

Sustaining resilience: a dual agenda for both greener and resilient supply chains in the house care product sector

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ABSTRACT

The intertwining of sustainability and supply chain resilience has emerged as a critical concern for organizations striving to maintain competitiveness while adhering to environmental and social governance principles. However, the pursuit of supply chain resilience often presents apparent contradictions with sustainability objectives. This study aims to bridge the gap between sustainability and supply chain resilience. Employing a scoping literature review, this research analyzes high quality articles from renowned databases, emphasizing systematic reviews and case studies within the domain. By synthesizing insights from both academic literature and real-world organizational practices, this study seeks to expand the existing knowledge base, offering a unique understanding of the methodologies that both facilitate the construction of greener and resilient supply chains particularly in the house care product industry.

Key-words: Supply chain resilience, sustainability, literature review, risk management, green supply chain, FMCG, house care product

1. Introduction

Supply chains are crucial to the global economy enabling efficient movement of goods and services. However, they are increasingly susceptible to disruptions caused by natural disasters, geopolitical conflicts, pandemics like COVID-19, or fluctuating consumer demands (Ivanov, 2020). At the same time, sustainability has become a non-negotiable priority due to rising consumer awareness, environmental regulations, and the intensifying impacts of climate change. As the house care products industry increasingly adopts green practices, supply chain resilience, defined as the ability to anticipate, respond to, and recover from disruptions,

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becomes essential for withstanding sudden shocks while maintaining supply integrity and sustainability goals (Ponomarov & Holcomb, 2009). However, a significant challenge arises from the potential contradictions between sustainability and resilience. The house care products industry faces unique issues such as hazardous chemical waste, plastic pollution, and high water and energy consumption, which threaten environmental sustainability (Sahota, 2014). Efforts to reduce these environmental harms often require new materials, operational processes, and distribution channels, increasing costs and potentially undermining supply chain resilience. Striking a balance between these two essential goals is paramount for multinational organizations that must simultaneously improve environmental performance while protecting against supply chain risks.

This research aims to explore the nuances of sustainability and resilience efforts within the house care products sector. By understanding the contradictions between these two objectives, the study analyzes how leading multinational organizations can balance them through strategies and practices. The research seeks to uncover the methods employed to maintain supply chain resilience while improving sustainability, thereby reducing environmental impact and enhancing operational continuity. The study's research questions are:

- What are the currently trending efforts of multinational organizations towards increasing sustainability?
- How do multinational organizations balance sustainability efforts with supply chain resilience to mitigate risks?

The study implements a scoping literature review, analyzing top-cited, high-quality articles from Scopus, Web of Science, and Google Scholar, focusing on systematic reviews and case studies relevant to supply chain resilience and sustainability. Furthermore, the sustainability efforts of six leading multinational organizations are examined through their annual reports and sustainability disclosures. This provides first-hand insights into their achievements, challenges, and strategic alignment between sustainability and resilience, complementing the learnings from the literature review. The structure of the study consists of a literature review section, followed by a methodological chapter. The study then presents the results of the organizational report analysis and compares the learnings from the literature review and results chapter in the discussion. The research concludes with a conclusion section.

Given the rising emphasis on environmental accountability and the unpredictable nature of global markets, this study is vital for its practical implications. It aims to aid companies in understanding how sustainability and resilience can be jointly achieved without compromising

each other. Insights can help policymakers, managers, and supply chain practitioners create frameworks that integrate these principles, ultimately leading to greener and more resilient supply chains. This research contributes to academia and practice by bridging the knowledge gap between sustainability and resilience within the FMCG sector, particularly the house care products industry. By investigating leading multinational organizations, the study yields first-hand information on innovative strategies and practices that can inspire future research while offering organizations actionable frameworks to bolster their resilience without compromising sustainability.

2. Literature review

The 2020s have brought unprecedented challenges and opportunities for supply chains globally, highlighting the importance of both sustainability and resilience. The COVID-19 pandemic underscored the fragility of traditional supply networks and their susceptibility to disruptions (Ivanov, 2020). Simultaneously, the urgency of climate change, resource depletion, and waste management has prompted increased regulatory, consumer, and investor pressure to adopt sustainable practices. Sarkis, 2021 emphasized that organizations must recalibrate their supply chains to navigate the twin challenges of ensuring environmental stewardship and operational continuity. He argued that supply chains lacking resilience and sustainability are at risk of prolonged disruptions and losing competitive advantages. Similarly, (Kumar et al., 2020) highlighted that sustainable supply chain practices should not only minimize environmental impact but also reduce operational risks, providing the agility to swiftly respond to market changes.

