

# Sustainability Practices in Retail Supply Chains: A Comparative Analysis of Global Brands

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## Abstract

This study examines sustainability practices in retail supply chains across major global brands, analyzing how sustainability initiatives are implemented, measured, and communicated. Through comparative analysis of ten leading global retailers, we investigate the depth and breadth of sustainability integration throughout their supply chains. Data from corporate sustainability reports, third-party assessments, and industry benchmarks were analyzed to determine patterns of adoption, implementation challenges, and competitive advantages. Findings reveal significant variation in approach and commitment levels, with European retailers generally demonstrating more mature sustainability frameworks than their North American and Asian counterparts. The research identifies four key dimensions of supply chain sustainability implementation: supplier engagement, materials sourcing, logistics optimization, and transparency mechanisms. Results indicate that while sustainability reporting has become standard practice, substantial gaps exist between public commitments and operational implementation. A sustainability maturity model is proposed to help retailers progress from compliance-focused approaches toward transformative business models that create shared value across the supply chain. The study contributes to understanding how sustainability practices are evolving in global retail and identifies best practices that can be adopted by retailers seeking to enhance their environmental and social performance.

**Keywords:-** Sustainable supply chain management, Retail industry, Environmental sustainability, Corporate social responsibility, Circular economy, Global brands, Comparative analysis.

## I. INTRODUCTION

The retail industry faces mounting pressure to address sustainability challenges throughout its extensive supply chains. These pressures stem from multiple sources: increasing regulatory requirements, consumer demands for ethical and environmentally responsible products, investor focus on environmental, social, and governance (ESG) criteria, and the growing recognition of supply chain vulnerability to climate change impacts (Rajeev et al., 2017). Global retailers, with their significant market reach and complex international supply networks, have substantial influence over production practices and resource utilization across multiple industries and geographies.

Sustainability in retail supply chains encompasses numerous dimensions, including greenhouse gas emissions reduction, waste management, sustainable sourcing, labor practices, water conservation, and the transition toward circular economy principles (Köksal et al., 2017). While many retailers have announced ambitious sustainability targets and initiatives, there remains considerable variation in the scope, depth, and effectiveness of implementation across different organizations and regions (Mejías et al., 2019).

This research aims to analyze how leading global retail brands are integrating sustainability practices into their supply chains and to identify patterns of adoption, implementation challenges, and competitive advantages that emerge from these efforts. By comparing approaches across different retailers and geographical regions, the study seeks to develop insights into

the current state of retail supply chain sustainability and to propose a framework for understanding different maturity levels of sustainability integration.

The specific research objectives are:

- To analyze and compare sustainability practices across the supply chains of ten major global retail brands
- To identify key dimensions of supply chain sustainability implementation and evaluate retailer performance across these dimensions
- To develop a maturity model for classifying retailers' approaches to supply chain sustainability
- To identify best practices and innovations in sustainable supply chain management that can be adopted more widely in the retail sector

The remainder of this paper is structured as follows: Section 2 provides a review of relevant literature on sustainable supply chain management in retail; Section 3 describes the research methodology; Section 4 presents the findings of the comparative analysis; Section 5 discusses the implications of these findings and presents a sustainability maturity model; and Section 6 concludes with recommendations for research and practice.

## II. LITERATURE REVIEW

### 2.1. Evolution of Sustainable Supply Chain Management

Sustainable Supply Chain Management (SSCM) has evolved significantly over the past two decades, transforming from a narrow focus on environmental compliance to a more comprehensive approach that integrates environmental, social, and economic considerations throughout the supply chain (Seuring & Müller, 2008; Carter & Rogers, 2008). This evolution reflects broader shifts in understanding sustainability as a strategic business imperative rather than merely a compliance or reputational issue.

