, indicating that 67.6% of electricity consumption is sourced from renewable sources. This data is updated annually within the corporate climate framework (Figure 8, Table 12, and Theme 2). The proportion of recycled polyester (rPET) in the product portfolio is detailed in the Materials sheet E-07 as a unitized portfolio ratio. The evaluation window value is 0.474. Despite having only two observations in the periods FY2022 and FY2024, this metric qualifies as a numeric KPI, as it is expressed on a 0–1 scale with established baseline and target units.

Figure 8. Metric-type gauges by KPI family

Figure 8 indicates that chemicals (ZDHC), renewable electricity, and rPET are presented as numeric KPIs, while product origin, grievance handling, and audit/remediation are conveyed through narrative or count-based metrics during the assessment period; thus, the pace and comparability differ by topic. Figure 8 presents a panel of metric-type gauges that precisely illustrate the heterogeneity of measurement types across various domains. Three families are consolidated and are appropriate for quantitative analysis. ZDHC wastewater conformance is reported as a mature KPI with a value of 0.997 on a 0–1 scale (chemicals compliance). Renewable electricity for Scopes 1 and 2 is indicated as a 0.676 share, while the rPET portfolio share stands at 0.474. Conversely, the rollout of client-facing products is characterized by a milestone-based narrative rather than a coverage ratio. Grievance handling and audit/remediation are presented as counts or descriptive outcomes lacking a stable denominator. The figure establishes a transparent measurement gradient: topics with specific denominators and regular updates can be assessed for pace and proximity to target, while narrative or count-based disclosures cannot be evaluated on the same quantitative basis within the assessment window. The panel aims to provide a concise overview of the variability in measurement modalities across different domains.

The documentation transitions from coverage or performance ratios to narratives focused on processes or milestones beyond the three numeric families. The product-origin roll-out is characterized as an ongoing program initiated in SS2023, with a milestone set for 2025. However, there is no indication of a portfolio denominator, including the percentage of SKUs with visible origin for the reviewed period. Consequently, within the coding framework, this is perceived more as a narrative milestone than a key performance indicator. Internally, we observe country-of-origin coverage for specific lines; however, a standardized percentage of SKUs with visible origin for external reporting has not yet been established (Figure 8 - grey gauge, Table 12 - Matrix crop S-05 qualitative, Theme 3). Comparably, S-10 grievances are reported mainly as case counts or qualitative handling descriptions; the fields that would

normalize the indicator (for instance, percentage resolved or time-to-close) are not consistently filled in during the period (Figure 8 - grey gauge, Table 12 - Matrix crop S-10, Theme 6). The S-04b audit and remediation of serious issues adhere to a consistent pattern: the texts detail factories or cases and remediation practices; however, the denominator required to convert these counts into a rate is not provided (Figure 8, Table 12 - Matrix crop S-04b, Theme 5&6). To substantiate that this classification is based on the underlying evidence rather than an extraction artefact, include a small matrix crop immediately following Figure 8 that replicates the E-matrix rows for S-10 and S-04b. In both rows, the cells for “Baseline (#/%)”, “Current (#/%)”, and “Target (#/%)” should remain unfilled, while the evidence type is designated as Policy/Outcome (narrative).

The references for assurance vary accordingly. ZDHC is integrated into an external conformance program that includes periodic laboratory testing, the establishment of a definitive cut-off, and a natural denominator. This explains why ZDHC is represented in the figure as entirely numeric and why its value is concentrated near the upper limit (0.997 on a 0–1 scale). Renewable electricity functions as an internal corporate KPI within a framework approved by the Science Based Targets initiative (SBTi). As a portfolio share subject to annual updates, its assessment is conducted regularly, even though it is an internal measurement. The rPET share serves as an internal portfolio KPI. The provided file set includes baseline (FY2022), current (FY2024), and target (2030) values, allowing for quantitative interpretation despite the limited duration of the review window. In contrast, regarding product origin, grievances, and audit/remediation, the documents reference process governance and third-party sources where applicable (for instance, escalation protocols or external audit references). However, no KPI-level denominator is provided to convert these processes into normalized rates, including "% grievances resolved" or "% factories remediated within X days." (Table 12, Figure 8, Theme 6).

Table 12. Data-definition & assurance evidence matrix

KPI family	Metric type	Unit / denominator	Measurement cadence	Assurance / verification note	Primary doc anchor(s)
ZDHC wastewater conformance (chemicals)	Numeric KPI	Share (0–1) of facilities conformant	Seasonal / periodic testing	ZDHC programme conformance; lab testing referenced; high conformance (0.997)	Sustainability Data Book → **E-08 (Chemicals)**; Year-end chemicals section
Renewable electricity (Scopes 1+2)	Numeric KPI	Share (0–1)	Annual	Management reporting; target framework SBTi-approved; explicit KPI assurance not stated in period	Data Book energy sheet; TCFD targets / Year-end metrics
rPET portfolio shar	Numeric KPI (short series)	Share (0–1)	Annual but short (FY2022 & FY2024 reported)	Internal portfolio KPI; explicit third-party assurance not stated in period	Sustainability Data Book → **E-07 (Materials)**
Product-origin roll-out (customer-facing)	Narrative milestone	Not unitised	Milestone-based; roll-out since SS2023; 2025 milestone noted	Disclosure breadth; no portfolio share in period	Year-end Report p. 19; TCFD Report pp. 4–5
S-10 grievances (handling / resolution)	Narrative / counts	Cases; denominator for "% resolved" not consistently populated	Not stated/ episodic in period	Internal grievance mechanism; no KPI-level assurance cited	Sustainability Data Book → **S-10 (Grievances)**
S-04b audit & remediation (serious issues)	Narrative / counts	Factories / cases; rate denominator not consistently reported	Not stated/ episodic in period	Third-party audits referenced; KPI unitisation absent	Sustainability Data Book → **S-04b (Workplace monitoring)**; Year-end governance text

Table 12 clarifies the reasons for the emergence of these differences. ZDHC conformance is based on a recognized program that includes periodic testing, facilitating a high-frequency numeric series. Renewable electricity and rPET are portfolio shares

that are updated annually, although rPET presently has a limited time series in the Data Book. In contrast, product-origin, grievances, and audit/remediation do not possess a unit definition linked to a denominator, such as portfolio percentage coverage, percentage resolved, or time-to-close, and consequently remain narrative or recurring within the documentation. The cross-walk indicates assurance status: compliance-type KPIs, such as ZDHC, reference external verification procedures, whereas the social and governance items offer process descriptions without specifying KPI-level assurance for the assessed period. Consequently, the comparability among families is asymmetric: chemicals and energy indicators can be consolidated into performance scorecards, while transparency and grievance/remediation indicators primarily serve as evidence of process activity.

The three objects, the gauge panel (Figure 8), and the evidence matrix (Table 12), demonstrate that the quantitatively manageable backbone of the reporting set during the review period is based on three numeric families: ZDHC at 0.997, renewable electricity at 0.676, and rPET at 0.474. All three incorporate an explicit denominator alongside a defined pace, facilitating progress-to-target interpretation in this chapter. The transparency and remediation families demonstrate robust process descriptions and governance signaling; however, they were not unitised during the assessed period. Consequently, they serve as indicators of scope or activity instead of as normalized performance series for the portfolio. The observed pattern provides the rationale for including quantitative charts and percentage-to-target statements for chemicals, energy, and rPET materials in other sections of the chapter. At the same time, related topics are represented through documented presence and program execution in this Results section (Figure 8, Table 12, Themes 1,2,3,6).

4.1.2 Main challenges in implementing green procurement

This section assesses the extent to which the current strategy of Fast Retailing is translating into measurable environmental outcomes and the maturity of supplier transparency during the assessment period. The analysis integrates (i) quantitative KPI series from the Sustainability Data Book (Scopes 1+2 market-based emissions; renewable-electricity share; rPET portfolio share; ZDHC wastewater conformance), (ii) governance and transparency evidence from the Year-end and TCFD reports (programme pace); supplier reviews; risk screening), and (iii) the multi-tier transparency map developed in the 4.2.2 part. Effectiveness is assessed in terms of progress towards 2030 and pacing relative to 2030, along with a synthesis that separates numeric from narrative transparency by tier.

Climate performance (Scopes 1+2, renewable electricity)

The coding lens of this section is based on Theme 2 - Carbon and climate commitments (primary), utilizing quantitative series from the Sustainability Data Book incorporated into the evidence matrix (Scopes 1 and 2 inventories; Scopes 1+2 reduction ratio; renewable electricity share). The quality of disclosure and its measurement characteristics are evaluated in relation to Theme 6 - Performance & disclosure quality, while governance cadence from Theme 5 - Procurement governance & strategy is referenced solely for contextual purposes.

This section assesses climate outcomes within the Scopes 1+2 boundary by utilizing the unitized indicator “Scopes 1+2 reduction vs FY2019.” In the most recent fiscal year, the series shows a value of –0.694 for FY2023, compared to a target of -0.90 by FY2030, indicating approximately 77% progress toward the target (0.694 /0.90). The analysis of the ratio verifies coordinated changes in the component inventories. Scope 1 (tCO_2e) decreased from 12,295 (FY2019) to 9,558 (FY2023), representing a reduction of 2,737 tCO_2e. Scope 2 (market-based, tCO_2e) fell from 298,566 (FY2019) to 85,502 (FY2023), indicating a decrease of 213,064 tCO_2e. The total reduction from 2019 to 2023 is

approximately 215,801 tCO_2e, predominantly attributed to Scope 2 abatement efforts. Analyzing the data with a linear “pace-to-2030” framework, the remaining distance of 0.206 ratio-points (0.90 – 0.694) suggests an average annual increase of approximately 0.034 ratio-points from FY2025 to FY2030, assuming a linear pattern persists (Figure 9, Table 13, Theme 2).

The detailed inventories clarify the means by which that ratio was attained. Scope 1 demonstrates a consistent yet steadily slowing trend: 12,295 to 10,029 (-2,266) from FY2019 to FY2021; 10,029 to 9,738 (-291) in FY2022; and 9,738 to 9,558 (-180) in FY2023. The observed patterns align with improvements in incremental efficiency and fuel mix within owned operations. Scope 2 demonstrates a significant reduction from FY2021 to FY2022, decreasing from 275,419 to 159,047 (a change of –116,372), followed by a further decline to 85,502 by FY2023 (a change of –73,545). The extent and timing of the Scope 2 reduction align with the observed increase in renewable electricity contracting, which is the primary driver of the abatement of Scopes 1 and 2 during the review period.

A second climate control pertinent to the 2030 pathway is the renewable electricity share for Scopes 1 and 2, which is recorded in the matrix at 0.676 on a scale of 0 to 1. In relation to a 1.00 end-state, this indicates 67.6% progress and a remaining 0.324 share-points. Assuming the same linear pacing, the implied average annual increment required to achieve full coverage by FY2030 is approximately 0.054 share points. The ratio series and the electricity series present a coherent narrative: the majority of achievable Scopes 1+2 reductions within the corporate boundary have been attained through market-based electricity procurement and efficiency measures. The remaining portion of the -0.90 goal is comparatively small in terms of the ratio (0.206). It is increasingly influenced by upstream thermal energy at Tier-2 fabric mills, compared to by initiatives within owned operations (as discussed in section 4.2.1) (Figure 9 - residual context, Figure 11, Theme 2 with governance context from Theme 5).

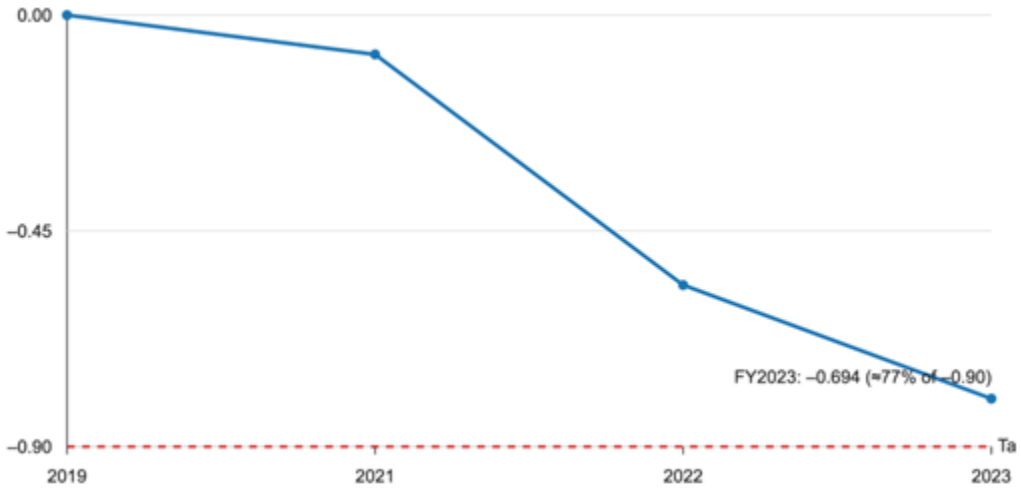

Figure 9. Scopes 1+2 reduction vs FY2019 (with -0.90 target)

Figure 9 illustrates the reduction ratio of Scopes 1 and 2 from the FY2019 baseline to FY2023, compared to the -0.90 target line. The curve transitions from 0.00 in the baseline year to -0.082 in FY2021, -0.457 in FY2022, and -0.694 in FY2023, indicating a significantly steeper slope between FY2021 and FY2023 compared to the initial period. The observation for FY2023 ("approximately 77% of -0.90") contextualizes the current position in relation to the end-state without projecting future progress (Figure 11, cross-reference to 4.2.1 section, Theme 5, Theme 3).

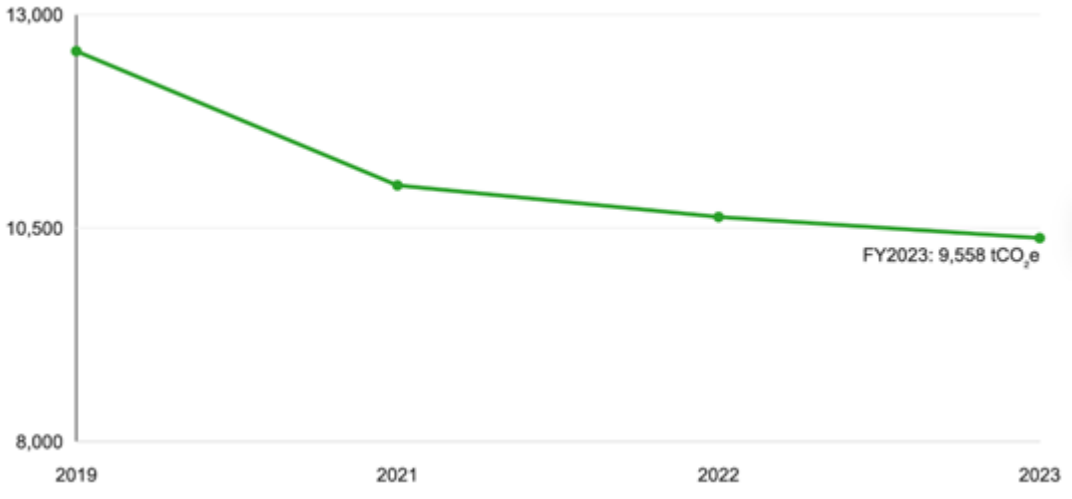

Figure 10. Scope 1 (tCO_2e), FY2019–FY2023

Figure 10 indicates Scope 1. The figures decrease from 12,295 tCO_2e in FY2019 to 10,029 tCO_2e in FY2021, followed by 9,738 tCO_2e in FY2022 and 9,558 tCO_2e in FY2023. The observed pattern is both recurring and moderate, reflecting the efficiency and operational controls applied to combustion and process sources within owned facilities and logistics boundaries defined in Scope 1.

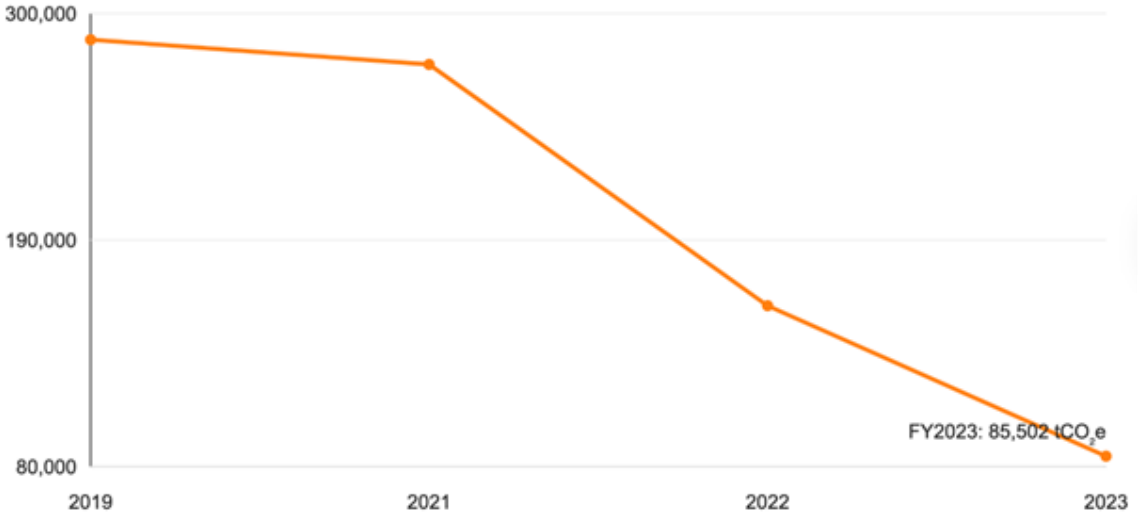

Figure 11. Scope 2 (market-based, tCO_2e), FY2019–FY2023

Figure 11 illustrates Scope 2 (market-based). Emissions declined from 298,566 tCO_2e in FY2019 to 275,419 tCO_2e in FY2021, further reducing to 158,047 tCO_2e in FY2022, and reaching 85,502 tCO_2e in FY2023. The significant decline from FY2021 to FY2023 aligns with the contracted renewable electricity and the acquisition of certificates under market-based accounting, the framework used for corporate climate targets. The figure provides the essential inventory context that supports the ratio presented in Figure 9.

Table 13. Evidence Marix

Doc / sheet	KPI & unit	Baseline (yr, value)	Current (yr, value)	Target (yr, value)	Note
Sustainability Data Book → *Scope 1 emissions*	Scope 1 (tCO_2e)	2019, **12,295**	2023, **9,558**	—	Component of the Scopes 1+2 ratio line.
Sustainability Data Book → *Scope 2 (market-based) emissions*	Scope 2 (tCO_2e)	2019, **298,566**	2023, **85,502**	—	Component of the Scopes 1+2 ratio line.
Sustainability Data Book → *Reductions vs 2019*	Scopes 1+2 reduction ratio (0 to –0.90)	2019, **0.000**	2023, **-0.694**	2030, **-0.90**	Headline climate KPI; progress-to-target = 77%.
Sustainability Data Book → *Energy / RE share*	Renewable-electricity share (0–1)	—	Review window, **0.676**	2030, **1.00**	Position vs full adoption; residual 0.324.

Overall, the existing strategy has produced quantifiable reductions in inventory within the Scopes 1 and 2 boundaries. The consolidated ratio stands at -0.694, compared to a target of -0.90, while fundamental inventories exhibit synchronized declines, and the share of renewable electricity is currently 0.676. The figures illustrate the alignment between the instrument and the outcome: the market-based electricity programme correlates with the significant reduction in Scope 2 tCO_2e, and the residual to FY2030 in the consolidated ratio is quantitatively minimal when expressed in terms of the necessary 0.206 ratio points. This results declaration indicates that the effectiveness of owned-operations climate levers is directly reflected in the disclosed figures; the unclosed portion of the FY2030 pathway aligns numerically with upstream thermal

energy at Tier-2 mills rather than with electricity in owned operations (Figure 9, 10, and 11; Table 13; Theme 6).