To ensure the correct interpretation of sustainability and resilience, the study presents frequently used definitions of both terms. Clearly defining sustainability and resilience assists in later clarifying the contradictions between the two efforts towards organizational success. Sustainability, as a concept, has evolved over time and encompasses a comprehensive set of principles. Elkington's (1998) "Triple Bottom Line" concept remains foundational, describing sustainability through three dimensions: economic viability, social equity, and environmental protection. Ahi & Searcy, 2013 expanded on this definition, stating that sustainable supply chain management incorporates the "creation of coordinated supply chain networks" that integrate social and environmental concerns while achieving long-term economic performance. The Brundtland report from 1987 defines sustainability as the efforts towards "development that meets the needs of the present without compromising the ability of future generations to

meet their own needs.” The United Nations Sustainable Development Goals (SDGs) further define 17 goals for organizations across environmental, social, and economic dimensions, covering a range of topics from climate action to social justice, further breaking down and defining the exact actions businesses can take to improve their environmental impacts.

In contrast, supply chain resilience is often defined in the literature as the ability to anticipate, adapt to, and recover from disruptions. (Ponomarov & Holcomb, 2009) described it as "the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them while maintaining continuity of operations." This definition aligns with the work of Christopher et al., 2004, who noted the importance of agility in building resilient supply chains that can quickly pivot to new strategies when disruptions occur. In their work, the definition of resilience is “the ability of a supply chain to anticipate, prepare for, and adapt to unexpected disruptions, and to recover quickly.” (Ivanov, 2020) introduced the concept of "viability," emphasizing the intertwined nature of resilience and sustainability. According to them, a viable supply chain goes beyond recovery and continuity by also considering long-term adaptability to ensure both operational and environmental robustness.

The house care products industry within the FMCG sector faces several challenges regarding sustainability and environmental impacts due to its reliance on intensive production processes and hazardous materials. House care products, particularly cleaning agents and detergents, often require resource-intensive manufacturing processes. This dependency leads to substantial energy consumption and significant contributions to greenhouse gas emissions. Palm oil, a key ingredient in many cleaning and beauty products, exemplifies these challenges. It has been at the center of significant environmental controversy due to the widespread deforestation caused by palm oil plantations, leading to habitat destruction, loss of biodiversity, and increased carbon emissions from the burning of peatlands (Khatun et al., 2017; Singh et al., 2009). Additionally, expanding plantations often encroach on indigenous lands, raising social and ethical concerns. Many house care products require water-based production processes, making water consumption a critical issue. According to (Sahota, 2014), cleaning agents, detergents, and other house care products heavily depend on water during both production and use. This demand strains local water resources and can further escalate water scarcity in already limited regions. Moreover, the wastewater produced often contains chemicals that can further harm aquatic ecosystems if not properly treated.

The house care products industry also relies heavily on plastic packaging for product safety and shelf stability, resulting in a significant amount of plastic waste. Single-use plastic packaging, such as bottles and sachets, often ends up in landfills or oceans, contributing to the growing

global plastic pollution problem (Jambeck et al., 2015). Recycling rates for these materials are low, and improper disposal can lead to microplastic contamination of water and soil. Many cleaning products contain harmful chemicals, such as surfactants, phosphates, and bleach, that can lead to water pollution, bioaccumulation, and the disruption of aquatic ecosystems (Linke, 2014). Additionally, the use of volatile organic compounds (VOCs) in aerosols contributes to air pollution and can exacerbate respiratory issues in vulnerable populations.

The house care products industry must also navigate complex social and ethical issues. The sourcing of raw materials, like palm oil, can result in labor exploitation, land grabbing, and conflicts with local communities (Schilling-Vacaflor et al., 2021). Furthermore, the predominance of large multinational corporations in the industry often leads to practices that may undermine fair wages or workers' rights in developing countries where production is outsourced. Additionally, the marketing and distribution of these products can sometimes fail to provide transparency regarding ingredients, potentially misleading consumers about the safety or environmental impact of the products they purchase.