Early research on SSCM emphasized environmental management systems and eco-efficiency, focusing primarily on waste reduction and pollution prevention (Srivastava, 2007). Subsequent work expanded to include social dimensions such as labor practices, community impacts, and human rights (Yawar & Seuring, 2017). More recently, SSCM literature has incorporated circular economy principles, emphasizing closed-loop supply chains, product lifecycle management, and regenerative business models (Geissdoerfer et al., 2018).

In the retail context specifically, SSCM research has examined issues such as sustainable procurement (Wiese et al., 2012), green logistics (Abbasi & Nilsson, 2016), and responsible supplier management (Köksal et al., 2017). Retailers face unique challenges in implementing SSCM due to their position at the consumer-facing end of often lengthy and complex global supply chains, which necessitates managing sustainability impacts that may occur far upstream in their value networks (Chkanikova & Mont, 2015).

### 2.2. Dimensions of Retail Supply Chain Sustainability

Research has identified several key dimensions of sustainability in retail supply chains. Sustainable sourcing focuses on the environmental and social impacts of raw materials and products, including considerations of resource depletion, biodiversity loss, and labor conditions (Krause et al., 2009). Logistics and distribution sustainability addresses transportation emissions, packaging waste, and warehouse operations (Abbasi & Nilsson, 2016). Supplier engagement encompasses approaches to monitoring, incentivizing, and developing supplier capabilities for sustainability (Tachizawa et al., 2015).

Product design for sustainability in retail involves considerations of durability, repairability, recyclability, and reduced material intensity (De Angelis et al., 2018). End-of-life management addresses take-back systems, recycling programs, and waste reduction initiatives (Bernon et al., 2018). Additionally, transparency and traceability mechanisms enable verification of sustainability claims and foster accountability throughout the supply chain (Mol, 2015).

### 2.3. Regional Variations in Retail Sustainability Approaches

Previous studies have documented regional variations in approaches to supply chain sustainability. European retailers have generally been found to adopt more proactive sustainability strategies, influenced by stronger regulatory frameworks, consumer awareness, and stakeholder expectations (Schramm-Klein et al., 2015). North American retailers have often emphasized efficiency-driven approaches focused on cost reduction and risk management (Kumar et al., 2012). Asian retailers have increasingly engaged with sustainability, though with significant variation across countries and with particular emphasis on social responsibility dimensions (Li et al., 2014).

These regional differences reflect variations in regulatory environments, market expectations, cultural factors, and competitive dynamics. However, as sustainability becomes more globalized as a business concern, some convergence in practices has been observed, particularly among multinational retailers operating across multiple regions (Gualandris et al., 2014).

### 2.4. Maturity Models in Sustainable Supply Chain Management

Several researchers have proposed maturity models to classify organizations' approaches to sustainable supply chain management. (Van Bommel, 2011) developed a model with four stages: reactive, functional, integrated, and extended. (Okongwu et al., 2013) proposed a five-level maturity model ranging from non-compliance to leadership. (Reefke et al., 2014) offered a capability maturity model specific to supply chain sustainability with stages from initial through optimized.

These models generally share a progression from compliance-driven approaches through increasing levels of strategic integration, concluding with transformative approaches that fundamentally reshape business models. However, limited research

has applied such models specifically to retail supply chains or conducted comparative analyses of major global retailers using these frameworks.

## 2.5. Research Gap

While substantial literature exists on SSCM generally and on specific aspects of retail sustainability, there remains a need for comprehensive comparative analyses of how major global retailers are implementing sustainability across their supply chains. This research aims to address this gap by conducting a systematic comparison of ten leading global retailers, evaluating their performance across key sustainability dimensions, and proposing a maturity model specific to retail supply chain sustainability.

# III. METHODOLOGY

## 3.1. Research Design

This study employs a mixed-methods comparative case study approach to analyze sustainability practices in the supply chains of ten global retail brands. The comparative case study method was selected for its suitability in examining complex phenomena across multiple organizations and contexts (Yin, 2018). The research combines qualitative content analysis of sustainability reports and other corporate documents with quantitative analysis of sustainability performance metrics to develop a comprehensive understanding of retailers' approaches.