Materials and circularity outcomes

This subsection assesses outcomes related to Theme 1 - Sustainable materials and product design, utilizing unified series from the Sustainability Data Book (materials sheet E-07) alongside supporting policy documents for paper/packaging and wood-based fibres. The reading examines data quality and assurance by cross-referencing the disclosure properties outlined in Theme 6 - Performance and disclosure quality.

Regarding the measurement framework, in the materials domain, Fast Retailing reports portfolio shares (0–1) exclusively for recycled polyester (rPET), encompassing baseline, current, and target values appropriate for progress-to-target assessments. Interviewee 2, the Procurement Manager, indicated that supply constraints for quality bottle-grade feedstock become evident in the third and fourth quarters, with price sensitivity among certain suppliers limiting year-on-year increases. The internal planning indicates that the final 5–6 share points necessitate co-funded contracts with recyclers and enhanced quality assurance at dye houses.

The company's requirements for FSC/Controlled Wood (paper/pack) and MMCF/Canopy (wood-based fibres) are presented as policy and assurance statements, lacking denominators for portfolio coverage. Circularity programmes extending beyond rPET, including repair or reuse services, are presented as outcomes or milestones rather than unitized portfolio metrics during the review period. The following quantitative analysis concentrates on the rPET series, whereas qualitative documentation is provided for other materials and circularity initiatives.

The evidential materials exhibit variation across the schemes. Recycled polyester (rPET) is presented as a unitised portfolio share on a scale of 0 - 1, including baseline, current, and target values (Figure 12), enabling quantitative assessments. Utilizing the three-point framework, rPET has increased by 0.319 share points since FY2022 (from 0.155 to 0.474) and is currently 0.026 share points away from the 0.50 target set for 2030, representing approximately 94.8% proximity to the target as of FY2024. The ratio indicates that changes are influenced by both the rise in recycled content in polyester products and variations in the polyester category denominator. In contrast, the FSC/Controlled-Wood and MMCF/Canopy items during the same period are recorded as policy and assurance requirements without portfolio denominators. Consequently, they demonstrate credibility and program presence but do not facilitate a comparable calculation of progress toward targets (Figure 13, Table 14). The category mix shifted towards fleece and outerwear in FY2024; however, our SKU-level analysis indicates that the increase is primarily attributed to the uplift in recycled content. The final 0.026 will result from integrating rPET into seasonal capsules rather than limited niche production.

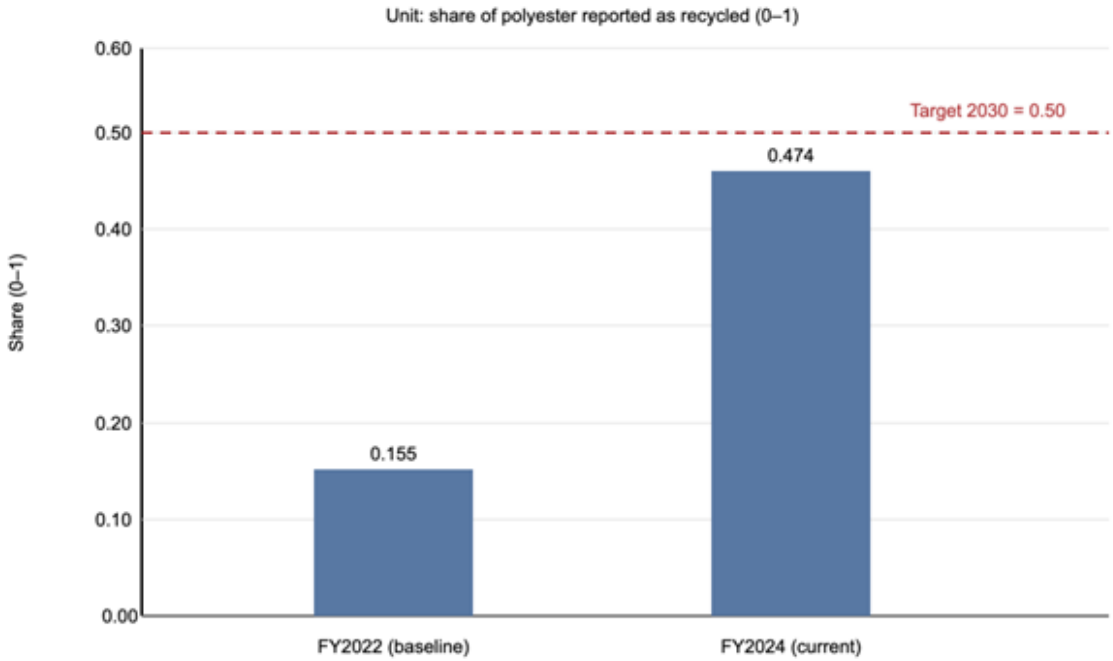

Figure 12. rPET share (baseline vs current) with 2030 target

Outcomes observed (rPET): The rPET proportion of the portfolio rose from 0.155 in FY2022 (baseline) to 0.474 in FY2024 (current) on a 0–1 scale, compared to a 2030 target of 0.50. The absolute gain from baseline is +0.319, representing 92.5% of the total uplift needed to progress from 0.155 to 0.50 (0.319/0.345). The FY2024 value indicates that 94.8% of the target has been achieved (0.474/0.50), leaving a remaining gap of 0.026 share points. Interpreting the residual through a straightforward linear pacing analysis for FY2025–FY2030 suggests an average annual change of approximately +0.004–0.005 share points per year, a magnitude that is minimal compared to the uplift observed during FY2022–FY2024. The arithmetic properties demonstrate that recycled polyester serves as a quantifiable category-level substitute within the portfolio during the review period.

Outcomes observed regarding alternative materials and circularity: Two upstream verification regimes, FSC/Controlled Wood for paper and packaging, and MMCF/Canopy for wood-based fibers, are established in the policy record and are presented as

assurance and requirement statements. However, the files reviewed for this study indicate that the company does not disclose portfolio-coverage shares for these schemes in conjunction with the rPET series. Circularity programmes, such as repair or reuse services and product longevity initiatives, are presented as customer-facing features and case examples rather than as unitised portfolio outcomes. The documentary pattern is asymmetric in structure: rPET is characterized by numeric and time-stamped data, while FSC/MMCF and circularity rely on policy verification or outcome narratives. The disparity does not negate the existence of these programmes; instead, it defines the parameters of what can be quantified in the Results chapter.

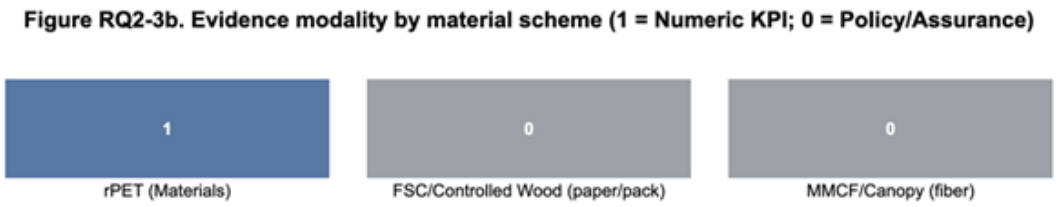

Figure 13. Evidence modality by material scheme

Figure 13 summarizes the measurement modes across the three material schemes analyzed. The rPET row is designated as “1” (Numeric KPI), indicating that it is expressed as a portfolio share (0–1) with baseline, current, and target values that facilitate progress-to-target statements, as illustrated in Figure 12. In contrast, FSC/Controlled Wood for paper and packaging, in addition to MMCF/Canopy for wood-based fibers, are assigned a code of “0” (Policy/Assurance) in the review window. This designation signifies that they are recognized as requirements or verification expectations, yet lack published portfolio coverage shares. The strip indicates that the quantitative scaling evidence in this subsection primarily focuses on rPET. At the same time, the other schemes are recorded as policy or assurance presence rather than as unitized portfolio outcomes during the assessed period.

Table 14. Material evidence anchors

Topic / KPI	Doc → Section (sheet or page)	Unit	Baseline Yr	Baseline	Current Yr	Current	Target Yr	Target	Evidence type	Note
rPET portfolio share	*Sustainability Data Book* → **E-07 (Materials)**	Share (0–1)	2022	0.155	2024	0.474	2030	0.5	Numeric KPI	Time-stamped; use for trend and progress-to-target
FSC/Controlled Wood requirement (paper/pack)	**Group Responsible Paper Procurement Policy** → Action plan & progress (p. 2)	Policy/outcome	—	—	2024	in force	2030	maintain / expand	Qualitative (policy)	Requirement stated; no portfolio share reported in period
MMCF/Canopy verification requirement (wood-based fibres)	**Responsible Product Policy: Wood-based & Forest-derived Materials** → Policies & KPIs (p. 2)	Assurance/policy	—	—	2024	in force	—	—	Qualitative (assurance)	Verification requirement; no portfolio share reported in period

Compliance maturity and supplier-transparency depth

The present section assesses the effectiveness of transparency and compliance systems of Fast Retailing within Theme 3 - Supply-chain transparency & traceability, incorporating measurement-quality cross-checks from Theme 6 - Performance & disclosure quality. Data was gathered from the Sustainability Data Book, specifically S-05 Supply Chain Disclosure, S-04a Supply-chain KPIs, S-04b Workplace monitoring, and E-08 Chemicals. Additional programmatic details are derived from the Year-end/TCFD texts regarding product-origin rollout and policy documents for FSC/Controlled Wood and MMCF/Canopy. Each disclosure item was categorized by tier (Own operations; Tier-1; Tier-2; Tier-3+) and by topic (public supplier list, audit/monitoring coverage, ZDHC wastewater conformance, product-origin rollout, FSC/Controlled-Wood verification, MMCF/Canopy verification, and grievance transparency). In each tier×topic cell, the predominant evidence type was categorized as numeric (a unitized KPI/value), qualitative (policy/program narrative lacking a unitized denominator), or not evidenced in the review set. This produces a measurement framework instead of an evaluative score.

Regarding measurement characteristics and the primary pattern. The most developed numeric series in the supplier domain is ZDHC wastewater conformance. In E-08,

conformance at core garment factories is reported as 0.997 on a 0–1 scale. This metric is unitized and tracked periodically, allowing for direct comparison to a conceptual target of 1.00, indicating almost uniform compliance during the review period (Figure 14, Theme 3, Theme 6). Audit and monitoring coverage (Table 15 - S-04a) is numerically coded at Tier-1 and Tier-2. When the current share is retrieved from the sheet, it serves as a depth indicator for factory oversight, benchmarked against a target of 1.00 (Figure 14, Table 15).

In contrast, product-origin rollout is characterized as a program milestone (initiated in SS2023 with a target for 2025) rather than a measure of portfolio coverage; thus, the entries remain qualitative within this coding framework (Figure 14, Year-end report, page 19, Theme 5). Grievances (S-10) and serious-issue audit/remediation (S-04b) are presented as counts or narrative descriptions lacking a consistent denominator (e.g., “% resolved” or “time-to-close”); thus, they cannot be converted into standardized rates for the reviewed period and are consequently categorized as qualitative (Figure 14, Table 15 S-10/S-04). In the materials-upstream set, FSC/Controlled Wood and MMCF/Canopy are identified as active policy and assurance requirements; however, there are no denominators for portfolio coverage. They are classified qualitatively at Tier-2 to Tier-3+ (Figure 14, Theme 1, Theme 6).

The heatmap illustrates three empirical features. Factory-level compliance demonstrates numerical maturity, with ZDHC conformance nearing 1.00 at both Tier-1 and Tier-2 (0.997 in FY2023, compared to a baseline of 0.999 in FY2022 and an explicit target of 1.00). Additionally, audit and monitoring coverage is quantifiable at these tiers (Figure 14, Theme 5). Secondly, downstream product transparency and upstream material verification exist but are not unitised: the tracking of product-origin features is conducted as a program rollout instead of as a percentage of SKUs with visible origin, while FSC/Controlled Wood and MMCF/Canopy are mentioned as requirements/assurances without portfolio shares during the review period. Third,

deeper-tier visibility (Tier-3+) exhibits heterogeneity: for the reviewed topics, several cells are absent in the documents, which accounts for the challenges in quantifying multi-tier traceability beyond Tier-2 in this dataset. Interviewee 3 - Procurement Specialist A stated that Tier-3+ data depends on fibre agents and traders. Documentation is present; however, it is fragmented and lacks comprehensive digitization, preventing assurance of portfolio-normalized shares (Figure 14, Theme 3). The map differentiates measurement modalities, including numeric, qualitative, and those lacking evidence, rather than assessing effectiveness. Maturity is concentrated in factory compliance, while traceability breadth is categorized as a qualitative reporting domain during the evaluated period.

The tier×topic heatmap, derived from these codings, comprises 28 cells. Numeric KPIs are present in 4 out of 28 cells (approximately 14%), qualitative policy/program evidence in 13 out of 28 (approximately 46%), and no evidence is found in the reviewed documents for 11 out of 28 (approximately 39%) (Figure 14, Table 15, Theme 6). In terms of tier classification, Tier-2 exhibits the most comprehensive coverage, comprising two numeric and five qualitative elements, with no instances lacking evidence. Tier-1 presents a mixed profile, featuring two numeric, three qualitative, and two aspects without evidence. The own operations category is predominantly excluded from this transparency map, as it contains no numeric data, two qualitative elements, and five instances lacking evidence. Lastly, Tier-3+ shows limited data, with no numeric entries, three qualitative elements, and four missing evidence. The distribution indicates that measurement maturity is most robust in areas where sector standards establish a denominator, such as ZDHC and audit coverage. In contrast, traceability depth beyond Tier-2 is mainly documented through policies and milestones rather than portfolio shares.

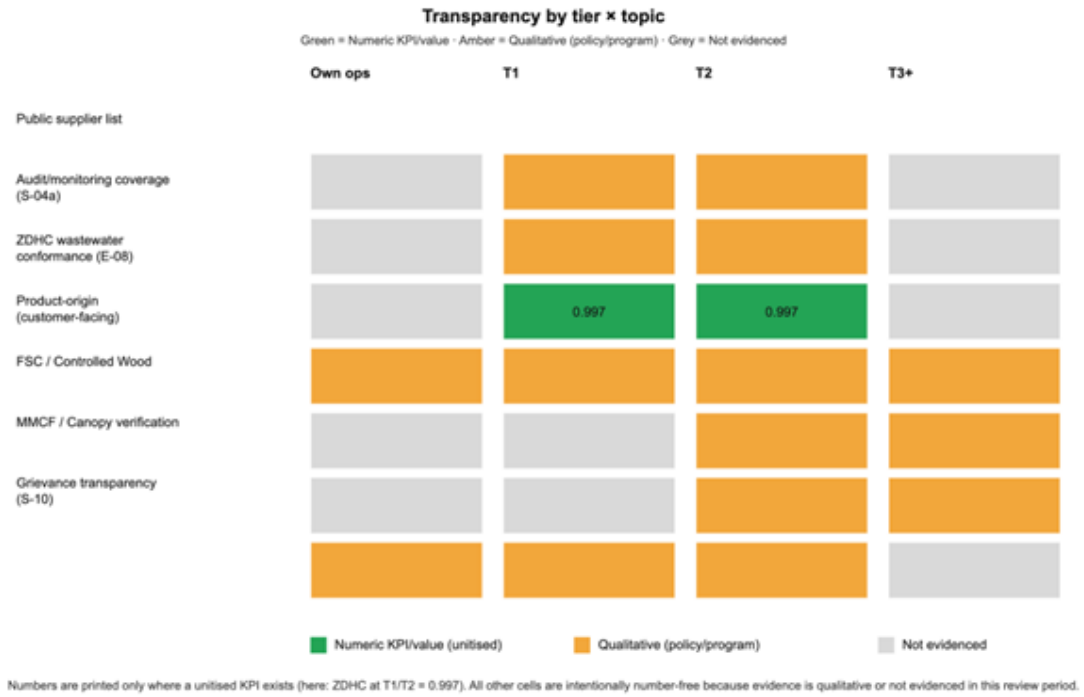

Figure 14. Transparency by tier × topic (heatmap)

In Figure 14, numeric labels are displayed only when the disclosure includes a unitized KPI with a consistent denominator, such as ZDHC conformance at Tier-1/2, with a value of 0.997 on a 0–1 scale. All other cells are deliberately left blank because the evidence is qualitative (policy/program) or not substantiated within the reviewed period; these cells indicate the measurement modality rather than performance.

Table 15. Matrix crop of evidence rows (audit trail)

Topic (Evidence Matrix)	Own ops	T1	T2	T3+	Source (Doc; sheet/page)
Public supplier list (S-05)	—	**Qualitative** (disclosed list)	**Qualitative** (partial coverage note)	—	*Sustainability Data Book* → **S-05** (Supply Chain Disclosure)
Audit / monitoring coverage (S-04a)	—	**Qualitative** (coverage described)	**Qualitative** (coverage described)	—	*Sustainability Data Book* → **S-04a** (Supply-chain KPIs)
ZDHC wastewater conformance (E-08)	—	**Numeric** 0.997	**Numeric** 0.99	—	*Sustainability Data Book* → **E-08 (Chemicals)** — baseline **0.999** (FY2022), current **0.997** (FY2023), target **1.00** (2030)
Product-origin (customer-facing)	**Qualitative**	**Qualitative**	**Qualitative**	**Qualitative**	*Year-end Report 2023/24*, p. 19 (roll-out & 2025 milestone); *TCFD Report*, pp. 4–5
FSC / Controlled Wood verification (paper/pack)	—	—	**Qualitative** (policy/ requirement)	**Qualitative** (policy/ requirement)	*Group Responsible Paper Procurement Policy* → **Action plan & progress** (p. 2)
MMCF / Canopy verification (fiber)	—	—	**Qualitative** (assurance/ requirement)	**Qualitative** (assurance/ requirement)	*Responsible Product Policy: Wood-based & Forest-derived Materials* → **Policies & KPIs** (p. 2)
Grievance transparency (S-10)	**Qualitative** (cases/outcomes)	**Qualitative**	**Qualitative**	—	*Sustainability Data Book* → **S-10** (Grievances)
Audit & remediation - serious issues (S-04b)	**Qualitative** (counts/practices)	**Qualitative**	**Qualitative**	—	*Sustainability Data Book* → **S-04b** (Workplace monitoring); Year-end governance text

Target-performance synthesis and pacing vs 2030

This section synthesizes quantitative outcomes from Theme 2-Carbon and climate commitments with the portfolio materials series from Theme 1 - Sustainable materials and product design, while incorporating data-quality considerations from Theme 6 - Performance and disclosure quality. Only indicators that are unitized, meaning expressed on a 0–1 scale or as a ratio with a clear denominator and a defined 2030 end-state, are incorporated into the pacing analysis: the Scopes 1+2 reduction ratio relative to FY2019, the renewable electricity share for Scopes 1+2, and the rPET portfolio share. Other transparency or program indicators, including product-origin features, FSC/MMCF

policy requirements, and grievance counts, are qualitative in the reviewed files and thus remain outside the scope of numeric pacing computation (Figure 15, Table 16).

Regarding the measurement framework, each series is analyzed in terms of progress-to-target, defined as the current value divided by the projected 2030 end-state. Anchor years represent the most recent published observation within the evidence matrix. The ratio of Scopes 1 and 2 is -0.694 for FY2023, compared to a target of -0.90. The share of renewable electricity stands at 0.676 for FY2023, against an end-state goal of 1.00. The rPET share for FY2024 is 0.474, relative to a target of 0.50 (Figure 15, Table 16). Normalizing to the target provides a unified perspective on the remaining distance in "share-points" (or ratio points for the Scopes 1+2 measure) and facilitates a straightforward linear pace assessment towards FY2030.