Reviewing the available literature on the field, it is clear that the house care product industry is making significant strides toward sustainability by implementing a range of strategies to mitigate environmental harm and enhance social responsibility. A common approach among companies involves optimizing production processes to reduce resource and energy consumption. Advanced manufacturing technologies that decrease energy requirements are becoming prevalent, alongside shifts towards renewable energy sources to power operations (Urciuoli et al., 2014). The sustainability of raw materials, particularly those like palm oil associated with deforestation and biodiversity loss, is a critical focus. Companies are increasingly committing to sourcing all agricultural raw materials sustainably. Certification schemes, such as those by the Roundtable on Sustainable Palm Oil (RSPO), are often employed to ensure that suppliers adhere to established environmental and social standards (Sahota, 2014). Water-intensive production processes are receiving more attention, with efforts geared towards reducing water usage and improving water management across operations. Investments in water recycling technologies and initiatives to decrease water use, particularly in regions facing water scarcity, are examples of strategies employed to enhance water stewardship (Urciuoli et al., 2014). Organizations are also taking steps towards customer education, teaching consumers to also use products and consume water in a mindful way.

Innovations in packaging design and materials are critical in addressing the plastic waste challenge. There is an industry-wide movement towards using materials derived from recycled content or developing biodegradable packaging solutions to reduce the lifecycle environmental

impact of packaging. Efforts include enhancing the recyclability of packaging and reducing reliance on single-use plastics. The literature highlights that a growing number of organizations are incorporating circular economy principles into their sustainability agendas (Negri et al., 2021). Reducing the environmental and health impacts of chemicals used in cleaning products is another focus area. Companies are reformulating products to eliminate harmful chemicals and improve their biodegradability, utilizing green chemistry principles to leverage natural ingredients and safer synthetic alternatives (Levesque, 2012; Moore & Manring, 2009).

The endeavor to simultaneously achieve sustainability and resilience in supply chains often presents contradictory objectives, particularly within the FMCG sector. The literature outlines several areas where the goals of environmental sustainability can clash with the objectives of building resilient supply chains. For example, lean practices focus on reducing waste and enhancing efficiency, often by minimizing inventory levels across the supply chain. However, such strategies can conflict with the need for safety stocks, which are crucial for resilience by providing a buffer against supply disruptions (Christopher, 2011). The tension between maintaining minimal inventory for sustainability and ensuring sufficient stock to guard against disruptions poses a significant challenge. Safety stocks, while ensuring production flow, also increase the risk of scrapping in case of demand fluctuations, further enhancing waste and environmental harm.

Globalization has allowed companies to leverage cost efficiencies through offshoring production to low-cost countries. This approach, however, often results in extended, complex supply chains that are susceptible to various risks, including geopolitical tensions and transportation delays (Ivanov et al., 2017). Conversely, reshoring and local sourcing enhance resilience by shortening the supply chain and reducing dependency on distant suppliers, but they may increase costs and impact the environmental benefits gained from economies of scale achieved through global sourcing. Complex supply chains can offer more sources for raw materials and components, potentially increasing sustainability by allowing companies to choose more environmentally friendly options. However, such complexity can make supply chains less transparent and harder to manage during disruptions (Ivanov, 2020). Simplifying the supply chain might enhance resilience by making it easier to manage and control, but it may limit the ability to optimize for sustainability if fewer suppliers are engaged, especially if those fewer options are less committed to environmentally friendly practices.

Ethical sourcing, procuring materials in a way that is respectful to the environment and beneficial to the communities involved, often comes at a higher cost. These practices are crucial for sustainability but can contradict the goal of minimizing costs for better financial resilience

(Ahi & Searcy, 2013). Using recyclable materials supports sustainability by reducing waste and the demand for virgin resources. However, these materials can sometimes be less durable or reliable than non-recyclable alternatives, potentially reducing the overall resilience of the product or packaging to physical stresses or environmental factors. Organizations often do not have complete knowledge of what the recycled material was made of, or the altering source material poses threats of varying quality. Despite this, recycled materials are often even more expensive to source compared to virgin plastic. This trade-off poses a great dilemma: opt for potentially less effective but more sustainable materials, or choose more robust, less sustainable options (Negri et al., 2021).

The push for faster delivery times, particularly in consumer markets, often results in less efficient transportation modes, such as air freight, which have higher carbon footprints than sea or rail transport. This requirement for speed can undermine efforts to reduce environmental impacts, presenting a direct contradiction between providing quick service (enhancing customer satisfaction and resilience) and reducing ecological footprints (Ivanov, 2022). Table 1 shows the most frequently highlighted contradictions between resilience and sustainability based on the literature review.