## 3.2. Sample Selection

Ten global retailers were selected based on the following criteria:

- Among the top 50 global retailers by revenue
- Representation across different retail sectors (general merchandise, grocery, apparel, and specialty)
- Geographical diversity (North America, Europe, and Asia-Pacific)
- Availability of comprehensive sustainability reporting for the period 2020-2023

Based on these criteria, the following retailers were included in the study:

- Walmart (USA, General Merchandise)
- Amazon (USA, E-commerce/General Merchandise)
- Inditex/Zara (Spain, Apparel)
- H&M Group (Sweden, Apparel)
- Carrefour (France, Grocery)
- Tesco (UK, Grocery)
- Target (USA, General Merchandise)
- IKEA (Sweden, Specialty/Home Furnishings)
- Aeon (Japan, General Merchandise/Grocery)
- Alibaba Group (China, E-commerce/General Merchandise)

## 3.3. Data Collection

Data were collected from multiple sources to enable triangulation and enhance reliability:

- *Corporate sustainability reports*: The most recent three years (2020-2023) of sustainability/ESG reports from each retailer were analyzed.
- *Annual reports and financial filings*: Relevant sustainability information from annual reports, 10-K filings, and similar documents was extracted.
- *Third-party assessments*: Ratings and evaluations from organizations such as CDP (formerly Carbon Disclosure Project), Dow Jones Sustainability Index, and MSCI ESG were collected.
- *Industry benchmarks*: Data from the Sustainable Apparel Coalition, Consumer Goods Forum, and other sector-specific initiatives were analyzed.
- *Corporate websites and press releases*: Additional information on sustainability initiatives and updates was gathered from official corporate communications.

## 3.4. Data Analysis

The collected data were analyzed using a systematic content analysis approach combining both qualitative and quantitative methods:

- *Coding framework development*: Based on the literature review, a comprehensive coding framework was developed to categorize sustainability practices across key dimensions:
  - Supplier engagement and management
  - Materials sourcing and product design
  - Logistics and distribution
  - Transparency and traceability
  - Circular economy initiatives
  - Climate change mitigation and adaptation
  - Social responsibility in supply chains

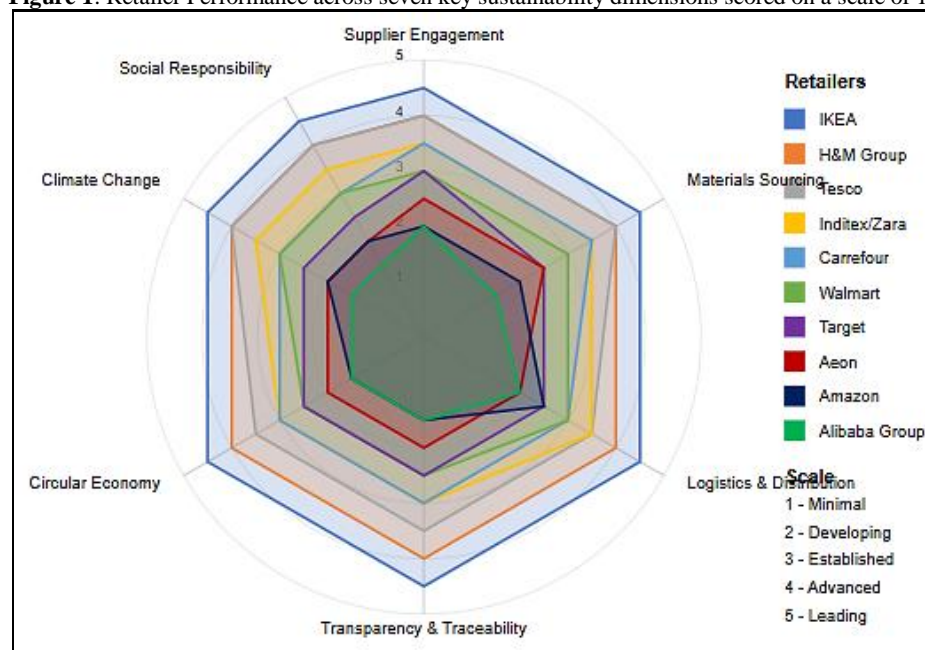
- *Content analysis*: Corporate documents were analyzed using the coding framework to identify and categorize sustainability practices, commitments, targets, and performance metrics.
- *Performance scoring*: A scoring system was developed to evaluate retailers' performance across each sustainability dimension on a scale of 1-5, based on:
  - Comprehensiveness of approach
  - Ambitiousness of targets
  - Implementation evidence
  - Performance metrics and results
  - External validation (third-party certifications, awards)
- *Comparative analysis*: Retailers' scores across dimensions were compared to identify patterns, best practices, and gaps. Regional, sectoral, and company-size comparisons were conducted.
- *Maturity model development*: Based on the cross-case analysis, a sustainability maturity model specific to retail supply chains was developed to classify retailers' overall approaches.