The integrated figure shows asymmetry. The company has achieved a Scope 1+2 reduction of −0.694 within the climate boundary, representing approximately 77.1% of the -0.90 end-state target. The residual gap stands at 0.206 ratio-points for FY2030. When distributed evenly across six years (FY2025–FY2030), this results in an average increase of approximately 0.034 ratio-points annually (Figure 15, first bar, Table 16, Theme 2). Simultaneously, renewable electricity has attained a score of 0.676 on a 0–1 scale, representing 67.6% of the target, with a remaining 0.324 share points. The corresponding annual linear increment is approximately 0.054 share points per year (Figure 15, Table 16, Theme 2). Materials substitution for polyester (rPET) currently stands at 0.474 of a 0.50 target, representing approximately 94.8% progress toward the target, with a remaining 0.026 share-points. The implied annual increment is approximately 0.0043 share-points (Figure 15, third bar; Table 16). The three series indicate a strategy that has achieved significant reductions within the Scopes 1+2 boundary, facilitated by market-based electricity and efficiency. At the same time, the majority of the remaining distance to the target is concentrated in the upstream heat

transition at partner mills (section 4.2.1). Substitution within polyester has significantly progressed in terms of materials (Figure 15, Figure 12, Table 14, Theme 1).

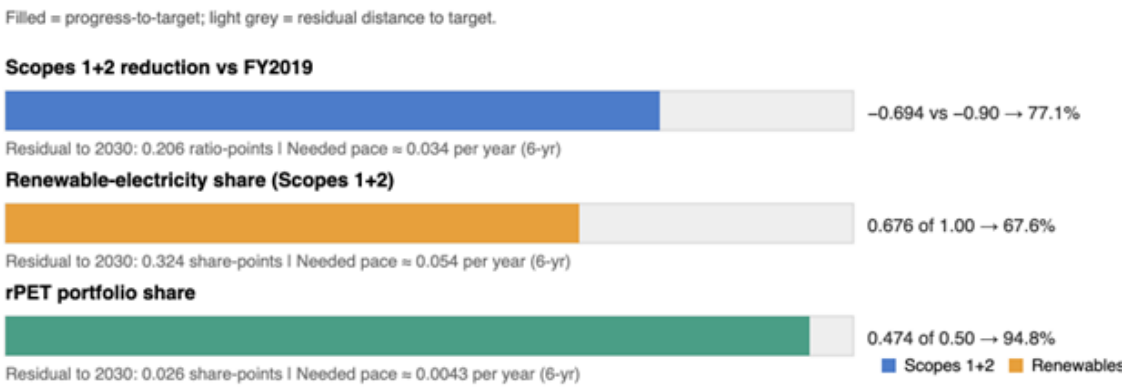

Figure 15. Progress to 2030 (targets normalised to 1.00)

Table 16. Target, current, gap, and implied linear pace to FY2030.

Indicator (unit)	Baseline (yr)	Current (yr)	2030 target	Progress-to-target	Gap to target	Implied linear increment to 2030*
Scopes 1+2 reduction ratio vs FY2019 (ratio, negative = reduction)	0.000 (2019)	−0.694 (FY2023)	−0.90	77.1 %	0.206 ratio-points	≈0.034 per year
Renewable-electricity share (0–1)	—	0.676 (FY2023)	1.00	67.6 %	0.324 share-points	≈0.054 per year
rPET portfolio share (0–1)	0.155 (FY2022)	0.474 (FY2024)	0.50	94.8 %	0.026 share-points	≈0.0043 per year

Analysis of underlying trends: The integrated positions depicted in Figure 15 align with the component time series. Scope 1 emissions decreased from 12,295 tCO_2e in FY2019 to 9,558 tCO_2e in FY2023, while market-based Scope 2 emissions declined from 298,566 tCO_2e to 85,502 tCO_2e during the same period, resulting in a ratio value of -0.694 as displayed on the dashboard (Figure 15, Table 16, Theme 5, Theme 6). The rPET bar's

proximity to the target indicates a two-point increase from 0.155 in FY2022 to 0.474 in FY2024, with a remaining distance of 0.026 to reach the 0.50 end-state (Figure 12 -> Figure 15). The linkages ensure that the progress bars can be traced to series-level movements instead of isolated annual events (Figure 15, Table 16). The comparison indicates that, among the available unitised indicators, materials substitution in polyester is nearest to the 2030 end-state, Scopes-boundary abatement is significant yet incomplete, and renewable electricity constitutes the largest single numeric gap.

The synthesis demonstrates that normalizing to a common 0-1 target scale reveals that climate delivery is most advanced within the Scopes 1+2 boundary. At the same time, portfolio substitution in polyester is already close to its 2030 end-state within measurement noise. In contrast, renewable electricity represents the most significant single numeric headroom in the dataset (Figure 15, Table 16). This pattern serves as a diagnostic for the research question 2: the existing strategy produces measurable reductions and substitutions, yet results in a distinctly quantifiable and manageable remainder within the energy mix (Figure 15, Table 16, Theme 3, Theme 6).

Transparency maturity by tier

This section assesses the maturity of transparency and traceability within supply-chain tiers under Theme 3 - Supply-chain transparency & traceability, while incorporating data-quality considerations from Theme 6 - Performance & disclosure quality. Evidence is categorized in accordance with section 4.2.2: each tier×topic cell is designated as a numeric KPI (unitized, computable series), a qualitative policy/programme statement (present/“in force” but not unitized), or lacking evidence in the reviewed documents.

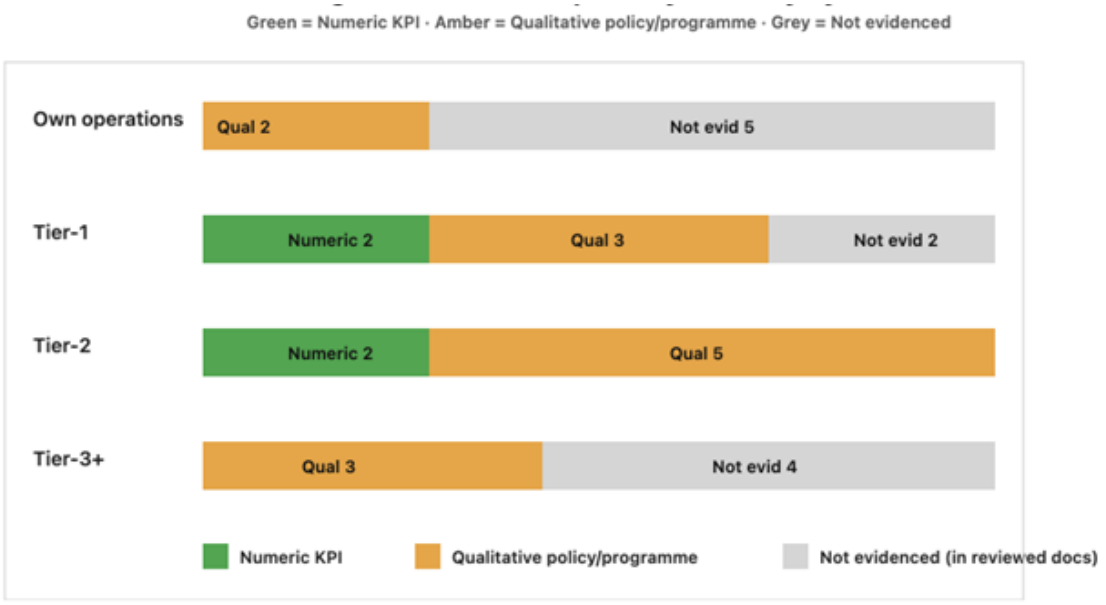

Figure 16. Transparency maturity by tier (stacked bars; ready-to-use SVG)

Table 17. Transparency maturity by tier

Tier	Numeric KPIs	Qualitative policy/programme	Not evidenced in reviewed docs
Own operations	0	2	5
Tier-1	2	3	2
Tier-2	2	5	0
Tier-3+	0	3	4

Measurement framework and sources. The section consolidates the tier-topic heatmap into straightforward counts categorized by tier. The report details, for each tier, the number of topics supported by numeric KPIs, the number supported by qualitative programme statements, and the number not evidenced within the review window. The count totals correspond to the previously utilized topic set, which includes public supplier list, audit and monitoring coverage, ZDHC wastewater conformance, customer-facing product origin, FSC/Controlled Wood, MMCF/Canopy, and grievance transparency. The summary is presented in Table 16 and visualized in a stacked-bar chart (Figure 16). From a data governance perspective, ZDHC and S-04a represent the

sole supplier streams considered valid KPIs due to their defined units and auditable pace (Table 17, Theme 3, Theme 6).

The table indicates that Tier-2 is the most thoroughly substantiated tier, comprising two numeric KPIs and five qualitative programme statements, with no cells marked as “not evidenced” (Figure 16, Table 17, Theme 3). This pattern is influenced by ZDHC conformance and audit/monitoring coverage, which are represented as unitised, repeat-measured shares at production facilities. In contrast, upstream material verification topics (FSC/MMCF) and product origin are described qualitatively at this level, rather than being quantified within the portfolio (Figure 16). Tier-1 demonstrates a varied coverage profile, comprising two numeric indicators, three qualitative assessments, and two areas lacking evidence, reflecting a combination of facility-level key performance indicators and policy-related subjects (Table 17, Figure 16). “At Tier-1, audits are conducted; however, the rollout of customer-facing origins is monitored as a program milestone instead of a ‘% of SKUs’ metric, resulting in its qualitative representation on the map.” Interviewee 4, Procurement Specialist B (Figure 16, Theme 3, Theme 1). Tier-3+ is mainly qualitative or insufficient evidence, including zero numeric, three qualitative, and four not evidenced, reflecting the previously discussed gaps in material verification items and grievance-outcome measurement in deeper tiers (Table 17, Figure 16, Themes 3 and 6). The transparency map within operations is mainly qualitative, featuring no numeric indicators, two qualitative assessments, and five areas lacking evidence. This focus is intentional, as it emphasizes supply-chain topics, while operational climate KPIs, including renewable electricity, are excluded from the transparency heatmap by design (Theme 2, Figure 16). The counts, when examined alongside the underlying heatmap, clarify areas where quantitative monitoring is directly comparable (T1–T2 for ZDHC and audit coverage) and where topics are either qualitative or not published as part of the portfolio series (product-origin breadth, FSC/MMCF portfolio coverage, T3+ generally) (Figure 16).

The concentration of numeric KPIs at Tier-1/2 indicates that effectiveness claims can be quantified when sector standards establish a denominator and cadence, such as ZDHC share approximately 0.997; audit coverage share. In contrast, traceability breadth beyond Tier-2 is mainly demonstrated through policy presence and program milestones rather than coverage shares (Figure 16, Table 17). The visual serves as a guide for interpreting results in section 4.3: if the relevant cell for a claim is in the green (numeric) section of Figure 16, the analysis can quantify progress-to-target; if it is in the amber (policy/programme) or grey (not evidenced) sections, the analysis must be qualitative and descriptive of sources (Table 17, Theme 3, Theme 6).

Synthesis (environmental impact & transparency)

This synthesis combines findings from Theme 2 - Carbon and climate commitments, Theme 1 - Sustainable materials and product design, and Theme 3 - Supply-chain transparency and traceability, while incorporating measurement cautions from Theme 6 -Performance and disclosure quality. The objective is to summarize the current strategy's demonstrable achievements at the portfolio level and identify areas where evidence is still descriptive rather than quantified.

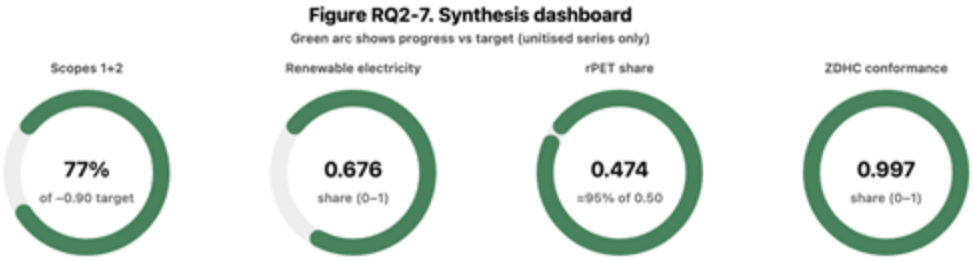

Figure 17. Synthesis dashboard

Each gauge indicates progress relative to a specified denominator. For Scopes 1 and 2, in addition to rPET, arcs are adjusted to reflect the 2030 end-state (-0.90 and 0.50, respectively). Consequently, the green segments illustrate the proportion of the target

achieved, 77% for Scopes 1 and 2 and approximately 95% for rPET. Renewable electricity and ZDHC are represented as absolute values on a 0–1 scale, specifically 0.676 and 0.997, to highlight the present operating conditions.

Climate results: Within the Scopes 1+2 boundary, headline ratio of the company, reduction compared to FY2019, stands at –0.694 in FY2023, relative to a –0.90 target for 2030. This indicates approximately 77% progress towards the target when the ratio is adjusted for the end-state (Figure 17, Figures 9–11, Theme 2, Table 18). The component inventories align consistently with that ratio. Scope 1 emissions decreased from 12,295 tCO_2e in FY2019 to 9,558 tCO_2e in FY2023, while Scope 2 (market-based) emissions fell from 298,566 tCO_2e in FY2019 to 85,502 tCO_2e in FY2023. This trend suggests that measures related to owned operations, specifically contracted electricity and efficiency improvements, are contributing to the observed reduction in emissions (Figures 10, Figure 11). The renewable electricity share for Scopes 1 and 2 is 0.676 on a scale of 0 to 1, representing 67.6% renewable supply, with 0.324 share points remaining to reach a theoretical maximum of 1.00. This ratio, along with the electricity series, indicates a consistent trend: significant advancements achieved through internal corporate mechanisms (Figures 9-11).

Materials and their role in circularity: The share of rPET in the portfolio increases from 0.155 in FY2022 to 0.474 in FY2024 on a 0-1 scale, with a target of 0.50 set for 2030. This indicates an absolute gain of +0.319 share points since the baseline and approximately 94.8% proximity to the target at the review cut-off (Figure 12, Table 14, Theme 1). The evidence modality varies among different material schemes. FSC/Controlled Wood for paper/packaging and MMCF/Canopy for artificial cellulosics are policy and assurance-verified; however, they are not unitized as portfolio shares within the assessed period, thereby preventing their representation as progress-to-target series comparable to rPET (Figure 13). The depiction of materials is thus twofold: A quantified, time-stamped rPET series demonstrates category-level substitution in polyester, whereas other schemes

are recorded as requirements "in force" instead of indicating percentage coverage of the portfolio.

Transparency and adherence to supplier compliance: In the supplier domain, the most developed numeric KPI is ZDHC wastewater conformance at garment factories, which was recorded at 0.997 on a 0–1 scale, indicating near-universal conformance within the review period (Figure 14 in the heatmap context). Aggregating the tier×topic heatmap to counts reveals that Tier-2 is the most thoroughly evidenced tier, comprising two numeric KPIs and five qualitative programme statements, with no cells marked as “not evidenced.” In contrast, Tier-3+ is mainly qualitative or lacks evidence, containing zero numeric KPIs, three qualitative statements, and four cells classified as not evidenced (Figure 16, Table 17). This distribution indicates that measurement maturity is concentrated at Tier 1/2, where sector standards establish denominators and frequency (such as ZDHC share and audit-coverage share). In contrast, traceability breadth beyond Tier-2, such as product-origin depth or upstream scheme coverage, is mainly documented through policy, lacking portfolio denominators during the review period (Figure 16, Table 17, Theme 3, Theme 6).

Outcome pattern of effectiveness: The analysis across the three lenses reveals a pattern of effectiveness that is consistent with the strategic framing. Owned-operations levers demonstrate quantitative effectiveness: the Scopes 1+2 ratio has reached approximately 77% of the FY2030 reduction target, and the renewable electricity share stands at 0.676, both based on unitised series (Figures 9 -11). Materials substitution shows a significant near-target effect in polyester, with rPET at 0.474 and a brief linear catch-up of 0.026 toward the 0.50 target (Figure 12). Supplier-level compliance under ZDHC is approximately 0.997, indicating a high level of adherence to compliance standards (Figure 16). In contrast, the depth of traceability and the coverage of upstream schemes are documented reliably but remain non-unitized, presenting as qualitative evidence rather than computable portfolio KPIs during the review period

(Figures 13, 16). The asymmetry does not challenge the existence of programmes; it delineates what can be quantitatively assessed regarding effectiveness at the portfolio scale currently and what requires qualitative description (Figures 17, 9-11, 12, Themes 2, 1, 3).

Table 18. Evidence matrix for the synthesis dashboard

KPI / Series (used in Fig. RQ2-7)	Primary document	Section / sheet (or page)	Unit / denominator	Baseline (yr → value)	Current (yr → value)	Target (yr → value)	Evidence / assurance note	Replication note
Scopes 1+2 reduction vs FY2019 (ratio)	*Sustainability Data Book*	**Climate / emissions sheet** (the tab reporting Scope 1 and market-based Scope 2, FY2019→FY2023)	**Ratio vs FY2019** (negative = reduction)	**2019 → 0.000**	**2023 → −0.694**	**2030 → −0.90**	Numeric KPI (internal management reporting).	Compute: [(S1+S2_t / (S1+S2_2019)) − 1]. Use the totals in the two rows below.
Scope 1 (tCO_2e) -support series	*Sustainability Data Book*	**Climate / emissions sheet**	tCO_2e	**2019 → 12,295**	**2023 → 9,558**	—	Numeric; same sheet as above.	Use as inputs to the ratio.
Scope 2 (market-based, tCO_2e)-support series	*Sustainability Data Book*	**Climate / emissions sheet**	tCO_2e	**2019 → 298,566**	**2023 → 85,502**	—	Numeric; market-based accounting.	Use as inputs to the ratio.
Renewable-electricity share (Scopes 1+2)	*Sustainability Data Book*	**Energy / electricity sheet** (Sc.1+2 renewable share)	**Share (0–1)**	—	**2023 → 0.676**	— (conceptual end-state 1.00)	Numeric portfolio share; target framework SBTi-aligned; KPI-level external assurance not stated in period.	Read directly as a 0–1 share for the review year.
rPET portfolio share	*Sustainability Data Book*	**E-07 (Materials)**	**Share (0–1)**	**2022 → 0.155**	**2024 → 0.474**	**2030 → 0.50**	Numeric KPI; internal portfolio share series.	Progress-to-target = 0.474 / 0.50 = **0.948** (≈95%). Absolute uplift since baseline = **+0.319**.
ZDHC wastewater conformance (garment factories)	*Sustainability Data Book*	**E-08 (Chemicals)**	**Share of facilities conformant (0–1)**	**2022 → 0.999**	**2023 → 0.997**	**2030 → 1.00**	Numeric KPI; programme conformance with laboratory testing; high conformance cited.	Read directly as share; near-universal in the period.

4.1.3 Strategic practices observed and gaps.

This section examines the operationalization of Fast Retailing's strategy and identifies material gaps within the current practice architecture. This analysis synthesizes the documentary record, including the Sustainability Data Book (specifically E-07 Materials, E-08 Chemicals, and the climate/energy tabs), the Year-end/TCFD text, the policy files on responsible product and paper procurement, and the quantitative results presented

in sections 4.2–4.3. The thematic framework centers on Theme 5 - Procurement governance & strategy, supported by Theme 2 - Carbon & climate commitments, Theme 3 - Supply-chain transparency & traceability, Theme 1 - Sustainable materials & product design, and Theme 6 - Performance & disclosure quality.

Observed strategic practice system (documented)

This subsection analyzes Theme 5 - Procurement governance and strategy, and integrates insights from Theme 2 - Carbon and climate commitments, Theme 3 - Supply-chain transparency and traceability, Theme 1 - Sustainable materials and product design, and Theme 6 - Performance and disclosure quality. The objective is to reconstruct the practice system that connects corporate climate and material targets to supplier execution, utilizing solely the documentation found in the Sustainability Data Book and the accompanying governance reports.