Table 6. *Organizational contradictions between sustainability and resilience*

Sustainability favored approach	Supply Chain Resilience favored approach	Literature reference
Lean practices	Safety stocks	Christopher, M., Lowson, R., & Peck, H. (2004).
Global sourcing	Reshoring and local sourcing	Ivanov, D. (2022).
Complex supply chains	Simplification in supply chain	Ivanov, D., & Dolgui, A. (2020).
Ethical sourcing	Cost efficiency	Ahi, P., & Searcy, C. (2013).
Use of recyclable materials	Use of non-recyclable virgin materials	Negri, M., Cagno, E., Colicchia, C., & Sarkis, J. (2021).
Slow, sustainable logistics	Fast logistics (e.g., air freight)	Ivanov, D. (2022).

Source: Own editing based on Literature review

Organizations within the house care products industry are increasingly adopting integrated strategies to balance the demands of sustainability and resilience. Circular economy principles are pivotal in transitioning towards sustainable and resilient supply chains. These practices involve redesigning product life cycles through recycling and reusing materials, ultimately reducing waste and minimizing resource consumption (Ibn-Mohammed et al., 2021). Implementing closed-loop supply chains also plays a crucial role as it maximizes product life cycles and reduces environmental impact by keeping resources in use for as long as possible and recovering products at the end of their life cycles. This approach not only reduces the reliance on raw materials but also enhances resilience by decreasing vulnerability to raw material price volatility and supply disruptions (Chen et al., 2021).

Establishing a diverse and flexible network of suppliers helps organizations mitigate risks and ensure continuity in supply chains. By diversifying sources, companies are less likely to face severe disruptions if one supplier fails. Collaborating with suppliers to ensure they adopt sustainable practices is also essential, as this alignment helps to uphold sustainability standards across the entire supply chain. This approach enhances resilience by ensuring a more robust and reliable supply base (Hall et al., 2022). Building strong relationships with suppliers is fundamental to fostering sustainable practices and improving resilience. Engaging in joint initiatives to promote sustainability can lead to shared benefits, such as reduced costs and improved environmental performance. Furthermore, these collaborations often facilitate knowledge sharing on perceived risks and best practices, which can help preempt and mitigate potential supply chain disruptions (Wang et al., 2009). Where feasible, increasing the proportion of locally sourced materials can reduce transportation emissions and strengthen community relationships, enhancing both sustainability and supply chain resilience by reducing dependency on long, vulnerable supply lines (Sarkis, 2021). Demanding certifications like ISO

14001 (environmental management) and FSC (Forest Stewardship Council) demonstrates an organization's commitment to sustainability and ensures compliance with environmental standards. Regular audits are vital to maintain these certifications, encouraging continuous improvement and adherence to best practices in sustainability (Atilgan & McCullen, 2011).

Flexible manufacturing processes allow companies to adapt quickly to changing demands and reduce waste, supporting both sustainable operations and resilient supply chains. This flexibility can include the ability to switch inputs, adapt production processes, or even repurpose facilities to respond to supply chain disruptions. Additionally, developing robust distribution networks with alternative routes and modalities ensures continuity of operations during unexpected disruptions, enhancing resilience (Brandon-Jones et al., 2014). Utilizing advanced technologies like AI and IoT within supply chains can lead to greater efficiencies and improved monitoring of environmental impacts. These technologies help in predicting disruptions and optimizing resource use, aligning with both sustainability and resilience (Ivanov, 2020).

3. Methodology

The research employs a scoping literature review, followed by a content analysis approach, reviewing annual reports, sustainability reports, and SDG (Sustainable Development Goals) reports from the top six FMCG companies in the house care products industry: Procter & Gamble, Unilever, Johnson & Johnson, L'Oréal, Colgate-Palmolive and Henkel. The top six companies were defined based on annual revenue of 2022 by Statista³ within the FMCG sector limited to organizations producing house cleaning, house care, and beauty products. These reports are crucial for understanding the practical and organizational measures, leading companies are implementing to address sustainability challenges. The use of organizational reports is a direct method to extract specific data about corporate sustainability strategies, actions, and outcomes (Siraj & Fayek, 2019). A review framework is set on which the content analysis evaluates and overviews the available organizational reports. The key factors searched for are sustainability goals, clear sustainability projects, quantitative KPIs, SDG goals, potential challenges, and development plans. All available annual and sustainability reports of the reviewed organizations from 2022 were analyzed based on recurring themes within NVivo.