## IV. FINDINGS

### 4.1. Overview of Retailer Sustainability Performance

The analysis revealed considerable variation in sustainability performance across the ten retailers studied. Figure 1 presents an overview of retailer performance across the seven key sustainability dimensions, based on the 1-5 scoring system.

**Figure 1:** Retailer Performance across seven key sustainability dimensions scored on a scale of 1-5



Several patterns emerged from this analysis:

- *Regional differences*: European retailers (Inditex, H&M, Carrefour, Tesco, IKEA) generally demonstrated more comprehensive sustainability approaches than their North American and Asian counterparts, particularly in materials sourcing and circular economy initiatives.
- *Sector variations*: Apparel retailers (Inditex, H&M) showed stronger performance in materials sourcing and supplier engagement, while grocery retailers (Carrefour, Tesco) excelled in food waste reduction and sustainable agriculture initiatives.
- *Company size effects*: Larger retailers by revenue (Walmart, Amazon) demonstrated advantages in climate initiatives requiring significant capital investment but were not necessarily leaders across all dimensions.
- *Leadership clusters*: IKEA, H&M, and Tesco emerged as overall sustainability leaders, with strong performance across most dimensions. Amazon and Alibaba scored lowest overall, with particular gaps in transparency and circular economy initiatives.

### 4.2. Analysis of Key Sustainability Dimensions

#### 4.2.1. Supplier Engagement and Management

Supplier engagement approaches varied significantly across retailers. Leading practices included:

- *Tiered supplier programs*: IKEA and H&M implemented sophisticated tiered approaches that differentiated requirements and support based on supplier strategic importance and sustainability maturity.



- *Capability building*: Walmart's Gigaton Initiative provided suppliers with technical assistance and tools to reduce emissions, while Inditex's The List program shared expertise on chemical management.
- *Collaborative innovation*: Tesco's Supplier Network facilitated peer learning and joint problem-solving among suppliers facing similar sustainability challenges.
- *Financial incentives*: Carrefour introduced preferential financing terms for suppliers meeting sustainability criteria, while IKEA offered longer-term contracts to high-performing sustainable suppliers.

The analysis found that most retailers focused supplier engagement primarily on tier 1 suppliers, with limited visibility or influence beyond this level. Only three retailers (IKEA, H&M, and Inditex) demonstrated comprehensive approaches to engaging tier 2 and 3 suppliers.

#### 4.2.2. Materials Sourcing and Product Design

Materials sourcing strategies showed clear sectoral patterns:

- *Apparel retailers*: H&M and Inditex led in sustainable fiber sourcing, with commitments to 100% sustainable cotton by 2025 and increasing use of recycled materials.
- *Home furnishings*: IKEA demonstrated leadership in sustainable wood sourcing, with 98% of wood from FSC-certified or recycled sources.
- *Grocery retailers*: Tesco and Carrefour emphasized sustainable agriculture certifications and local sourcing programs.
- *General merchandise*: Target's sustainability requirements covered 14 high-impact product categories, while Walmart focused primarily on packaging reduction.