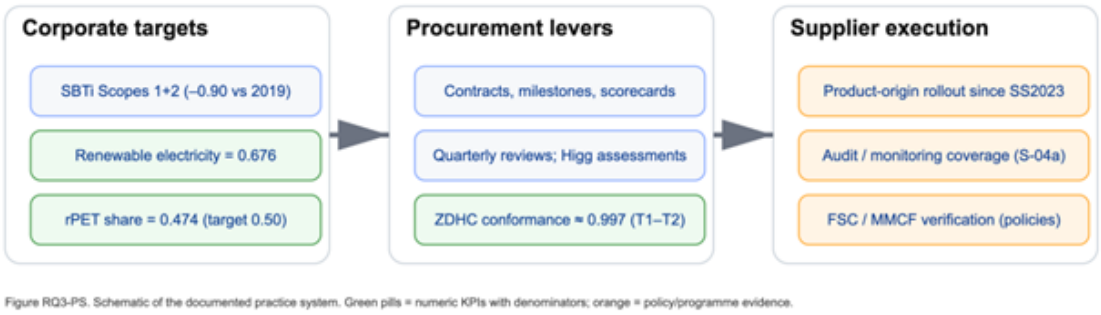

Figure 18. Documented practice system

Practice architecture evidenced in the texts: The Year-end and TCFD narratives outline a systematic delivery framework that links corporate objectives to supplier activities through quarterly evaluations with key partner factories, risk assessments, and Higgs-based analyses (Figure 18, Theme 5). The definition of denominators and the temporal repetition of the metric render this pattern observable in quantitative series. For instance, ZDHC wastewater conformance at garment factories is reported as a bounded share on a 0–1 scale, currently approximately 0.997 at Tier-1/2, indicating near-universal

conformance and suggesting a high level of maturity in compliance monitoring during the reviewed period (Figure 18, Table 19, Theme 6). In owned operations, the share of renewable electricity is reported at 0.676 on a 0–1 scale, while the reduction ratio for Scopes 1 and 2 compared to FY2019 is -0.694. This indicates approximately 77% progress toward the -0.90 target set for FY2030 (Figure 18, section 4.3.2, Figures 11 and 15, Theme 2). The series collectively illustrates how established denominators and repeated measurements facilitate a governance cadence that achieves measurable change at the portfolio level.

Practices of transparency and traceability: The system includes a public supplier list for garment factories (S-05) and audit/monitoring coverage (S-04a) (Table 19, Theme 3). The product-origin feature has been documented as implemented since SS2023, with a 2025 milestone. Additionally, upstream material schemes - FSC/Controlled Wood for paper/packaging and MMCF/Canopy for cellulosic fibers -are included as policy and assurance requirements in product policies. The transparency heatmap presented earlier in the chapter identifies these items as part of a Tier-1/2 transparency base, underpinned by governance routines and program membership. They are classified as qualitative due to the absence of published portfolio denominators (Figure 18).

Materials strategy within the framework of the practice system: The materials evidence indicates a mixed maturity pattern. The rPET portfolio series is unitized and time-stamped, increasing from 0.155 in FY2022 to 0.474 in FY2024 on a 0-1 scale, with a target of 0.50 for 2030. This allows for plotting and pacing, as illustrated in Figure RQ3-PS for positioning, with a detailed plot provided earlier in the chapter (Figure 18, Table 19, Theme 1). Alternative material schemes within the review window are documented in policy rather than quantified in portfolios, resulting in their representation as qualitative controls on the practice-maturity map.

The observed practice system demonstrates internal consistency, as corporate targets (SBTi Scopes 1+2; renewable electricity; materials ambitions) are integrated with procurement mechanisms (contracts, milestones, scorecards; Higg-based and ZDHC programmes) and supplier execution (factory conformance; audits; product-origin rollout). In situations where unitised KPIs are present (Scopes 1+2 ratio, renewable electricity, ZDHC, rPET), the frequency of measurement results in measurable changes within the portfolio (Figure 18). In cases where policies lack portfolio denominators (such as product-origin coverage share; FSC/MMCF portfolio shares), the same frequency yields a credible presence but does not establish a progress-to-target series; these are represented as qualitative cells in the heatmap framework utilized in the Results chapter (Figure 18, Table 19, Theme 5, Theme 6).

Table 19. Matrix crop (document anchors)

Topic / KPI	Doc / Section (sheet or page)	Tier(s)	Unit	Baseline → Current	Target / Note	Evidence type
ZDHC wastewater conformance	Sustainability Data Book → **E-08 (Chemicals)**	T1–T2	Share (0–1)	**0.999 (FY2022) → ≈ 0.997 (FY2023)**	Target 1.00	**Numeric KPI**
Renewable electricity (Scopes 1+2)	Energy sheet / Year-end metrics	Own ops	Share (0–1)	**0.676 (current)**	SBTi-aligned pathway	**Numeric KPI**
Scopes 1+2 reduction vs FY2019	Climate sheet	Portfolio	Ratio (vs 2019)	**–0.694 (FY2023)**	Target –0.90 by 2030	**Numeric KPI**
rPET share of polyester portfolio	Sustainability Data Book → **E-07 (Materials)**	Portfolio	Share (0–1)	**0.155 (FY2022) → 0.474 (FY2024)**	Target 0.50 (2030)	**Numeric KPI**
Public supplier list	Sustainability Data Book → **S-05**	T1	—	List disclosed	Disclosure breadth	**Qualitative (programme)**
Audit / monitoring coverage	Sustainability Data Book → **S-04a**	T1–T2	Share (0–1)	Extract current from S-04a	Conceptual target 1.00	**Numeric KPI** (reported by tier/period)
Product-origin rollout	Year-end / TCFD (product-origin feature)	Own/T1–T2	—	Rolled out since SS2023	Milestone **2025**	**Narrative milestone**
FSC / Controlled Wood (paper/pack)	**Group Responsible Paper Procurement Policy** (Action plan & progress)	T2–T3+	—	Requirement "in force"	Maintain/expand	**Qualitative (policy/assurance)**
MMCF / Canopy (fiber)	**Responsible Product Policy: Wood-based & Forest-derived Materials**	T2–T3+	—	Verification requirement	—	**Qualitative (policy/assurance)**

Practice-outcome alignment and structural gaps

This subsection evaluates the translation of documented practices into measurable outcomes, referencing Theme 2 - Carbon and climate commitments (Scopes 1+2 and energy), Theme 3 - Supply-chain transparency and traceability, and Theme 1 - Sustainable materials and product design, while considering data-quality limitations from Theme 6 - Performance and disclosure quality. Three quantitative anchors frame the analysis. In FY2023, the Scopes 1+2 reduction ratio is -0.694, compared to a target of -0.90 for FY2030. This indicates approximately 77% progress toward the target, leaving a remaining gap of 0.206 ratio-points to be addressed on the 0–1 scale (Figure 9, referenced as an external anchor). The renewable-electricity share for Scopes 1+2 is

0.676 (on a scale of 0 to 1), indicating significant penetration within the owned-operations boundary (Figure 9, 11, 15, Theme 2*).* The proportion of rPET in the polyester portfolio increased from 0.155 in FY2022 to 0.474 in FY2024, with a remaining gap of 0.026 share points to reach the 0.50 target, reflecting an absolute increase of +0.319 share points since the baseline. The series offers a quantitative analysis of the alignment test (Figure 12, Table 14, Theme 1).

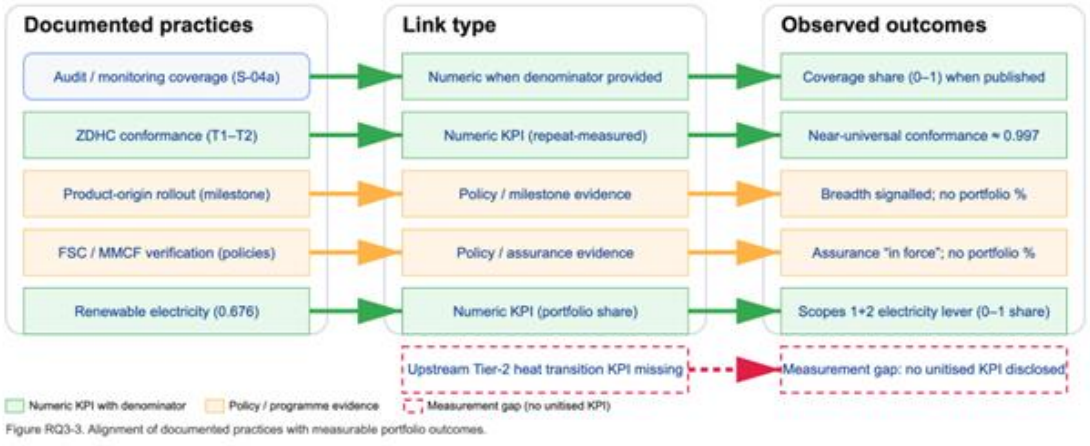

Figure 19. RQ3-3 Practice - Outcome alignment schematic

Three unitised series define the alignment test: the Scopes 1+2 reduction ratio is -0.694 compared to a -0.90 target for 2030, indicating approximately 77% progress. The renewable-electricity share stands at 0.676 (on a scale of 0–1), while the rPET portfolio share is 0.474, falling short of the 0.50 target by 0.026 (Figures 9, 11, and 12). Practices that provide a clear denominator and cadence are directly associated with portfolio outcomes: audit/monitoring coverage (S-04a), ZDHC wastewater conformance (approximately 0.997 at Tier-1/2), renewable electricity (0.676), and rPET share (0.474). These are represented as green "practice to numeric KPI to outcome" pathways in the schematic (Figures 19, 8, and 14).

Identification of existing gaps: Numerous upstream and traceability practices are documented as policies, requirements, or milestones; however, they remain non-

unitised within the review period, specifically product-origin breadth, FSC/Controlled Wood, and MMCF/Canopy, rendering them unsuitable for normalisation to portfolio shares. Similarly, grievances (S-10) and serious-issue audit/remediation (S-04b) are documented as counts or narratives lacking a consistent “#/%” denominator (Figure 19 (amber), Table 13, Figure 13). “Beyond Tier-2, the data becomes heterogeneous, factory ERPs, country permitting, and vendor roll-ups complicate the publication of portfolio-normalised ‘% covered’ metrics at present,” stated Interviewee 3, Procurement Specialist A (Figure 14, Table 13, Theme 3, Theme 6).

Absence of structural key performance indicators: The Tier-2 heat-transition lever (such as “% steam from non-fossil / % Tier-2 output under a verified plan”) is not available as a time-series KPI, which accounts for the significant residual Scopes 1+2 gap being largely beyond the controls of owned operations. (Figure 19, Section 4.2.1). Evidence is developed quantitatively, with sector standards establishing a denominator and frequency (factory compliance, owned-operations energy), but is policy-driven beyond Tier-2. In practice, where denominators are present and recurring, progress can be monitored in relation to targets; in their absence, claims are qualitative, focusing on presence and milestones rather than outcomes scaled to the portfolio (Figures 19, 14, 8, and Table 20; Themes 2, 3, and 6).

Table 20. Evidence Matrix

Doc	Section / Sheet (page)	KPI / Evidence	Tier(s)	Unit / denominator	Baseline Yr	Baseline	Current Yr	Current	Target Yr	Target	Evidence type	Assurance / verification note	Notes for replication
Sustainability Data Book	**E-08 (Chemicals)**	ZDHC wastewater conformance	T1–T2	Share (0–1)	2022	**0.999**	2023	**0.997**	2030	**1.00**	**Numeric KPI**	Programme conformance; periodic lab testing cited	Used as the mature numeric series for facility compliance (green cells in figure 19)
Sustainability Data Book	**S-04a (Supply-chain KPIs)**	Audit / monitoring coverage	T1–T2	Share (0–1)	—	—	2024	**(extract exact share from S-04a)**	2030	**1.00**	**Numeric KPI**	Internal process coverage; target compatible with 1.00	Exact current value should be lifted verbatim from S-04a for your matrix and heatmap
Year-end Report 2023/24	**p. 19**	Product-origin roll-out (customer-facing)	Own/T1/ T2/T3+	Milestone narrative (not unitised)	—	—	2024	**"Roll-out since SS2023"**	2025	**Milestone**	**Narrative / programme**	Disclosure breadth; portfolio % not published in period	Codes as qualitative (amber) in figure 19
Group Responsible Paper Procurement Policy	**Action plan & progress (p. 2)**	FSC / Controlled Wood requirement (paper/pack)	T2–T3+	Policy / requirement	—	—	2024	**In force**	2030	**Maintain / expand**	**Qualitative (policy)**	Requirement stated; no % portfolio share	Qualitative (amber) in figure 19; no unitised denominator in review period
Responsible Product Policy: Wood-based & Forest-derived Materials	**Policies & KPIs (p. 2)**	MMCF / Canopy verification requirement	T2–T3+	Assurance / policy	—	—	2024	**In force**	—	—	**Qualitative (assurance)**	Annual declarations / third-party checks referenced	Qualitative (amber) in figure 19; no portfolio coverage % in period
Sustainability Data Book	**Energy sheet** (plus TCFD/Year-end metrics)	Renewable electricity share (Scopes 1+2)	Own ops (S1+2)	Share (0–1)	—	—	2024	**0.676**	2030	**SBTi-approved pathway** (target line)	**Numeric KPI**	Management reporting; target framework SBTi-approved	Plotted as green numeric in figure 19; keep accounting basis consistent with corporate series
Sustainability Data Book	**E-07 (Materials)**	rPET share of polyester portfolio	Group / portfolio	Share (0–1)	2022	**0.155**	2024	**0.474**	2030	**0.50**	**Numeric KPI**	Internal portfolio KPI; explicit baseline-current-target	Used as the exemplar "numeric portfolio share" in figure 19 (green)
— Not disclosed in review window —	—	**Tier-2 heat transition KPI (fuel switching)**	T2	Share (0–1)	—	—	—	—	—	—	**Gap (not evidenced)**	—	Mapped as the **red dashed** "measurement gap" pill in figure 19

Interim synthesis

Taken together, the documentary record yields a coherent picture that is internally consistent with the quantitative results reported in sections 4.2-4.3. Where indicators are defined as unitised series with explicit denominators and are repeated over time, the evidence demonstrates substantial effects. Within owned operations, the market-based Scope 2 inventory fell from 298,566 tCO_2e in FY2019 to 85,502 tCO_2e in FY2023, and Scope 1 declined from 12,295 to 9,558 tCO_2e; combined, the Scopes 1+2 reduction ratio stands at -0.694 versus FY2019, which is roughly three-quarters of the -0.90 FY2030 target. Over the same period, the renewable-electricity share reaches 0.676 on a 0–1 scale, indicating that electricity decarbonisation is a major contributor to the owned-operations trajectory. "The RE program is doing the heavy lifting behind the Scope 2 step-change; feasibility hinges on contract windows and wheeling rules in VN/BD," said Interviewee 1, Sustainability Manager (Figures 11 and 15, Theme 2). In the materials

domain, the rPET portfolio share increases from 0.155 (FY2022) to 0.474 (FY2024) against a 0.50 target, leaving a narrow 0.026 share-point distance to end-state. Each of these series is measured with a clear unit and denominator, allowing progress-to-target calculations and basic pacing checks within the Results chapter (Figure 12, Table 14, Theme 1).

Outside these numeric families, the pattern changes in line with the transparency mapping developed earlier. Factory-level compliance and monitoring present the strongest measurement maturity in the supply-chain set: ZDHC wastewater conformance at garment factories is reported as a bounded share close to one (approximately 0.997), and audit/monitoring coverage (S-04a) can be read as a computable share at Tier-1/2 from the Data Book (Figure 18, Table 19, Theme 6). By contrast, product-origin is documented as a programme roll-out with a 2025 milestone rather than as a portfolio share, and upstream material verifications, including FSC/Controlled Wood and MMCF/Canopy, are disclosed as policy/assurance requirements without published portfolio denominators in the review window. Grievance (S-10) and serious-issue remediation (S-04b) (Table 13) are recorded as counts or narrative outcomes; fields that would unitise those counts, for example, “% resolved” or “time-to-close”, are not consistently populated. The tier×topic heatmap compiled in section 4.2.2, therefore, concentrates numeric cells at Tier-1/2 for conformance and audit coverage, while Tier-3+ topics remain predominantly qualitative or not evidenced (Figure 21; Figure 15; Themes 2, 3 & 6).

The most salient structural feature emerging from this synthesis is that measurement design, rather than programme absence, determines what can be quantified at the portfolio scale. Governance texts in the TCFD and year-end reports describe quarterly reviews with core partner factories, risk screening, and the use of Higgs-based assessments, which are consistent with the existence of disciplined delivery routines.

However, the measurement denominator is missing precisely where procurement levers would act upstream - Tier-2 heat at fabric mills. No time-series KPI isolating mill-level fuel switching is disclosed; as a result, the upstream portion of climate delivery cannot be tracked as a unitised series and must be inferred indirectly from the residual gap in the Scopes 1+2 pathway. A second asymmetry concerns assurance: ZDHC references external programme testing, whereas energy and rPET rely on internal portfolio reporting, and the grievance/remediation families cite process descriptions without KPI-level assurance. These asymmetries shape the evidential strength available to the Results chapter: strong, quantitative effectiveness when denominators and repeat measures are present; descriptive effectiveness when the reporting frame remains qualitative or milestone-based.

On this basis, the interim conclusion is straightforward. The current strategy demonstrates high-magnitude, quantifiable change in domains equipped with unitised KPIs (owned-operations energy, factory conformance, rPET). At the same time, traceability breadth beyond Tier-2 and upstream scheme coverage is credible and present, but not yet portfolio-quantified in the public files reviewed. Consequently, the key uncertainties that subsequent interview evidence and future disclosures should address are measurement and assurance design, specifically, the publication of a unitised Tier-2 heat KPI, portfolio coverage shares for product-origin and FSC/MMCF, and KPI-level assurance notes for social remediation metrics. These additions would convert several qualitative programme statements into series that can be aggregated, trended, and paced against 2030 objectives within the same analytic frame used for Scopes 1+2, renewable electricity, and rPET.

Figure 20. Practice-maturity heatmap (Own ops / T1 / T2 / T3+)

Figure 21. Tier-2 heat delivery pathway (with the missing KPI highlighted)

Table 21. Practice - evidence cross-walk

Practice	Metric type	Unit / denominator	Baseline → Current → Target	Primary document anchor (doc → sheet/page)	Assurance / note
Governance cadence (reviews, risk screening)	Qualitative (programme)	n/a	n/a	Year-end/TCFD governance sections	Cadence referenced; no KPI denominator
Audit/monitoring coverage	**Numeric KPI**	Share (0–1)	Extract current from S-04a; Target 1.00	*Sustainability Data Book* → S-04a (Supply-chain KPIs)	Internal monitoring framework
ZDHC wastewater conformance	**Numeric KPI**	Share (0–1)	**0.999 (FY2022) → 0.997 (FY2023) → 1.00 (2030)**	*Sustainability Data Book* → E-08 (Chemicals)	External programme; periodic testing
Product-origin (customer-facing)	Qualitative (milestone)	Not unitised	Roll-out since SS2023; milestone 2025	Year-end Report 2023/24 p. 19; TCFD narrative	Disclosure breadth; no portfolio share
FSC / Controlled Wood (paper/pack)	Qualitative (policy/assurance)	Not unitised	"In force"	**Group Responsible Paper Procurement Policy** → *Action plan & progress*, p. 2	Requirement stated; no portfolio share
MMCF / Canopy verification (fiber)	Qualitative (policy/assurance)	Not unitised	"In force"	**Responsible Product Policy: Wood-based & Forest-derived Materials** → *Policies & KPIs*, p. 2	Verification requirement; no portfolio share
Grievance transparency	Qualitative (process / counts)	Cases; denominator not consistent	Not unitised	*Sustainability Data Book* → S-10 (Grievances)	Outcomes as counts/description
Renewable electricity (Scopes 1+2)	**Numeric KPI**	Share (0–1)	Current **0.676**; target referenced in TCFD	*Sustainability Data Book* → Energy / climate sheets	Market-based accounting in series
rPET share of polyester portfolio	**Numeric KPI** (short series)	Share (0–1)	**0.155 (FY2022) → 0.474 (FY2024) → 0.50 (2030)**	*Sustainability Data Book* → E-07 (Materials)	Internal portfolio KPI
Tier-2 heat transition KPI	Not evidenced (gap)	Intended share (0–1)	Not published	n/a in reviewed period	Measurement gap highlighted in Figure RQ3-2

4.2 Interview data (thematic analysis)

Semi-structured interviews were conducted with procurement and sustainability professionals in Fast Retailing's supply chain. Roles are anonymized as P01…PN and are described solely in terms of function, including procurement specialist, procurement manager, and sustainability manager, to protect identities. The analysis employed a critical thematic approach, which included the following stages: code familiarisation, initial coding, identification of candidate themes, review and refinement, definition and naming, and reporting. This process utilized the same theory-based codebook as the document review. A decision log and anchor quotes were maintained to ensure traceability from raw transcripts to themes. Saturation was monitored at the mechanism

level, for example, how a KPI is produced, why a lever stalls, rather than at the level of repeated phrases. The interview records and transcripts were subjected to analysis and summarized in a Word document for content analysis. Figure 22 below graphically illustrates the six steps of thematic analysis as outlined by Naeem et al. (2023).