Product design approaches similarly varied by sector, with apparel and home furnishings retailers showing more advanced incorporation of sustainability criteria into design processes.

#### 4.2.3. Logistics and Distribution

Climate impact reduction in logistics emerged as a focus area across all retailers:

- *Fleet electrification*: Amazon committed to deploying 100,000 electric delivery vehicles by 2030, while Walmart aimed to electrify its entire fleet by 2040.
- *Alternative fuels*: Carrefour and Tesco increasingly utilized biofuel and natural gas vehicles for medium and heavy transport.
- *Logistics optimization*: Alibaba's smart routing algorithms reduced delivery distances by 30%, while Target's load optimization reduced transportation emissions by 22%.
- *Facilities*: IKEA invested heavily in renewable energy for distribution centers, achieving 90% renewable electricity across operations.

The analysis found that while transportation emissions received substantial attention, packaging sustainability varied considerably, with European retailers generally implementing more comprehensive approaches to packaging reduction and reuse.

#### 4.2.4. Transparency and Traceability

Transparency emerged as a key differentiator among retailers:

- *Supply chain mapping*: H&M and Inditex published full lists of tier 1 suppliers and partial tier 2 supplier information.
- *Product-level transparency*: IKEA's product sustainability scorecards provided customers with environmental impact information for major product lines.
- *Blockchain initiatives*: Walmart piloted blockchain traceability for food safety in produce, while Carrefour implemented blockchain for 20 product lines allowing consumers to access origin information.
- *Reporting comprehensiveness*: Tesco's detailed sustainability reporting included disclosure of challenges and setbacks alongside achievements.

Amazon and Alibaba demonstrated the least transparency, with limited disclosure of supplier information and sustainability metrics.

#### 4.2.5. Additional Dimensions

Detailed analysis of circular economy initiatives, climate change responses, and social responsibility practices revealed similar patterns of variation, with European retailers generally demonstrating more comprehensive approaches, particularly in circular business models and scope 3 emissions reduction strategies.

### 4.3. Sustainability Maturity Classification

Based on the cross-dimensional analysis, retailers were classified into four maturity levels:

- *Compliance-Focused (Level 1)*: Primarily driven by regulatory requirements and risk management. Amazon and Alibaba fell primarily into this category.
- *Efficiency-Driven (Level 2)*: Emphasizing sustainability initiatives that deliver cost savings and operational efficiencies. Walmart, Target, and Aeon demonstrated many characteristics of this approach.

- *Strategic Integration (Level 3)*: Embedding sustainability as a core business value with comprehensive programs across dimensions. Carrefour and Inditex showed strong alignment with this level.
- *Transformative (Level 4)*: Fundamentally reshaping business models around sustainability principles to create shared value. IKEA, H&M, and Tesco exhibited numerous aspects of this approach, though none had fully achieved transformation across all dimensions.

**Table 1:** distribution of retailers across maturity levels





Maturity Level	Key Characteristics	Retailers
<b>Level 4: Transformative</b>	<ul style="list-style-type: none"> <li>• Shared value creation</li> <li>• System change approach</li> <li>• Entire value chain scope</li> <li>• Business model innovation</li> </ul>	
<b>Level 3: Strategic Integration</b>	<ul style="list-style-type: none"> <li>• Competitive advantage focus</li> <li>• Extended supply chain scope</li> <li>• Comprehensive programs</li> <li>• Extensive reporting</li> </ul>	
<b>Level 2: Efficiency- Driven</b>	<ul style="list-style-type: none"> <li>• Cost savings and efficiency</li> <li>• Own operations + tier 1 suppliers</li> <li>• Systematic programs</li> <li>• Operational efficiency KPIs</li> </ul>	
<b>Level 1: Compliance- Focused</b>	<ul style="list-style-type: none"> <li>• Regulatory requirements</li> <li>• Risk management</li> <li>• Own operations focus</li> <li>• Basic compliance metrics</li> </ul>	

Table 1, illustrates the distribution of retailers across these maturity levels, showing the predominant level for each retailer while acknowledging that most demonstrated characteristics of multiple levels across different dimensions.

**Keys:** Circle position indicates retailer's primary maturity level and Retailers typically exhibit characteristics across multiple levels:

- Level 4 retailers show strong performance in most dimensions but may have gaps
- Level 3 retailers often demonstrate Level 4 characteristics in select dimensions
- Level 2 retailers may show Level 3 characteristics in specific focus areas
- Level 1 retailers primarily focus on compliance but may show efficiency in select operations

## V. DISCUSSION

### 5.1. Retail Supply Chain Sustainability Maturity Model

Building on the empirical findings and extending previous work on sustainability maturity models (Van Bommel, 2011; Okongwu et al., 2013; Reefke et al., 2014), we propose a Retail Supply Chain Sustainability Maturity Model that captures the evolutionary progression observed among global retailers.

#### Level 1: Compliance-Focused

- *Primary drivers*: Regulatory requirements, risk management, reputational concerns
- *Scope*: Focused on own operations with limited supplier requirements
- *Approach*: Reactive, addressing issues as they arise
- *Metrics*: Basic compliance measures, limited public disclosure
- *Organizational integration*: Sustainability as a specialized function

#### Level 2: Efficiency-Driven

- *Primary drivers*: Cost savings, operational efficiencies, waste reduction
- *Scope*: Own operations and key tier 1 suppliers
- *Approach*: Systematic programs targeting "low-hanging fruit"
- *Metrics*: Operational efficiency KPIs, some public reporting
- *Organizational integration*: Sustainability integrated into operations

#### Level 3: Strategic Integration

- *Primary drivers*: Competitive advantage, stakeholder expectations, purpose alignment
- *Scope*: Extended supply chain including tier 2+ suppliers
- *Approach*: Comprehensive programs with ambitious targets
- *Metrics*: Detailed KPIs across environmental and social dimensions, extensive reporting

- *Organizational integration*: Sustainability embedded in strategy and governance

#### Level 4: Transformative

- *Primary drivers*: Shared value creation, system change, regenerative approach
- *Scope*: Entire value chain and broader industry ecosystems
- *Approach*: Fundamental business model innovation
- *Metrics*: Impact-oriented measures, integrated financial and sustainability reporting
- *Organizational integration*: Sustainability fully embedded in all business decisions

This model provides a framework for retailers to assess their current approaches and identify pathways for advancing sustainability maturity. The analysis suggests that most retailers operate across multiple maturity levels simultaneously, with some dimensions more advanced than others.

### 5.2. Enablers and Barriers to Sustainability Advancement

The comparative analysis identified several key factors that enable or hinder retailers' progression to higher sustainability maturity levels:

#### Enablers:

- Senior leadership commitment and clear governance structures
- Integration of sustainability into strategic planning and capital allocation
- Supplier collaboration and capability building programs
- Technology investments in traceability and data analytics
- Incentive alignment across the organization
- Consumer engagement and education initiatives

#### Barriers:

- Short-term financial pressure and quarterly earnings focus
- Complexity and opacity of multi-tier supply chains
- Lack of standardized measurement approaches
- Consumer price sensitivity and willingness to pay
- Regulatory inconsistency across global markets
- Legacy systems and organizational silos

Retailers that successfully advanced to higher maturity levels demonstrated systematic approaches to leveraging enablers and overcoming barriers, particularly through strong governance mechanisms and strategic alignment of sustainability with core business objectives.