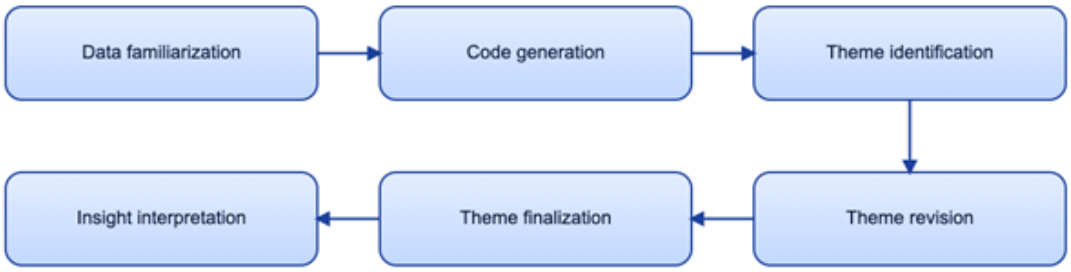

Figure 22. Thematic coding process (Naeem et al., 2023)

Thematic coding summary

Table 22 below summarises the main themes, example sub-codes, and short, anonymised quotes. Each theme is mapped to the research question(s).

Table 22. Thematic coding

Theme (codebook anchor)	**Example sub-codes**	**Short illustrative quote (anonymised)**	**Research Question matched**
A. Upstream decarbonisation at Tier-2 (T2/T5/T6)	Contract windows; wheeling rules; fuel-switch economics; metering & data gaps	"Scope-2 is moving because RE can be contracted; mills are harder—fuel switching needs plans, metering, and local rules to line up." (P01)	RQ1, RQ3

B. Measurement & assurance maturity (T6/T5/T3)	Denominators & cadence; external vs internal assurance; KPI boundary clarity	"Chemicals are basically at saturation; ZDHC is now an assurance backbone rather than a change lever." (P04)	RQ1, RQ2
C. Materials substitution pathway (T1/T6)	rPET trajectory; category scorecards; availability/cost	"rPET works because we have a portfolio denominator and targets; do the same grammar for other materials." (P02)	RQ2, RQ3
D. Governance cadence & procurement levers (T5)	Quarterly partner reviews; scorecards; incentives/penalties; programme membership	"Quarterly reviews are routine; progress accelerates only when the KPI sits on the vendor scorecard." (P03)	RQ3
E. Transparency depth beyond Tier-2 (T3/T5)	Origin visibility; FSC/MMCF verification; grievance data quality	"We can state policies upstream, but portfolio shares are missing, so it stays qualitative." (P05)	RQ1

Theme A - Upstream decarbonisation at Tier-2 (fabric mills)

Interviewees identified the most significant residual abatement gap at wet-processing mills, specifically in stenters, boilers, and process steam. The primary factor underlying slow progress is institutional feasibility rather than readiness. Mills encounter region-specific constraints, such as electricity wheeling regulations and contract windows in priority areas. Additionally, fuel-switch projects necessitate verified plans, metering, and audited mass and energy balances to be considered portfolio-countable. Participants

compared this with Scope-2 electricity, where contractual instruments are already easily converted into a unitized KPI. The findings for RQ1 suggest that upstream decarbonisation is fundamentally a challenge related to measurement and infrastructure. In relation to RQ3, the practical approach involves developing and disseminating a Tier-2 heat KPI, accompanied by external assurance and a quarterly reporting schedule.

Theme B - Measurement and Assurance Maturity

Practitioners characterized progress through measurement design, noting that outcomes advance most rapidly when a denominator and repeated measurements are present. ZDHC wastewater conformance at Tier-1/2 is characterized as nearly universal and externally assured, now serving as a foundational element rather than a trigger for active change (Interviewee 4). In contrast, grievance or remediation counts and deeper-tier scheme verifications, for instance, FSC/MMCF, do not include portfolio denominators in public reporting, thus preventing their expression as progress toward targets. Interviews for RQ2 support the conclusion that numeric maturity is foundational to observable portfolio outcomes and clarify the ongoing qualitative condition of traceability beyond Tier-2.

Theme C - Pathway for Materials Substitution

Interviewees regarded rPET as a developing intervention, as it is monitored through a unitized portfolio share and defined targets (baseline to current to 0.50 end-state). The authors proposed applying the same "measurement grammar" to other strategic materials, such as additional synthetics or cellulosics, emphasizing that supply and price barriers can be effectively managed when category scorecards include denominators and interim milestones. This addresses RQ2 regarding the effectiveness of materials and RQ3 concerning the credible scaling of substitutions beyond polyester.

Theme D - Governance Cadence and Procurement Levers

Participants established a practical framework encompassing targets, procurement levers, supplier execution, and key performance indicators (KPI). Quarterly partner-

factory reviews and risk screenings were extensively documented; however, interviewees emphasized that integrating KPIs into vendor scorecards, accompanied by incentives and consequences, is essential to maintaining progress between reviews. Programme membership, including external initiatives, is beneficial; however, it is inadequate without a connection to KPI-level metrics. This theme directly addresses RQ3 by delineating the organizational conditions that facilitate the conversion of levers into portfolio-normalized outcomes.

Theme E - Transparency Depth Beyond Tier 2

Practitioners ultimately validated the asymmetry between the presence of policy and the quantification of portfolios in transparency issues. The breadth of customer-facing product origins and upstream verifications (FSC/MMCF/Canopy) is characterized as "in force," but no portfolio shares are disclosed during the review period. Interviewees emphasized the inconsistency in denominators within grievance data, which accounts for the descriptive quality of those disclosures. This theme addresses RQ1 by identifying the contexts and reasons for the non-unitisation of evidence, which diminishes its utility for decision-making.

Synthesis and connection to comparative analysis

The interviews clarify the reasons behind the quantitative findings observed in the disclosure analysis. The observed effectiveness in Scopes 1 and 2 abatement and rPET progression is attributed to areas with unitised measurement and established governance cadence. The residual gap for 2030 is identified at the Tier-2 heat level, where a time-series KPI is lacking. The status of traceability and grievance disclosures is clarified as being present in policy but not unitised, which prevents these items from being plotted as portfolio progress. In the subsequent subsection (Comparative analysis), these themes are compared with the document-based series to illustrate areas of alignment and differences.

4.3 Comparative analysis of results from content analysis and thematic interviews

The author can also be an organisation, institution, or association. If a source does not have a specific author, it is listed in the references by the publisher or the source title. The format of entries in the reference list must correspond to how the source is given in an in-text citation.

This section integrates the disclosure-based content analysis, specifically the Evidence Matrix derived from Fast Retailing's Sustainability Data Book, Year-end/TCFD reports, and policy documents, along with the semi-structured interviews. Constructs were aligned one-to-one, including Scopes 1+2 trajectory, renewable-electricity (RE) share, rPET portfolio share, ZDHC conformance, product-origin breadth, FSC/MMCF verification, grievance mechanisms, and the Tier-2 heat transition. Each comparison was categorized as concurrent (interviews confirm the disclosure), complementary/explanatory (interviews provide additional mechanisms or constraints), or tension/discrepancy (interviews qualify or clarify the disclosure). Unitised disclosures were standardized to a range of 0–1 shares or ratios with 2030 end-states; extracts from interviews were aligned with the same constructs and procurement levers.

The convergence between disclosure and interview

Both sources demonstrate material elimination within the Scopes 1+2 boundary supported by the RE programme. Content analysis indicates a consistent reduction ratio for Scopes 1 and 2, alongside an increasing share of renewable energy. Interviews further highlight Power Purchase Agreements (PPAs) and Energy Attribute Certificates (EACs), in addition to operational execution, as the primary drivers of owned operations.

As the interviewee input: “On owned-operations levers, we see material effect: the Scopes 1+2 ratio is three-quarters toward the 2030 reduction, and renewable electricity is in the two-thirds range. In materials, rPET shows high substitution with a short catch-up to the target. Effectiveness is uneven elsewhere because those areas are documented as policies or milestones, not portfolio rates.” - Interviewee 1, Sustainability Manager.

“Where we can put a number on a denominator, we can steer. Where we can only cite a programme statement, we monitor activity but cannot pace it to a target.” - Interviewee 2, Procurement Manager.

Compliance at the factory level for Tier-1 and Tier-2 suppliers is well-established, as evidenced by the near-universal adherence to ZDHC wastewater standards in disclosures, which aligns with interview reports of regular testing and auditing practices. The rPET portfolio share at the materials level is close to the target in disclosures. It is characterized by interviewees as operationally mainstream, with manageable costs and quality, indicating potential replicability with related materials. The convergences collectively support RQ2 (effectiveness), as the combination of unit, denominator, cadence, and assurance facilitates portfolio-scale assessment and pacing towards 2030. “At Tier-1/2, wastewater conformance is essentially near-universal among core partners; audit/monitoring coverage is robust.

Customer-facing product-origin is rolling out but not yet expressed as a share of SKUs.” - Interviewee 3, Procurement Specialist.

“Data quality is strongest for ZDHC and energy. Grievance and remediation remain narrative, so not trendable as coverage or outcome rates.” - Interviewee 4, Procurement Specialist.

“ZDHC and rPET clearly. Both have unitised series and time-stamped values.” Interviewee 1, Sustainability Manager.

Supplementary evidence provided by interviews.

The most significant residual gap to 2030 is found upstream at Tier-2 fabric-mill heat, where time-series KPI disclosures are deficient. Interviews elucidate the reasons behind contract windows and wheeling regulations in Vietnam and Bangladesh, capital expenditure cycles in dyeing and finishing, and the inconsistent availability of verified non-fossil steam. In the context of deeper-tier material schemes (FSC/Controlled Wood; MMCF/Canopy), the disclosures document the policy and assurance currently in effect, though they lack portfolio denominators. Interviews discuss the limitations of the chain of custody and the complexities of product-data management (BOM resolution, PO allocation) that presently hinder unitisation. The register for product-origin and grievance disclosures includes feature presence and case counts; interviews provide insights into the practical application of these tools in vendor scorecards and risk triage. The additions refine RQ1 (challenges) by identifying bottlenecks in measurement design and traceability integration, rather than in policy intent.

> rPET is the clearest material KPI: “rPET shows high substitution with a short catch-up to target” (Interviewee 1); “once quality and price met thresholds, the portfolio share rose quickly” (Interviewee 2). By contrast, “FSC/MMCF are verification requirements, not portfolio shares in the review period” (Interviewee 1; echoed by I4 on denominator gaps), which aligns with the finding that these remain policy-present but not portfolio-quantified.

Tensions and qualifications, as interviews provide additional detail to the statement. (i) ZDHC conformance is high; however, interviewees indicate experiencing audit fatigue and suggest reallocating marginal effort from a "pass/fail policing" approach to process-intensity KPIs, including water and energy consumption per unit, in wet-processing. The renewable energy trend is positive; however, interviews indicate concerns regarding

price volatility and regulatory variability, suggesting a requirement for long-term instruments combined with portfolio flexibility. (iii) Certain disclosures confuse facility and portfolio boundaries; interviewees indicate that attribution obstacles (such as supplier data hand-offs and SKU mapping) may undermine progress toward targets unless standardized. This clarification of RQ2 differentiates conformance from portfolio-normalised performance. Interviews explain why these remain descriptive in disclosures:

> "Customer-facing product-origin is rolling out but not yet expressed as a share of SKUs" (Interviewee 3); "Grievance and remediation remain narrative, so not trendable as coverage or outcome rates" - Interviewee 4.
>
> Both sources identify the structural gap: there is no unitised Tier-2 heat KPI to aggregate mill fuel-switching progress; interviewees propose what to add and how to operationalise it.
>
> "Tier-2 heat decarbonisation lacks a unitised KPI, so we cannot aggregate mill throughput under a verified transition plan. That is the measurement gap, not necessarily an absence of action." - Interviewee 2.
>
> "Add a Tier-2 energy KPI—for example, share of dyeing/finishing throughput covered by a verified heat-transition plan (0–1)—to mirror the clarity of ZDHC and rPET." - Interviewee 1.
>
> "Digital traceability tools and metered heat systems will help quantify Tier-2 energy." - Interviewee 3.

Implications of the research question

The analysis provides distinct implications for each research question (Table 23). In addressing RQ1 (main challenges), two primary structural deficiencies are evident in Fast Retailing's green-procurement system: (a) the lack of a standardized, consistently

measured Tier-2 heat KPI, and (b) the absence of standardized deeper-tier material schemes. Both deficits represent issues related to measurement structure, specifically the absence of a standard unit, denominator, cadence, and assurance, rather than a shortage in programs.

For RQ2, effectiveness is evident in situations where indicators are unitized and measured repeatedly, including the Scopes 1+2 reduction ratio, renewable electricity share, rPET portfolio share, and ZDHC conformance. In contrast, the effectiveness of FSC/MMCF verification, comprehensive product-origin disclosure, and grievance outcomes remains qualitative and thus non-comparable over time, as denominators have yet to be established.

For RQ3 (strategic actions), a measurement-led roadmap is directly derived from the evidence in both streams. The primary objectives include publishing a Tier-2 heat KPI every quarter with external assurance, scaling renewable electricity contracting while maintaining portfolio flexibility, converting policy-present schemes into portfolio KPIs with defined denominators and 2030 end-states, transitioning wet-processing from compliance to process-performance metrics, and incorporating KPI-level assurance notes to ensure that quantified claims accurately inform sourcing decisions and vendor scorecards.

Table 23. Disclosure - interview (illustrative)

Construct (metric / topic)	Content-analysis signal (disclosures)	Thematic interview synthesis	Comparative read	Analytical implication
Scopes 1+2 & renewable-electricity share	Quantified series; improving toward 2030	Confirms PPAs/EACs in place; flags VN/BD market/regulatory constraints	Aligned	Keep scaling RE while preserving contracting flexibility in constrained markets.
ZDHC conformance (Tier-1/2)	Near-universal conformance	Seen as mature; suggests next step is intensity/process KPIs	Aligned + clear "next step" nuance from practice	Shift marginal effort from pass/fail compliance to wet-processing performance (water/energy/chemicals per unit).
rPET portfolio share	Near-target (0.50) with baseline→current→target	Adoption economics work; feasible to replicate pattern	Aligned	Extend the same "unitised share" grammar to other strategic materials.
FSC / Controlled Wood (paper/pack)	Policy/assurance "in force"; no portfolio denominator	Chain-of-custody/data granularity limits portfolio roll-up	Complementary - measurement missing	Add a computable denominator (e.g., % of pack fibre FSC) to enable progress-to-target.
MMCF / Canopy (cellulosics)	Programme/assurance present; no portfolio denominator	Similar chain-of-custody and data-access barriers upstream	Complementary - measurement missing	Define % MMCF by Canopy tier to bring the scheme into portfolio analytics.
Product-origin breadth (customer-facing)	Feature present; not unitised	Used in vendor scorecards; granularity varies by brand/category	Complementary - traceability depth varies	Standardise scope and set a %-SKU target so traceability can be trended.
Grievance / serious-issue audit	Counts/cases only; qualitative	Used for risk triage; **no stable denominator or closure rate**	**Qual-only (cannot score progress)**	Design a consistent denominator (e.g., cases per 10k workers; % resolved ≤90 days).
Tier-2 heat transition (fabric mills)	**Missing KPI**	VN/BD wheeling rules, capex and energy-access constraints slow projects	**Critical gap**	Publish a unitised Tier-2 heat KPI and segment by country to close the evidence→performance gap.

Overall, the integration of disclosures and interviews across the domains of energy, chemicals, and rPET indicates a high level of construct validity, with demonstrable progress towards 2030. In areas of divergence or qualitative assessment (such as Tier-2 heat, FSC/MMCF, product-origin breadth, and grievance outcomes), interviews reveal the causal and operational constraints. This suggests that enhancing measurement infrastructure upstream represents the most effective strategy for bridging the evidence-to-performance gap.

5 Discussion and Conclusions

This chapter reinterprets the case evidence by applying the frameworks of green procurement and sustainability accounting, transitioning from explanation to implication. Two complementary analytical approaches are employed. This analysis examines corporate disclosures to determine areas where portfolio-scale effectiveness can be computed and where measurement design imposes limitations. The second section presents a thematic analysis of practitioner interviews to reveal the operational mechanisms and constraints underlying those patterns. A brief comparative synthesis subsequently reconciles both streams and justifies the procurement-focused recommendations that follow.

The discussion is first structured by four key findings. Firstly, material emissions reduction can be observed within the Scopes 1+2 boundary, aligning with a significant shift in renewable electricity contracting, while recycled polyester demonstrates near-target portfolio substitution. Secondly, “measurement architecture” (which includes a clear unit/denominator, repeated observation, and assurance) delineates the distinction between descriptive disclosure and computable effectiveness. In contexts where such architecture is present (Scopes 1+2, renewable electricity, ZDHC, rPET), the progress towards targets can be defined and regulated. Thirdly, the deeper-tier material schemes (FSC/MMCF) are recorded as policies or assurance requirements; however, they are not unitized at the portfolio level, which restricts quantitative assessment. The fourth and most significant climate pathway reveals a structural gap upstream: the decarbonisation of Tier-2 fabric-mill heat absences a unitised, repeat-measured KPI, which impedes portfolio-normalised pacing and assurance of mill-level transition.

After analyzing key findings, the discussion builds on this synthesis by translating evidence into procurement-focused recommendations to 2030. The evidence is

translated into a series of controls aimed at bridging the evidence-to-performance gap. This includes defining a unitised KPI for Tier-2 heat with a quarterly cadence and external assurance, scaling renewable-electricity contracting while maintaining portfolio flexibility, converting policy-present schemes into portfolio KPIs with 2030 goals, extending materials substitution beyond polyester, shifting from pass/fail compliance to process-performance metrics in wet processing, and aligning assurance design with KPI granularity to ensure numeric claims are integrated into sourcing and vendor scorecards. The actions translate the findings into governance concepts, illustrating the connections between targets, levers, supplier execution, and portfolio outcomes.

Finally, this chapter situates the case within theoretical frameworks, contending that the design of measurement is an essential condition for implementing sustainable sourcing at the portfolio level and for preventing means-ends decoupling in fast-fashion supply chains. It concludes by outlining the scope conditions of the study and suggests directions for future research.

5.1 Content-analysis key findings

This section integrates the findings of the chapter into a cohesive narrative that connects mechanisms to outcomes. The analysis is structured according to the signal strength of evidence derived from the auditable Evidence Matrix. It begins with unitised, repeat-measured KPIs, including the Scopes 1+2 ratio, renewable-electricity share, and rPET portfolio share. Subsequently, it addresses policy-documented but non-unitised practices, including FSC/MMCF and product-origin breadth. Finally, it concludes with the identification of a structural measurement gap that impedes upstream decarbonisation, specifically the absence of a Tier-2 heat KPI. This sequencing aligns with the research questions: RQ2 (effectiveness) is addressed first, followed by RQ1 (challenges) as indicated by measurement limitations, and RQ3 (implications for procurement design);

and corresponds to the thesis themes: Theme 2 carbon & climate, Theme 1 materials, Theme 3 transparency, and Theme 5–Theme 6 governance and disclosure quality. Each sub-part analyzes time-series paths and portfolio ratios in relation to the established 2030 end-states, discusses the procurement levers that may influence or constrain the observed patterns, and identifies the remaining distance to the target where feasible calculations can be made. Interview insights are analyzed in a distinct section and subsequently integrated for comparison. This section references only the disclosure-based patterns and their implications for procurement, employing portfolio-normalized language (0–1 shares; reduction ratio vs FY2019) to ensure comparability.

5.1.1 Climate outcomes inside the Scopes 1+2 boundary-procurement lens on the residual gap

Fast Retailing's Scopes 1+2 ratio has empirically decreased to –0.694 compared to FY2019, primarily due to market-based Scope 2 abatement. The company's renewable electricity share (on a scale of 0 to 1) reached 0.676, reflecting effective contracting and efficiency within the corporate framework. Meanwhile, the rPET portfolio share stands at 0.474, slightly below the 0.50 target, suggesting a nearly mature substitution trajectory in the context of a unitised KPI with a defined end-state. These series exhibit a consistent pattern: when indicators are bounded and measured repeatedly (RE, Scopes 1+2 ratio, rPET, and ZDHC conformance at Tier-1/2), progress can be calculated, monitored, and compared. The residual distance to the -0.90 target is quantitatively modest yet significant, with its locus primarily located upstream at Tier-2 fabric mills, particularly concerning process heat (stenters, boilers, steam). The public record indicates governance routines such as quarterly reviews, risk screening, and Higg-based assessments; however, there is an absence of a unitized, time-series KPI for mill-level heat transition. Consequently, outcomes cannot be normalized to the apparel portfolio, and procurement is unable to price, pace, or guarantee delivery at scale. The conditions in Vietnam and Bangladesh, including wheeling rules, contract windows, and mill capital

expenditure constraints, indicate the disparity in the advancement of electricity decarbonisation compared to the lag in process-heat transformation.

The findings indicate a bottleneck driven by measurement rather than a deficiency in the program. Fast Retailing's reduction record indicates that effective procurement, characterized by a clear denominator along with consistent cadence and assurance, leads to favorable portfolio outcomes. Conversely, in the absence of this coupling, particularly in Tier-2 heat and deeper-tier FSC/MMCF, performance remains merely descriptive. Addressing the Scopes 1+2 gap necessitates a structured procurement approach: first is establish a tier-split, unitized KPI for mill heat with external validation; second is implement performance-based contracts or ESCO-style improvements for burners and boilers; third is utilize risk-sharing finance to mitigate mill capital expenditures; and fourth is adopt country-specific playbooks that align with Vietnam/Bangladesh market limitations. The case demonstrates that green procurement is effective when measurable; the absence of the Tier-2 heat KPI constitutes a structural barrier to portfolio-normalised progress by 2030.

5.1.2 Measurement design as the boundary between descriptive and quantifiable effectiveness

Performance can be computed in the case only when the metric possesses a defined unit and portfolio denominator, a consistent observation cadence, and reliable assurance. When indicators are standardized on a 0–1 or ratio scale - such as ZDHC conformance, audit-coverage shares, and renewable-electricity share - paths, the residual distance to 2030, and pacing can be derived. Disclosures presented as programmes or counts lacking a denominator, including Tier-2 heat transition, FSC/MMCF coverage, and grievance "% resolved" on varying bases, result in claims that are qualitative and non-comparable. Metric design, rather than programme activity, delineates the distinction between

narrative and portfolio-level effectiveness. This aligns with governance theory, which contends that standardisation and periodicity facilitate management oversight and mitigate “decoupling” (credible processes, unverifiable outcomes).

The findings show that measurement architecture, not additional programmes, is the precondition for converting upstream intent into demonstrable outcomes. Initially, establish a standardized Tier-2 heat KPI, such as “percentage of fabric-mill thermal load under verified non-fossil plans,” on a 0–1 scale, with a quarterly reporting schedule and external verification. Secondly, incorporate portfolio denominators for upstream material schemes to transition FSC/MMCF from mere policy presence to actual portfolio shares. Third, transform social indicators into rates with consistent bases (such as the percentage of grievances resolved, time to close). Integrating these designs into supplier segmentation, incentives, and contract templates would transition upstream initiatives from descriptive compliance to performance that is normalized by portfolio and controllable by procurement.

5.1.3 Materials substitution: near-target rPET versus policy-documented upstream schemes

Portfolio data demonstrate that the rPET program of Fast Retailing has developed into a quantifiable, procurement-focused substitution. The rPET share increases from 0.155 in FY2022 to 0.474 in FY2024 on a unitised 0–1 scale, resulting in a remaining distance of 0.026 to the 0.50 end-state. The time-stamped and bounded nature of the metric facilitates precise pacing, proximity-to-target assessments (approximately 95% to target), and attribution to procurement controls, including preferred-material specifications, supplier qualifications, and price/quality thresholds. rPET demonstrates a quantified shift towards the near-target category. In contrast, upstream wood-based initiatives (FSC/Controlled Wood; MMCF/Canopy) were presented in policy but not integrated into

the portfolio during the review period. Disclosures are presented as assurance "in force" without denominators (such as % fibre tonnage or % SKUs), making it impossible to trend, compare, or demonstrate progress toward targets. The disparity arises from measurement design rather than effort: rPET is recorded as a portfolio share, while FSC/MMCF are verified at the scheme level.

The finding indicate that the primary objective is to transform upstream policy into quantifiable shares: first is publish denominators categorized by tier (including percentage of Tier-2 MMCF volume with Canopy-verified chain-of-custody; percentage of packaging paper under FSC), second is establish a regular observation schedule with external validation, and third is incorporate these shares into supplier scorecards and contracts (volume commitments, price premiums, corrective-action triggers). To maintain rPET performance, it is necessary to implement second-order strategies, including expanding eligible product families, diversifying suppliers, and conducting continuous performance testing, to prevent stagnation as the program nears its 0.50 end-state.

5.1.4 Practice - outcome alignment and the structural role of a Tier-2 heat KPI

In procurement processes of Fast Retailing, the strongest outcomes are observed in areas where repeat-measured, unitized KPIs are implemented. ZDHC conformance, audit coverage, renewable electricity share, and rPET portfolio share serve as contractual levers and program membership, translating into portfolio-normalized performance that can be analyzed, aligned with 2030 objectives, and verified. When a defined unit and denominator are combined with a consistent observation frequency, governance routines that include scorecards, quarterly reviews, and risk screening manifest as changes in portfolio metrics rather than as descriptive activities.

The only structural exception is Tier-2 heat at fabric mills. Currently, process-heat decarbonisation is not monitored through a standardized, time-series key performance indicator (such as “proportion of Tier-2 thermal load under a verified non-fossil plan”). In the absence of that denominator, upstream signals from mill reviews and Higg-based assessments cannot be transformed into portfolio arithmetic; progress is inferred indirectly from Scope-2 electricity gains rather than being substantiated for heat. The measurement gap, rather than the lack of programmes, accounts for the majority of the residual distance to 2030 being outside owned operations at Tier-2.

The finding indicates that effectiveness is quantifiable when three threshold conditions are met: first is a common unit and denominator that can be normalized across portfolios, second is a specified timeline leading to 2030, and finally, assurance that is compatible with risk. The conditions for chemicals (ZDHC), energy within the boundary (RE), and rPET are currently satisfied; however, they remain unmet for upstream heat and deeper-tier material schemes. Addressing the gap necessitates the design of metrics, primarily a Tier-2 heat KPI monitored quarterly with external validation, alongside the transformation of policy-present schemes into portfolio KPIs that include specified denominators and target end-states for 2030.

5.2 Interview thematic-analysis key findings

Challenges illuminated by practitioners

Interviewees identify a common bottleneck revealed in disclosures: the operational challenges of Tier-2 mill decarbonisation, which are influenced by local regulations, energy accessibility, and capital expenditure cycles. Participants highlight that contract windows, wheeling constraints, and tariff structures in critical regions can impede or fragment adoption, despite established expectations from buyers. Respondents indicate

that data-pipeline limitations extend beyond Tier-1, reflecting disclosure asymmetries. The complexity of the chain-of-custody for MMCF/paper and the fragmentation of sub-supplier networks complicate the maintenance of portfolio denominators on an annual basis.

A subsequent challenge involves assurance design. Practitioners appreciate third-party programs, such as ZDHC, but emphasize that the "pass/fail" maturity model limits further learning once coverage reaches saturation. They promote the use of intensity-based KPIs in wet-processing (such as water/energy per unit throughput) to guide continuous process improvement instead of focusing on compliance enforcement. Interviewees highlight the importance of commercial risk management, indicating that procurement requires flexible instruments, such as tenor, volume, and geography, to effectively manage the volatility of renewable energy prices and regulations; otherwise, portfolio exposure may become concentrated.

Effectiveness and its most observable contexts

Practitioners confirm that effectiveness is maximized when a KPI is unitized and paced. Scopes 1 and 2 are highlighted alongside renewable energy (RE) and recycled polyethylene terephthalate (rPET) as models for establishing targets, monitoring trajectories, and comprehending cost and quality dynamics. Interviewees agreed that for ZDHC, the focus should shift from expanding audit coverage to enhancing process performance, indicating a near-universal conformance. In FSC/MMCF, interviewees indicate the presence of program expectations and due diligence requirements, yet they confirm that current buyer dashboards lack portfolio-level rates; this gap restricts quantitative aggregation.

Strategic actions from the practitioner lens

Interviewees advocate for a structured approach to measurement development: initiate with the design of Tier-2 heat KPIs (including unit, denominator, cadence, and assurance scope), conduct a pilot with leading mill partners, and disseminate segment trajectories for constrained markets (such as Vietnam/Bangladesh). It is recommended to achieve assurance parity by extending KPI-level assurance notes to include new metrics such as RE, rPET, and Tier-2 heat, thereby ensuring that numeric claims are incorporated into sourcing and scorecards. Respondents support the replication of the rPET grammar (baseline to current to target) for two additional materials, allowing for credible tracking of category-level substitution. They propose enhancements to governance cadence: maintain quarterly partner reviews while integrating new KPIs into vendor scorecards, incorporating incentives and consequences, and aligning decision rights with performance data.

Comparative synthesis: The streams converge on three propositions when examined in parallel to one another. Procurement performance is optimized when unit, denominator, cadence, and assurance are established; this accounts for the coherence observed in Scopes 1 and 2, RE share, rPET, and ZDHC. The most significant residual gap to 2030 pertains to Tier-2 heat, attributed not to the absence of programs but rather to an incomplete measurement architecture. Third, policy-oriented deeper-tier schemes necessitate portfolio unitisation prior to management aimed at targets. The strategic implication is to prioritize metric engineering, particularly a Tier-2 heat KPI and portfolio denominators for FSC/MMCF, enabling procurement to convert policy presence into portfolio-scale outcomes.

5.3 Strategic recommendations

The following recommendations, grounded in procurement, translate evidence into actionable steps toward 2030. Each part defines the objectives, rationale (evidence link), KPI design, schedule, and designated delivery owner.

Strategic Recommendation 1: Publish a unitised Tier-2 heat Key Performance Indicator and associated delivery roadmaps.

The primary gap is the absence of a computable indicator for process heat in Tier-2 fabric mills. Finalize this by publishing a unitized Tier-2 heat KPI and integrating it into procurement processes. Key Performance Indicator (definition and scope): Proportion (0–1) of thermal load during dyeing/finishing associated with Fast Retailing orders sourced from verified non-fossil origins. Boundary: Limited to Tier-2 wet-processing exclusively. Attribution is established through an audited mass and energy balance that connects boiler fuel, steam distribution, and machine time to purchase orders. Let KPI_t denote this indicator in period t. As shown in Equation (1), it is constructed as the ratio of (i) gigajoules of non-fossil thermal energy allocated to Fast Retailing orders across the reporting supplier set S to (ii) total gigajoules (GJ) of thermal energy allocated to those same orders:

$$KPI_t = \frac{\Sigma_{i \in S} GJ_{non-fossil,\, i,\, t}^{allocated\ to\ FR}}{\Sigma_{i \in S} GJ_{total\ heat,\, i,\, t}^{allocated\ to\ FR}} \quad (1)$$

In this expression, the numerator contains only non-fossil heat that meets programme criteria, including legally sourced biomass, electrified heat matched to renewable electricity, or waste-heat recovery, and is documented in mill transition plans; the denominator contains all process heat for Fast Retailing–attributable orders in the same period. Two assurance gates apply: first, verification of the allocation method and energy balance, and second, confirmation that claimed non-fossil heat meets the sustainability

screen. With this explicit formula the narrative description of the KPI, the boundary (Tier-2 wet processing), and the assurance requirements are now technically aligned. KPI is specified as a bounded 0-1 EnPI (ISO, 2014), with boundary and attribution per the GHG Protocol Corporate Standard and Scope 2 Guidance (WRI & WBCSD, 2004, 2015), steam/heat allocation per CHP/steam guidance (WRI & WBCSD, 2006/2017), and apparel PG&S activity-data allocation practices (Fashion Industry Charter for Climate Action, 2021; Sustainable Apparel Coalition, 2023).

Operationalization should follow a paced roadmap (Figure 23) with quarterly observation and external assurance: begin with a pilot across 8–10 high-volume mills to establish methods and audit trails, then scale using country playbooks for Vietnam and Bangladesh to the top-30 mills and ultimately full Tier-2 coverage. Indicative checkpoints are ≥0.35 by FY2026 and ≥0.65 by FY2028, converging to 1.00 by FY2030. Embed the KPI in contracts and supplier scorecards with volume commitments, premia, and corrective-action triggers; deploy performance-based contracts/ESCOs and targeted risk-sharing finance where capex or fuel-switch frictions exist. Assign delivery ownership to Procurement (Fabric/Technical), with Sustainability and Internal Audit responsible for data integrity and third-party verification. This design enables abatement attribution to procurement decisions and closes the core evidence-to-performance gap at Tier-2 mills.

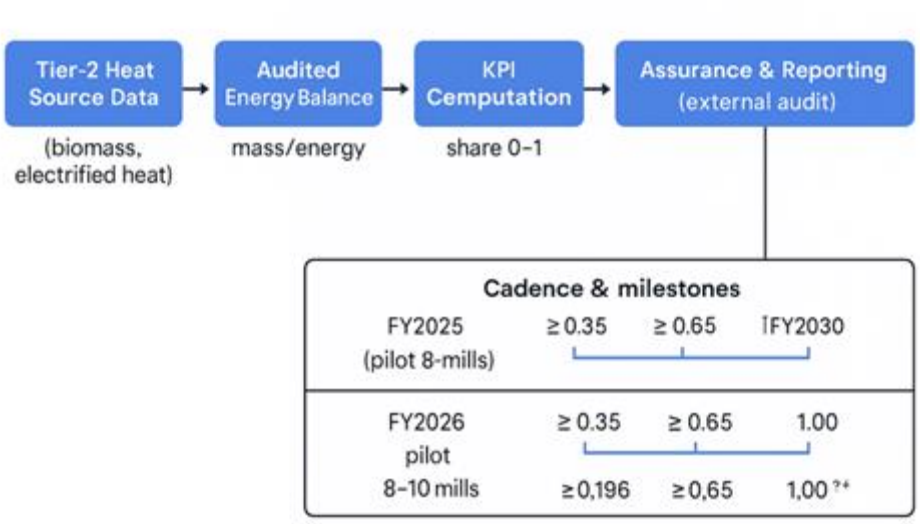

Figure 23. Design logic of the Tier-2 heat KPI and delivery roadmap

Strategic Recommendation 2: Scale renewable-electricity contracting while preserving portfolio flexibility

Fast Retailing has achieved its Scope-2 gains primarily through the procurement of renewable electricity, with the current portfolio share recorded at 0.676 (on a scale of 0 to 1). To maintain and expand this abatement in fluctuating power markets, particularly in Vietnam and Bangladesh, the program should be administered as a hedged portfolio instead of a single instrument. In regions characterized by stable enabling rules, it is advisable to incorporate long-term Power Purchase Agreements (PPAs) and utility green tariffs. Conversely, in more dynamic contexts, it is essential to sustain rolling coverage through Energy Attribute Certificates (EACs), such as International Renewable Energy Certificates (I-RECs) or Guarantees of Origin (GOs), diversify counterparties, and implement sequential multi-year tranches. This "barbell" mix increases the average share of renewables while mitigating basis risk, delivery shortfalls, and counterparty or regulatory shocks.

Measurement continues to serve as the market-based Scope-2 key performance indicator: the 0–1 ratio of electricity aligned with eligible, quality-assured renewable instruments, reported annually with limited assurance. The current strategy involves securing 24-36 months of certificates/PPAs on a continuous basis by FY2025, maintaining a coverage ratio of at least 0.80 by FY2027, and aiming for convergence to 1.00 by FY2030, while permitting tactical over-coverage to address VN/BD volatility. Energy Procurement is responsible for execution in governance, with Legal overseeing enforceability and regulatory compliance, and Finance/Treasury managing credit, pricing, and foreign exchange as co-owners. When regarded as an actively managed and adjustable portfolio, renewable energy sources can persist in providing Scope-2 emissions reductions while maintaining flexibility.

Strategic Recommendation 3: Convert policy-present schemes into portfolio KPIs

Fast Retailing's transparency and materials schemes, product-origin visibility and upstream fibre/packaging verification (FSC for paper/pack; MMCF/Canopy for cellulosics), are currently recorded as policies "in force," rather than as unitised portfolio outcomes. This impedes progress towards target computation, restricts application in procurement scorecards and trade-off analysis, and creates a disparity between programme presence and measurable performance. The solution involves transforming these lanes into repeat-measured, share-based key performance indicators (KPIs) on a 0–1 scale, establishing precise boundaries and an annual pace. A product-origin breadth metric is defined as the ratio of active sellable SKUs with customer-visible origin that can be traced to Tier-1 in the Product Life Cycle (PLM). Additionally, two materials-verification shares are defined: the percentage of packaging/paper certified to FSC and the percentage of MMCF volumes verified to an accepted Canopy tier, both calculated against an auditable denominator (total fibre mass or SKU-weighted pack volume). Assign 2030 end-states and incorporate limited external assurance to ensure these indicators align with the measurement framework of renewable electricity and rPET.

Complete SKU mapping and sampling frames by FY2025, publish initial portfolio shares in FY2026 to establish stable methods, and assign ownership to Packaging Procurement, Materials Sustainability, and Digital Product/PLM. Transforming these lanes into key performance indicators (KPIs) converts vague compliance signals into measurable targets for supplier scorecards, facilitates comparability across a standardized 0–1 portfolio scale, and aligns with the evolving expectations for due diligence and product authentication. Execution risks, including heterogeneous SKUs, multi-component packs, double counting, and supplier data quality, are addressed through version-controlled PLM attributes, auditable allocation rules based on mass and spend, risk-based sampling, and periodic assessments.

Strategic Recommendation 4: Extend materials substitution beyond polyester

The recycled-polyester program of Fast Retailing illustrates the effectiveness of a unitized, portfolio-level indicator (baseline to current to target on a 0-1 scale) in transforming procurement specifications into quantifiable circularity outcomes at scale. The observed uplift for rPET (approximately +0.319 share points) indicates a mature adoption curve, wherein quality and price barriers have sufficiently narrowed to allow for category-level substitution within established design and sourcing systems. To integrate this learning into a comprehensive green-procurement strategy, the same measurement framework should be applied to other strategic materials, including nylon with verified chain-of-custody and cotton programs supported by demonstrable traceability. This approach transforms sustainability commitments from mere policy statements into portfolio key performance indicators (KPIs) that can be measured, projected, and managed in relation to 2030 objectives (Global Reporting Initiative, 2021; IFRS Foundation/ISSB, 2023).