### 5.3. Regional Contexts and Convergence Trends

The findings confirmed previous research on regional variations in sustainability approaches (Schramm-Klein et al., 2015; Kumar et al., 2012; Li et al., 2014), with European retailers generally demonstrating more mature sustainability practices. This regional variation appears to be driven by several factors:

- Stronger regulatory frameworks in Europe, including extended producer responsibility laws
- Higher consumer expectations and willingness to pay for sustainability in European markets
- More developed stakeholder engagement traditions and social expectations
- Earlier adoption of sustainability as a strategic priority

However, the analysis also identified evidence of convergence in certain practices, particularly in areas such as climate commitments, where science-based targets have become increasingly standardized across regions. North American retailers showed accelerating adoption of sustainability practices pioneered by European counterparts, while Asian retailers demonstrated rapid advancement in technology-enabled sustainability solutions.

### 5.4. Linking Sustainability Performance to Business Outcomes

The relationship between sustainability performance and business outcomes emerged as complex and multifaceted. While the research did not establish direct causal relationships, several patterns were observed:

- Retailers at higher sustainability maturity levels (3 and 4) generally demonstrated stronger long-term financial performance over the study period.
- Sustainability leaders reported benefits in supplier relationship stability, employee engagement, and consumer loyalty.
- Efficiency-driven sustainability initiatives (Level 2) consistently delivered cost savings and operational improvements.
- Transformative approaches (Level 4) opened new revenue streams through circular business models and sustainability-focused product innovations.

These observations align with previous research suggesting that sustainability can enhance business performance through multiple pathways, including risk reduction, efficiency improvements, value creation, and reputational benefits (Esty & Winston, 2009).

## VI. CONCLUSION

### 6.1. Theoretical Contributions

This research makes several contributions to the literature on sustainable supply chain management in retail:

- It provides a comprehensive comparative analysis of sustainability practices across major global retailers, documenting the current state of implementation and identifying patterns of variation.
- It develops and empirically validates a Retail Supply Chain Sustainability Maturity Model that describes the evolutionary progression of retailers' approaches.
- It identifies key dimensions of supply chain sustainability implementation and documents best practices within each dimension.
- It contributes to understanding the regional, sectoral, and organizational factors that influence retailers' sustainability approaches and performance.

### 6.2. Practical Implications

For retail practitioners, this research offers several actionable insights:

- *Maturity assessment:* Retailers can use the proposed maturity model to assess their current sustainability approaches and identify areas for advancement.
- *Dimension prioritization:* The dimensional analysis helps retailers identify where to focus efforts based on their strategic priorities and current performance gaps.
- *Best practice adoption:* The documented best practices across dimensions provide a roadmap for retailers seeking to enhance specific aspects of their sustainability approach.
- *Strategic alignment:* The findings underscore the importance of aligning sustainability initiatives with core business strategy and governance to advance beyond efficiency-driven approaches.

### 6.3. Limitations and Future Research

This study has several limitations that suggest directions for future research:

- The analysis relied primarily on publicly available information, which may not fully capture internal practices and implementation challenges. Future research could incorporate primary data collection through interviews and surveys with retail sustainability practitioners.
- The sample size of ten retailers, while providing depth of analysis, limits generalizability. Larger-scale studies could test the identified patterns across a broader range of retailers.
- The cross-sectional design provides a snapshot of current practices but limited insight into longitudinal development. Future research could track retailers' sustainability evolution over time.
- Causality between sustainability practices and business outcomes was not established. More focused studies on specific dimensions could investigate these relationships more directly.

Additional promising directions for future research include examining how emerging technologies like artificial intelligence and blockchain are transforming sustainability capabilities in retail supply chains, investigating the role of policy and regulation in driving sustainability adoption across different markets, and exploring how retailers can more effectively engage consumers in sustainable consumption behaviors.

In conclusion, this comparative analysis of sustainability practices in retail supply chains reveals significant variation in approaches and maturity levels across global brands. While some retailers are pioneering transformative approaches that fundamentally reimagine their business models around sustainability principles, others remain focused primarily on compliance and efficiency. The proposed maturity model offers a framework for understanding this variation and for guiding retailers' progression toward more comprehensive and impactful sustainability integration throughout their supply chains.

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