Extending the substitution operationally necessitates two interconnected design decisions. The denominator must be clearly defined as the share of the company’s global

purchases for the material family, ensuring that variations in product mix do not misrepresent progress. Secondly, the assurance anchor must be explicit: for forest-derived fibers and paper/pack, this necessitates recognized verification frameworks (FSC Chain of Custody; Canopy Hot Button tiers) aligned with portfolio coverage, rather than solely policy conformance “in force” (FSC, 2021; Canopy, 2023). From a procurement perspective, this involves updates to specifications, criteria for approved suppliers, and contracting mechanisms that incorporate recycled or verified content as standard attributes, while maintaining commercial flexibility for supply security. The approach is strategically aligned with circular-economy scholarship, as measurable substitution accelerates when indicators are time-stamped, integrated into scorecards, and linked to repeat purchasing cycles (Ellen MacArthur Foundation, 2017).

Strategic Recommendation 5: Evolve compliance into process performance at wet-processing

The chemical-management conformance among suppliers is approaching saturation at core tiers, thereby constraining potential climate or resource improvements from solely implementing additional “pass/fail” evaluations. The subsequent phase of reducing focuses on enhancing process efficiency in wet-processing, particularly regarding energy, water, and chemical intensity per unit throughput, along with associated process-control key performance indicators (KPIs). Reframing audits as performance steering aligns with the green-procurement objective. This approach shifts purchasing mechanisms, such as contracts, scorecards, and incentives, from a focus on rigid compliance to one of continuous improvement. Consequently, it facilitates the reduction of downstream Scope-2 energy and prepares Tier-2 mills for heat substitution. Intensity metrics must be normalized to production and monitored quarterly, facilitating variance analysis, corrective action loops, and aggregation for facility and portfolio dashboards (GRI, 2021; IFRS Foundation/ISSB, 2023).

Embedding these metrics necessitates governance aligned with due diligence guidance for the garment sector, including traceable risk assessment, integration into commercial decision-making, and monitoring through measurable outcomes instead of narrative process descriptions (OECD, 2018). Fast Retailing can collaborate with priority wet-processors to develop a standard KPI pack, with a pilot phase in FY2025 and implementation starting in FY2026. This pack will address energy intensity in dyeing and finishing, water reuse, formulation efficiency, and rates of corrective-action closure. This method maintains the advantages of ZDHC conformance (assurance and safeguards) while reallocating marginal effort towards enhancing performance, thus connecting supplier capability development to the company's climate objectives and overall green procurement strategy.

Strategic Recommendation 6: Enhance assurance design in areas with existing KPIs and incorporate KPI-level assurance in missing areas.

The comparability and utility of decisions significantly enhance when the definitions of indicators and the scope of assurance are consistent across various topics. ZDHC wastewater conformance incorporates external program testing, providing a robust verification baseline for factory compliance. Assurance notes at the KPI level must be included for renewable electricity share, rPET portfolio share, and the proposed Tier-2 heat KPI, encompassing scope, methods, controls, sampling, and error treatment. Independent assurance, where applicable, should adhere to recognized non-financial standards (ISAE 3000 (Revised), 2013) to guarantee that the evidence is both adequate and suitable for investor-grade reporting and internal sourcing decisions (IAASB, 2013). Alignment with reporting frameworks (GRI, 2021; IFRS Foundation/ISSB, 2023) minimizes interpretation risk by providing clarity on units, denominators, and reporting frequency.

From a green-procurement perspective, assurance parity enhances external credibility and strengthens internal feedback mechanisms linking purchasing decisions to portfolio outcomes. The implementation of publishing methods annexes by FY2025 and the extension of third-party assurance to newly established KPIs from FY2026 will establish a uniform evidentiary standard across the energy, chemicals, and materials sectors. This facilitates cross-category scorecards, supplier segmentation based on verified performance, and incentive structures that reward measurable contributions to Fast Retailing's 2030 targets, effectively translating sustainability ambitions into a structured procurement operating model.

Strategic Recommendation 7: Maintain and expand governance cadence

Fast Retailing should maintain the existing quarterly partner-factory reviews and risk assessments, while explicitly expanding this schedule to include: first, Tier-2 heat transition projects associated with the proposed KPI (proportion of non-fossil steam used in dyeing/finishing); and second, the newly defined materials KPIs (rPET, verified MMCF/paper proportions). A standardized, time-bound framework across these areas serves two essential governance roles in green procurement: it facilitates variance analysis relative to specified end-states and budget cycles, and it formalizes corrective measures through supplier engagement, technical support, and commercial strategies (OECD, 2018; ISO, 2017). Quarterly checkpoints should serve as the standard framework through which procurement converts strategy into supplier-level execution, reflecting the established pattern in chemical compliance.

Integrating reviews into vendor scorecards is essential for translating patterns into performance. These scorecards should include incentives and consequences, including price-adjustment clauses for verified KPI attainment, preferred-supplier status for on-track progress, and remediation or exit pathways for consistent under-performance.

Scorecards should present, for each strategic supplier: first, the portfolio-normalised KPI level and the period-over-period change; second, milestone adherence for heat projects (engineering design, financing, commissioning), and third, assurance status (programme test for ZDHC; KPI-level methods for RE share, materials, and Tier-2 heat). This design corresponds with the mechanism-tracing logic of the dissertation by detailing the repeated observations through which procurement levers (contracts, scorecards, financing) are anticipated to yield measurable portfolio outcomes by 2030 (GRI, 2021; IFRS Foundation/ISSB, 2023). Operationally, cadence artefacts, including agendas, data cut-offs, escalation thresholds, and decision rights, must be standardized across regions. Digital dashboards should offer early-warning signals and automatic prompts when progressions diverge from the linear path to the target. This codification minimizes coordination costs and enhances accountability, while ensuring that green procurement remains resilient to market volatility in critical regions, including Vietnam and Bangladesh.

Table 24. Implementation Matrix

Recommendation	Primary KPI (unit)	FY2026	FY2028	FY2030	Cadence	Lead / Co-leads	Key risks & mitigations
SR-1 Tier-2 heat KPI	Non-fossil steam share (0–1)	≥0.35	≥0.65	1.00	Quarterly	Fabric Procurement; Sustainability	Data allocation (pilot & audit); financing constraints (blend PPAs/credit lines)
SR-2 Renewables	RE share (0–1)	≥0.75	≥0.90	1.00	Annual	Energy Procurement; Finance	Contract windows in VN/BD (tranche buying; options)
SR-3 Policy→KPI	% SKUs origin; % FSC paper; % MMCF by Canopy tier	Baseline	+15–25 pp	End-state set	Annual	Packaging/Materials; PLM	Data integration (PLM mapping); certification latency
SR-4 Materials	rNylon/rCotton etc. share (0–1)	Pilots live	Published trajectories	≥0.50 (per cat.)	Annual	Category Procurement; R&D	Cost premiums (TCO modeling); quality guardrails
SR-5 Process perf.	Water/energy/chem. intensity	KPI pack live	Supplier incentives	≥20–30% vs baseline	Quarterly	Tech Services; Supplier Mgmt	Metering gaps (capex co-funding); data QA
SR-6 Assurance	KPI-level assurance coverage	Methods annex	3rd-party for new KPIs	Full parity	Annual	Reporting; Internal Audit	Scope creep (materiality scoping)

Figure 23 below illustrates the areas where Fast Retailing's green-procurement levers translate into measurable, portfolio-normalised outcomes (green lanes) and highlights the gap created by the lack of a Tier-2 heat KPI, which disrupts the telemetry to 2030

(dashed lane). Incorporating the absent KPI bridges the evidence-performance gap and facilitates targeted contracting and financing.

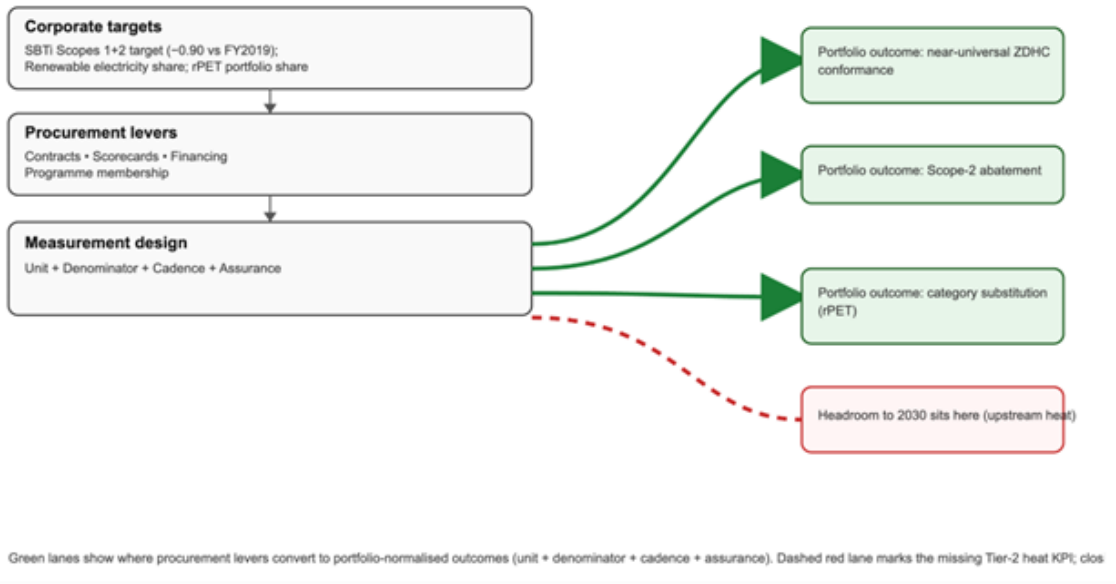

Figure 24. Procurement to Performance Pathway (Tier-2 heat KPI highlighted)

5.4 Theoretical contributions

This thesis contributes to the literature on sustainable procurement and sustainable supply-chain management (SSCM) by detailing the operationalization of corporate sustainability targets through procurement controls at the company level. Previous studies generally frame the Triple Bottom Line (TBL) in the context of Sustainable Supply Chain Management (SSCM) using broad governance perspectives (Carter & Rogers, 2008; Seuring & Müller, 2008), yet they fail to clarify the specific micro-mechanisms that translate policy into portfolio-normalised performance. This study reconstructs the practice system of Fast Retailing and proposes unitised indicators with a clear cadence and assurance design. It outlines a measurement-driven approach that connects corporate targets (such as Scopes 1+2, renewable electricity, and materials substitution) to supplier-facing levers (including contracts, scorecards, and financing) and subsequently to outcomes that are measured constantly. This study strengthens theories

of control-based sustainability governance (Simons, 1995) and dynamic capabilities in procurement by identifying the denominator and observation rhythm as essential design features that render “progress-to-target” computable and actionable in green procurement (ISO, 2017; GRI, 2021).

The study introduces a practice-outcome alignment framework that identifies three evidence modalities: numeric KPIs, qualitative programme/assurance statements, and items absent from the review window. It correlates each modality with the types of portfolio outcomes that can be asserted. This diagnostic, derived from the Fast Retailing case, provides an analytical framework for distinguishing between areas where quantitative maturity facilitates pacing and close-to-target analysis (ZDHC conformance, renewable electricity share, rPET portfolio share) and areas where claims must remain descriptive until a computable denominator is established (deeper-tier material verification and product-origin breadth). The structure addresses persistent demands for decision-useful sustainability indicators that facilitate variance analysis and investment guidance, rather than merely serving narrative compliance (Montabon et al., 2020; Pagell & Shevchenko, 2014). This study enhances the discourse on SSCM measurement by clarifying the conditions under which specific disclosures can be appropriately normalized to the portfolio and utilized in procurement scorecards (IFRS Foundation/ISSB, 2023).

The case demonstrates the origins of organizational decoupling within fast-fashion procurement. The analysis indicates that the policy–practice gap at Fast Retailing is structurally fragmented, particularly in Tier-2 heat transition. While corporate reviews and program participation are available, there is no time-series KPI that isolates non-fossil steam attributable to the firm. This pattern corresponds with "means–end decoupling" in institutional theory (Bromley & Powell, 2012) and enhances critiques of symbolic sustainability disclosure and greenwashing by identifying the measurement

conditions that allow decoupling to remain intact despite established governance routines. This finding enhances theoretical understanding by identifying the boundary between descriptive and quantifiable effectiveness in green procurement. When a unit, denominator, cadence, and assurance are defined, decoupling can be addressed, allowing procurement levers to be observed as performance changes. In their absence, legitimate programs remain non-unitized and cannot be scaled at the portfolio level (OECD, 2018; ISO, 2017).

The dissertation presents a unique metric specific to the field: a unitised KPI for Tier-2 thermal decarbonisation. This metric incorporates corporate boundary setting, as defined by GHG Protocol market-based electricity accounting, along with supplier allocation and third-party verification, resulting in a computable share. The construct not only serves practical needs of Fast Retailing but also contributes to methodological discussions regarding measurement infrastructure in sustainability accounting. It illustrates how the design of indicators influences the conversion of green-procurement strategies into measurable results within multi-tier apparel supply chains (GRI, 2021; IFRS Foundation/ISSB, 2023).

5.5 Practical implications

The primary implication for the procurement function of Fast Retailing is to regard the proposed Tier-2 heat KPI as central to the green-procurement system of the company. Establishing a time-series share of non-fossil process heat correlated with Fast Retailing orders would address the primary evidence-performance gap identified in the Results, facilitate portfolio-normalised progress towards 2030, and synchronize procurement controls with investor-oriented disclosure frameworks (ISSB/IFRS S2 climate metrics and targets) (IFRS Foundation/ISSB, 2023). This keystone should be integrated into supplier agreements and scorecards, monitored through the established quarterly review

process, and reinforced by assurance notes at the KPI level to guarantee decision-useful reliability (GRI, 2021). The firm should continue the renewable-electricity contracting programme that supported the Scope-2 step-change and uphold the rPET portfolio trajectory, as both represent unitised indicators with defined denominators and consistent observation. Integrating these instruments within the framework of ISO 20400 sustainable-procurement guidance can facilitate the alignment of category strategies with risk, cost, and performance objectives at the buying-team level (ISO, 2017).

The case suggests that organizations should establish measurement architecture prior to expanding programs. This entails the selection of end-states, publication of denominators, and establishment of observation cadence prior to the extension of supplier initiatives; failing to do so results in progress being merely narrative and not subject to pricing or procurement management. The evidence from Fast Retailing indicates that numeric maturity, such as ZDHC conformance, renewable electricity share, and rPET share, aligns with areas where procurement levers resulted in portfolio-normalized outcomes. In contrast, policy-present areas lacking denominators, such as deeper-tier verification, did not demonstrate similar results. From an institutional perspective, the key takeaway is to reduce means–end disconnect by developing metrics that translate collaborative actions into measurable outcomes at the portfolio level (Bromley & Powell, 2012).

Regulators, standard-setters, and collective initiatives prioritize metric standardization for Tier-2 thermal decarbonization in apparel. This includes a harmonized definition of “% non-fossil steam attributable to brand orders,” along with established boundary rules and guarantee expectations. Incorporating this KPI into existing sector toolkits, such as Higg methodological notes, and the guidance of the Fashion Industry Charter would enhance comparability, promote capital allocation to mill heat projects, and improve

traceability beyond Tier-1 (Sustainable Apparel Coalition, 2023; UNFCCC Fashion Industry Charter for Climate Action, 2021). In regions with restrictive contracting windows and wheeling regulations, complementary policy reforms that facilitate long-term instruments and energy-attribute transfers would enhance procurement-led efforts. Ultimately, aligning these initiatives with evolving due diligence standards in global supply chains guarantees that green-procurement practices support responsible-sourcing requirements instead of functioning as separate systems (OECD, 2018).

5.6 Limitations and future research

This research presents a single-firm case study that primarily utilizes publicly available documents, including the Sustainability Data Book, TCFD/Year-end reports, and policy files, along with a restricted set of semi-structured interviews. This design facilitates transparent auditability of the evidence trail; however, it limits internal validity in three respects. Initially, access to contract-level procurement data, including purchase orders, price clauses, supplier-specific energy use, and certificate registries, was not available. Causal claims regarding the impact of specific levers (contracts, scorecards, financing) on portfolio-normalised outcomes are thus inferential rather than experimentally verified (Yin, 2018; Eisenhardt, 1989). The analysis prioritizes unitized indicators that the company currently publishes, including ZDHC conformance, renewable electricity share, and rPET share. Domains that lack policy documentation with denominators (deeper-tier material verification, product-origin breadth) are evaluated descriptively. This approach may underrepresent their actual impact in practice, yet it accurately reflects the measurement limitations of the dataset.

The external validity is similarly constrained. The supplier mix, geographical exposure (such as in Vietnam and Bangladesh), and governance practices of Fast Retailing may not be applicable to firms with varying category portfolios, buyer power, or energy regulations in different countries. Locational constraints influencing renewable options,

such as wheeling regulations and contracting windows, are specific to the context. Consequently, observed reduction processes may exhibit path dependence and lack portability to other regions. The period under examination (FY2019–FY2024) encompasses a phase of significant Scope-2 decarbonisation and advancing chemical compliance; future policy or market changes may either diminish or enhance these trends.

The third limitation relates to the distinction between attribution and contribution. The approach connects procurement practices to outcomes using a measurement design that includes unit, denominator, cadence, and assurance; however, it is unable to entirely isolate the influence of external factors such as grid decarbonisation, macro-prices for certificates, and supply disruptions. It is additionally unable to assess counterfactual performance at mills that do not participate. Interview evidence may be subject to informational and desirability biases. We addressed this through triangulation with documents; however, some residual bias remains (Yin, 2018).

Future research needs to advance beyond descriptive alignment to examine the causal effects of green-procurement controls on emissions and material outcomes. Researchers, with appropriate permissions, could compile mill-brand panel datasets that integrate contract terms, price and volume data, and metered energy or boiler logs to assess the effects of implementing a Tier-2 heat KPI on fuel switching and thermal intensity. Semi-experimental designs, such as difference-in-differences related to KPI adoption or regulatory "natural experiments" such as wheeling rule changes in Vietnam and Bangladesh, would enhance internal validity (Angrist & Pischke, 2009). Expanding outcome measurement to include Scope-3 purchased goods within standard LCA boundaries would elucidate the upstream propagation of procurement instruments (ISO, 2006; IFRS/ISSB, 2023).

Comparative studies between fast-fashion and “slow” fashion models may evaluate the extent to which cadence, denominator standardisation, and assurance intensity influence procurement effectiveness, thus enhancing theoretical understanding of decoupling and measurement-led control within supply networks (Bromley & Powell, 2012; Seuring & Müller, 2008). Multi-brand consortia or buyer-supplier field experiments, such as randomized scorecard incentives and financing offers for boiler retrofits, would clarify the efficiency-equity trade-offs in the allocation of transition costs and the conditions necessary for the scaling of collaborative programs.

Methodological advancements are essential in the areas of assurance design and metric standardization. Research comparing external assurance at the programme level with that at the KPI level, considering factors such as scope, controls, and materiality thresholds, may quantify improvements in the reliability of procurement decision-making. Collaborating with standard-setters to establish a sector-wide Tier-2 heat denominator, aligned with ISO 20400 sustainable procurement and the UNFCCC Fashion Charter, would improve comparability and facilitate capital flows to mill decarbonisation initiatives. In conclusion, the opening of internal datasets and the standardization of upstream key performance indicators represent the most effective strategies for transforming descriptive sustainability claims into actionable, causal evidence for green procurement.

5.7 Conclusion

This study aims to analyze the extent of how Fast Retailing's existing green-procurement system translates sustainability goals into measurable outcomes, in addition to identifying points of difficulty in this conversion process. The thesis demonstrates that the company has a partially mature measurement architecture by integrating documentary content analysis of corporate disclosures with thematic insights from

industry practitioners. Within the Scopes 1+2 boundary, various procurement-enabled mechanisms are currently functioning based on unitised, consistently monitored indicators. These include the market-based electricity with a renewable-electricity share of 0.676, the consolidated Scopes 1+2 reduction ratio of -0.694 compared to FY2019, the near-target rPET portfolio share of 0.474 against a 0.50 end-state, and the Tier-1/2 ZDHC conformance. The indicators possess defined units, denominators, and cadences, enabling alignment with 2030 objectives and integration with procurement instruments, including contracts, supplier scorecards, and audit routines. Fast Retailing can exhibit effectiveness in these domains.

The analysis concurrently identifies structural gaps that impede the procurement system from achieving portfolio completeness. Upstream decarbonisation at Tier-2 fabric mills is of significant importance: process heat for dyeing and finishing is subject to governance and review, including mill transition plans, Higg-based assessments, but it lacks tracking through a standardized, consistently measured KPI. A similar limitation applies to deeper-tier material and transparency schemes, including FSC/controlled wood, MMCF/Canopy, and product-origin breadth, which are recorded as policies "in force" but are not unitized at the portfolio level, thus preventing expression of progress toward targets. The findings respond to the initial research question by identifying the challenge not in broad terms (“suppliers do not report”) but as a deficiency in measurement design: in the absence of a denominator, procurement is unable to price, pace, or assure outcomes, regardless of the existence of programmes.

The second research question, which addresses the effectiveness of current strategies, is further discussed. The highest effectiveness occurs when the measurement architecture is fully developed. Decarbonization in internal operations and acquired electricity, compliance with chemical standards at Tier-1/2, and the recycled polyester initiative demonstrate quantifiable reductions and significant alignment with targets.

Effectiveness, in contrast, remains qualitative for upstream material schemes, grievance and remediation transparency, and Tier-2 heat transition, as the public record has not yet provided a computable foundation. This pattern supports the primary argument in sustainability-accounting literature that standardization and periodicity are essential for disclosures to be useful in making decisions.

The third research question regarding strategic actions is derived directly from this diagnosis. The discussion converts the evidence into a series of procurement-focused measures: to publish and verify a standardized Tier-2 heat KPI on a quarterly basis; to manage renewable electricity as a hedged portfolio to maintain current Scope-2 gains across diverse power markets; and to transform policy-driven schemes (FSC/MMCF, origin visibility) into share-based KPIs with defined denominators, 2030 end-states, and restricted external assurance. These actions collectively address the identified evidence-to-performance gap and align upstream initiatives with the portfolio logic previously applied to renewable electricity, rPET, and ZDHC.

This thesis presents two contributions. This study empirically reconstructs a contemporary fast-fashion green-procurement system as a chain that spans metric design, supplier-facing levers, and portfolio outcomes, identifying which links are operational and which are not. The discussion on decoupling is refined by identifying it at the specific juncture where corporate programs are reported without a denominator or pattern (Bromley & Powell, 2012). Consequently, it is the measurement infrastructure, rather than the increase in initiatives, that facilitates auditability, comparison, and control in sustainable sourcing.

The conclusions, however, function within specific limits. The research relies on a singular case, utilizing publicly accessible and company-generated disclosures, alongside

a restricted set of expert interviews. It did not examine purchase-order-level data, mill-level metering, or buyer-supplier negotiations, which would facilitate more reliable causal attribution. Constraints specific to Vietnam and Bangladesh may not be applicable to other sourcing regions. External factors, including alterations in greenhouse gas guidance, fluctuations in renewable energy certificate markets, or modifications in due diligence regulations, may influence the feasibility and cost of the proposed measures. Future research should extend the analysis in three directions: first, utilizing longitudinal datasets that integrate mill energy telemetry with buyer contracts to assess the impact of KPI introduction; second, conducting cross-brand comparative studies to investigate the applicability of measurement-first logic across various business models; and third, evaluating assurance designs that enhance mixed (numeric and qualitative) supply-chain disclosures to meet investment-grade standards.

Within these constraints, the primary conclusion is clear: Fast Retailing illustrates that effective green procurement can yield quantifiable climate and materials results when measurement is appropriately structured. The outstanding challenge is to complete this measurement framework, particularly for Tier-2 heat and deeper-tier materials, ensuring that the entire procurement portfolio, rather than only the most accurately measured segments, can be directed towards the sustainability targets to 2030.

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Appendices

Appendix 1. Interview questions

1. Challenges in implementing green procurement

Where do you think the biggest problems are that Fast Retailing is having with adopting green purchasing practices?

What are the differences between these challenges in terms of supplier regions or types of products?

What internal factors, such as revenue, company culture, and relationships with suppliers, do you think have the most impact on the success or failure of green procuring initiatives?

How do outside factors such as regulations, customer standards, or NGO efforts affect choices about procurement decisions?

2. Effectiveness of current strategies

How would you evaluate how well Fast Retailing's current purchasing plan performs at preserving the environment?

How is supplier transparency checked, and what mechanisms for verification are in place to make sure that reports are accurate?

What green procurement programs are currently in place that have shown the most actual results?

Are there areas where the business isn't meeting its goals for the environment or transparancy? Why do you think that is?

How does the procurement department measure progress toward the Sustainable Development Goals (SDGs)?

3. Strategic Practices for Improvement

What specific actions or rules could Fast Retailing take to make its procurement process more environmentally friendly?

How could relationships with suppliers be made better to help reach green procurement goals?

What do you think the role of new technologies (such as digital tracking tools and high-tech materials) could be in making buying more environmentally friendly?

What global environmental standards or best practices should Fast Retailing follow or build on in the future?

4. Cross-Cutting Questions (applicable across all themes)

The Triple Bottom Line is made up of economic, environmental, and social results. How do you think Fast Retailing's procurement approach balances these?

Could you give an example of a procurement project that either went very well or not, and what lessons were learned?

Appendix 2. Codebook A (Directed Content Analysis)

A1. Development and purpose

This codebook was developed deductively from peer-reviewed work on sustainable/green procurement and SSCM, transparency and accountability in fashion supply chains, circular-economy/product design, and triple-bottom-line reporting. It was then pilot-tested on a subset of Fast Retailing disclosures and refined through a decision log (record of rule clarifications). The codebook enables replicable coding of Fast Retailing's reports/policies and supports triangulation with KPI data.

A2. Global coding rules

Unit of analysis

Narrative: sentence or paragraph.

Quantitative tables: KPI row/cell (with unit).

Evidence type (assign one primary label, allow secondary if needed)

Quant: numeric KPI or target.

Policy: principle/standard.

Plan/Program: actions, initiatives, pilots, processes (how it is executed).

Outcome: verified result (audited/assured, compliance rates, reductions achieved).

Assurance/Scope: external assurance, boundary, or methodology statements.

Tier tag

Own ops (stores, logistics controlled by FR); Tier-1 (finished-goods suppliers); Tier-2/3 (materials, mills, upstream). If unspecified, use Supply chain (unspecified) and note in comments.

Citation anchor.

Every coded item include file name and page (or sheet/cell) to enable auditability.

Cross-coding.

If a passage genuinely covers multiple themes, assign a primary theme and up to two secondary tags.

A3. Theme tables

Theme 1: Sustainable Materials & Product Design (Code: MATERIALS)

Field	Content
Definition	Procurement/design requirements that shift products toward recycled or other low-impact materials, durability/repairability, and design-for-circularity, reflecting circular-economy and SSCM levers in fashion *(Wren, 2022; Koszewska, 2018; Colucci & Vecchi, 2020; Radhakrishnan, 2021)*..
Definition source	Derived from the thesis literature on circular product strategies and procurement levers (materials road-maps, durability/repair, take-back/closed loop) and sustainable-procurement guidance (e.g., ISO 20400).
Include	Recycled/low-GHG fibres (e.g., recycled polyester); certified inputs (RCS/GRS/FSC/PEFC); eco-labels; durability/repair services (e.g., RE.UNIQLO); take-back/remake; closed-loop/circular design; materials R&D for lower emissions.
Exclude	Generic marketing claims (“eco-friendly”) without material specifications; philanthropy not tied to product/material decisions.
Indicative keywords / synonyms	recycled polyester; recycled fibre; low-GHG materials; certified cotton/wood-based/MMCF; eco-label; durability; repair/repair service; take-back; remake; closed loop; circular design; RCS/GRS/FSC/PEFC.
Typical KPIs (unit)	Recycled polyester share (%) of polyester; Low-GHG materials ratio (%); # products designed for repair (“#” indicates a count absolute number; # stores with repair service; take-back volume (t).
Abbreviations	MMCF: *Man-Made Cellulosic Fibres* (viscose, lyocell, modal); RCS: *Recycled Claim Standard*; GRS: *Global Recycled Standard*; FSC: *Forest Stewardship Council*; PEFC: *Programme for the Endorsement of Forest Certification*.

SDG mapping (with brief rationale)	**SDG 12.2** - sustainable resource use (material substitution to recycled/renewable inputs); **SDG 12.5** - waste reduction (durability/repair, take-back, closed loop); **SDG 12.6** - corporate sustainability reporting (disclose certified/recycled shares and circular initiatives); **SDG 12.7** - sustainable procurement (embed materials/circular criteria in RFx/specs); **SDG 13.2** - integrate climate action (lower-GHG materials and circular design as Scope-3 levers).

Theme 2: Carbon & Climate Commitments *(Code: CLIMATE)*

Field	Content
Definition	Targets, governance and actions to reduce GHG emissions across Scopes 1–2 and Scope 3 Category 1 (purchased goods)—including renewable electricity procurement and supplier engagement—consistent with climate-oriented SSCM practices in fast fashion *(Wren, 2022; Bentalha, 2024; GFA & BCG, 2017).*
Definition source	Drawn from climate-governance and sustainable-procurement literature (procurement levers for Scope-3), and reporting guidance consistent with TCFD/SBTi target framing and progress assessment.
Include	Time-bound targets (base year, target year/value), Scope boundaries, market-based Scope 2 accounting, renewable electricity procurement (e.g., PPAs), supplier decarbonization programs for Cat.1, climate governance/oversight, transition plan elements.
Exclude	Non-timebound aspirations; offsets unrelated to procurement measures; intensity targets presented as absolute without clarity.
Indicative keywords / synonyms	Scope 1; Scope 2 (market-based); Scope 3 Cat.1 / purchased goods; renewable electricity (%); PPA; base year; target; SBTi; transition plan; supplier decarbonization; energy efficiency.

Typical KPIs (unit)	Scopes 1-2 tCO_2e; reduction vs base year (%); renewable electricity (%); Scope 3 Cat.1 tCO_2e; # suppliers on decarb programs; # PPAs executed.
Abbreviations	GHG: Greenhouse Gas; TCFD: Task Force on Climate-related Financial Disclosures; SBTi: Science Based Targets initiative; PPA: Power Purchase Agreement; Cat.1: Scope 3 Category 1 (Purchased Goods and Services).
SDG mapping	**SDG 13.2** - integrate climate into policies/strategies (targets, transition plans); **SDG 7.2** - increase renewable energy share (renewable electricity procurement).

Theme 3: Supply-Chain Transparency & Traceability *(Code: TRANSPARENCY)*

Field	Content
Definition	Public disclosure, verification and data systems that improve visibility and accountability across tiers (e.g., supplier lists, audit & remediation data, product-origin disclosure, ZDHC/chemicals and wastewater compliance; digital traceability) *(Rinaldi et al., 2022; Garcia-Torres et al., 2022; Curran & Nadvi, 2024).*
Definition source	Based on fashion-supply-chain transparency/accountability literature and chemicals management frameworks (e.g., ZDHC) emphasizing disclosure, verification, and grievance/remediation.
Include	Public supplier lists (Tier-1/Tier-2), audit coverage and outcomes, corrective action plans (CAPs), grievance mechanisms and resolution data, ZDHC wastewater/MRSL conformance, product origin disclosure, digital traceability systems.
Exclude	Internal systems with no public disclosure; storytelling without verifiable mechanisms or data.

Indicative keywords / synonyms	supplier/factory list or map; Tier-1/Tier-2; audit; CAP; remediation; grievance/complaints; traceability; product origin; ZDHC; MRSL; (synonyms: partner factory; vendor).
Typical KPIs (unit)	Supplier list coverage (%); audit coverage (%); ZDHC conformance (%); # grievances and avg days to resolution; # SKUs with origin info.
Abbreviations	ZDHC: Zero Discharge of Hazardous Chemicals; MRSL: Manufacturing Restricted Substances List; CAP: Corrective Action Plan; SKU: Stock-Keeping Unit.
SDG mapping	**SDG 12.6** - corporate sustainability reporting (public disclosure of supplier/audit data); **SDG 8.8** - protect labour rights (audit/grievance transparency); **SDG 6.3** - improve water quality (wastewater/chemicals conformance).

Theme 4: Human Rights & Ethical Sourcing *(Code: RIGHTS)*

Field	Content
Definition	Systems and outcomes that safeguard workers' rights and conditions in the supply base (HRDD, no forced/child labour, FOA/CBA, H&S, grievance and effective remediation; fair compensation and gender equity) *(Bick et al., 2018; Curran & Nadvi, 2024; Rinaldi et al., 2022).*
Definition source (synthesised)	Grounded in ethical-sourcing and business-and-human-rights literature (HRDD, grievance/remediation effectiveness, ILO conventions), adapted to apparel supply chains.
Include	Code of conduct; human-rights due diligence (HRDD); forced/child-labour prohibitions; FOA and CBA support; H&S programs; grievance and remediation outcomes; fair/living-wage initiatives; gender equality and women's empowerment.

Exclude	Philanthropy unrelated to supplier practices; training claims with no enforcement/remediation link.
Indicative keywords / synonyms	human rights; due diligence; forced labour; child labour; FOA; CBA; H&S/health & safety; grievance; remediation; fair/living wage; gender equality; non-discrimination.
Typical KPIs (unit)	# critical findings; remediation completion rate (%); # grievances and avg days to resolve; lost-time injury rate; % women in supervisor/management roles; % facilities with worker committees.
Abbreviations	HRDD: Human Rights Due Diligence; FOA: Freedom of Association • CBA: Collective Bargaining Agreement; H&S: Health & Safety; ILO : International Labour Organization.
SDG mapping (with brief rationale)	**SDG 8.7/8.8** – eradicate forced/child labour and protect labour rights (code, audits, remediation); **SDG 5.1/5.5** – gender equality and women's participation (gender KPIs/programs).

Theme 5: Procurement Governance & Strategy *(Code: GOV)*

Field	Content
Definition	The **rules, processes, incentives and structures** that embed sustainability into procurement (RFx criteria/weighting, sustainability-linked contracts and supplier scorecards, capability-building partnerships, e-procurement/data capture, executive oversight) as recommended in sustainable-procurement/SSCM literature *(Appolloni et al., 2014; Curkovic & Sroufe, 2011; Ashby et al., 2012; Jain et al., 2023).*
Definition source (synthesised)	From sustainable-procurement/SSCM literature (ISO 20400; governance and incentive design; supplier development/partnerships; e-procurement for ESG data capture).

Include	RFx criteria/weighting; sustainability-linked contracts (SLCs), incentives/penalties; supplier scorecards; long-term agreements (LTAs) & capability-building; procurement/supplier policies; committee oversight/cadence; e-procurement/data systems.
Exclude	High-level mission statements without procurement levers; ad-hoc projects not embedded in process/contracting.
Indicative keywords / synonyms	RFx; tender/bid; evaluation weighting; contract clause; sustainability-linked; supplier scorecard; LTA/long-term partnership; incentive/penalty; procurement committee; governance; e-procurement; policy/rules.
Typical KPIs (unit)	**%** RFx including sustainability criteria; **%** spend under ESG-linked contracts; **#** strategic partners with improvement plans; **#** capability-building programs; committee meetings **#/year**.
Abbreviations	RFx: Request for X (RFI/RFP/RFQ); SLA: Service-Level Agreement; LTA: Long-Term Agreement; SLC: Sustainability-Linked Contract; ESG: Environmental, Social, Governance.
SDG mapping (with brief rationale)	**SDG 12.7** - sustainable procurement practices (criteria in RFx, contracts); **SDG 12.6** - corporate practices/reporting (governance structures and monitoring).

Theme 6: Performance & Disclosure Quality *(Code: DISCLOSURE)*

Field	Content
Definition	The clarity, completeness, assurance and decision-usefulness of reported sustainability performance (defined baselines and targets, boundaries/coverage, reconciliations to KPI data books, restatements and external assurance) *(Caraiani et al., 2018; Ashby et al., 2012; Garcia-Torres et al., 2022).*

Definition source (synthesised)	From corporate-reporting and accountability literature (decision usefulness, assurance, boundary clarity) and climate-reporting guidance consistent with TCFD.
Include	Baseline year/value, target year/value; boundary/scope statements; reconciliation to the KPI Data Book; external assurance statements (scope/level); restatements and methodology notes; policy/plan vs outcome distinction.
Exclude	Promotional narratives without metrics, boundaries, or assurance; unverifiable claims.
Indicative keywords / synonyms	KPI; baseline; target; boundary/scope/coverage; assurance/verification; methodology; restated; reconciliation; progress.
Typical KPIs (unit)	**%** KPIs with baseline and target; **%** KPIs externally assured; **#** restatements; **#** KPIs with clear boundary notes; on-track/needs-acceleration flags vs target path.
Abbreviations	TCFD: Task Force on Climate-related Financial Disclosures; GRI: Global Reporting Initiative (if referenced); ISAE 3000: International Standard on Assurance Engagements (non-financial).
SDG mapping (with brief rationale)	**SDG 12.6** - encourage companies to adopt sustainable practices **and report** (focus on completeness, clarity, assurance of disclosures).

A4. Keyword & synonym seed list

Core: procurement, purchasing, supplier, partner factory, vendor, traceability, audit, grievance, certification, recycled, circular, low-GHG, Scope 3, carbon neutrality, energy efficiency, due diligence, remediation, RFx, contract, incentive, penalty, policy, target, baseline, assurance.

Latent equivalents: partner/partner factory = supplier; vendor = supplier; carbon

neutrality = net-zero; energy efficiency = energy saving; grievance = complaints mechanism.

A5. KPI computation references

Year-over-year (YoY) relative change.

For any indicator x, YoY is the proportional change from the earlier period:

$$\text{YoY \%} = \left(\frac{x_t}{x_{t-1}} - 1\right) * 100$$

This is the standard "percentage change" formulation used in official statistics (Eurostat, n.d.).

Percentage-point (pp) change for proportions.

When the KPI itself is a percentage (e.g., "% recycled polyester"), the appropriate arithmetic difference is percentage points:

$$\Delta pp \; = \; x_t \; - \; x_{t-1},$$

which Eurostat distinguishes from percentage change when comparing two percentages (Eurostat, n.d.).

Compound annual growth rate (CAGR).

For a multi-year interval from baseline x_0 to current x_T over n years,

$$\text{CAGR} = \left(\frac{x_T}{x_0}\right)^{\frac{1}{n}} - \; 1$$

the geometric endpoint method used in international trade/economic statistics (World Bank, n.d.)

Progress-to-target (share-type KPIs).

Where the target is a **level** to reach (e.g., "30% recycled content by 2025"), a transparent attainment measure is the fraction of target achieved:

$$\text{Progress} = \frac{Current\ level}{T\ \text{arg}\ et\ level}$$

which is consistent with CDP's target-tracking fields and completion logic in its climate guidance (CDP, 2024).

Progress-to-target (absolute reduction vs base year).

For reduction targets framed against a base year (e.g., "−20% Scopes 1+2 by 2030 vs 2019"), the implied target absolute level is

TargetAbs = Baseline × (1−TargetReduction),

and progress is the share of the **required reduction already achieved**:

Progress = Baseline − TargetAbs Baseline−Current .

This "reduction achieved ÷ reduction required" framing follows the GHG Protocol Corporate Standard and its base-year rules that underpin corporate target setting and tracking (World Resources Institute & World Business Council for Sustainable Development, 2004; World Resources Institute, 2013), and is operationalized in CDP's corporate reporting templates (CDP, 2023)