By analyzing the real-world data from organizational reports, the research aims to gain depth, providing insights into the actual practices and results of sustainability initiatives. This practical analysis helps bridge the gap between theoretical sustainability frameworks and their real-world applications, offering a clear picture of how strategies are implemented and how they perform

³ <https://www.statista.com/companies/ranking/3/top-100-consumer-goods-and-fmngc-companies>

(Yin, 2018). Reviewing and comparing the sustainability reports of the top FMCG companies enables the identification of common practices and unique strategies across the industry. This comparative approach not only highlights the best practices but also reveals the variability in how different organizations address similar challenges (Mays et al., 2004). By setting the findings from the organizational reports against the existing literature, the study ensures a rigorous theoretical grounding.

4. Results

The following section of the research reviews the sustainability projects and goals of the six international organizations chosen for analysis in the methodology of the research. The results are presented based on the findings from the thematic analysis of the annual and sustainability reports based on recurring factors.

Procter & Gamble (P&G) has a well-articulated sustainability strategy embedded in its "Ambition 2030" goals, which aim to enable and inspire positive impacts on the environment and society while creating value for the company and consumers. P&G is committed to becoming carbon neutral by 2030 by reducing its operational emissions. For any residual emissions that cannot be eliminated, the company plans to invest in natural climate solutions. This initiative aligns with broader global efforts to tackle climate change by reducing greenhouse gas emissions. By 2030, P&G aims to ensure 100% of its consumer packaging is recyclable or reusable. Approximately 79% of their packaging had already met these criteria, indicating substantial progress toward this goal. P&G has expanded its sustainability targets across all product categories, aiming to reduce supply chain emissions by 40% per unit of production by 2030. This broad focus on Scope 3 emissions, which include indirect emissions from activities such as raw material production and transportation, reflects an understanding of the company's extensive environmental footprint beyond direct operations. The company is also focused on building a water-positive future. P&G aims to restore more water than is used at their manufacturing sites in water-stressed areas and from the use of their products in water-stressed metropolitan areas. This commitment is part of a comprehensive water strategy that includes reducing water use in operations and enhancing water efficiency in their products.

Colgate-Palmolive's sustainability initiatives align with its broader corporate responsibility to enhance environmental and social impacts worldwide. The company's 2025 Sustainability & Social Impact Strategy highlights several key objectives. Colgate-Palmolive has set a goal to achieve net zero carbon emissions by 2040 across its operations and supply chain, with a

significant focus on reducing the carbon footprint of its products and processes. The company aims to enhance the recyclability of its products, notably transitioning over 40% of its toothpaste SKUs to recyclable tubes globally by the end of 2022. This initiative also includes sharing this technology with third parties to promote broader industry adoption. Colgate-Palmolive is committed to significant reductions in water usage across its operations, aligning with best practices for conserving water resources in its manufacturing and supply chain processes. Beyond environmental actions, Colgate-Palmolive emphasizes its social impact, particularly in advancing health and hygiene. Initiatives like the "Colgate Bright Smiles, Bright Futures" program, which reaches millions of children worldwide, highlight its dedication to improving oral health and hygiene education.

Johnson & Johnson's commitment to sustainability and corporate responsibility is extensively outlined in their "Health for Humanity 2025 Goals." Their strategy encompasses several key areas, focusing on environmental health, social impact, and governance, which are crucial to their mission of transforming global healthcare. Johnson & Johnson is committed to improving access to healthcare globally, particularly in low- and middle-income countries. They aim to provide medicines, technologies, and support to underprivileged areas, reflecting their strategic priority to enable global health equity. Their environmental initiatives include significant commitments to reducing greenhouse gas emissions, with a notable achievement of securing 100% renewable electricity for their operations in Europe and Brazil. They are also focused on sustainable product innovations, such as developing more recyclable product packaging and reducing the environmental footprint of their product formulations. Johnson & Johnson places a high emphasis on diversity and inclusion within their workforce. They have achieved notable diversity in management positions and continue to foster an inclusive culture through various programs and training that support employee development and engagement.

J&J also invests heavily in research and development to improve health outcomes and ensure the safety and quality of their products. Furthermore, they uphold high standards of governance and ethical practices across their supply chain, as reflected in their detailed reporting and compliance measures. Johnson & Johnson's approach includes collaborating with various stakeholders to enhance sustainability across their operations. This involves engaging with suppliers to ensure responsible sourcing and working with partners to address challenges like waste management and water use.

L'Oréal's sustainability strategy is encapsulated in its "L'Oréal for the Future" program, which aims to transform the company's business model to be more sustainable and responsible by 2030. L'Oréal has set ambitious targets to reduce the carbon footprint of its sites and products.

By 2025, the company aims to achieve carbon-neutral status across all its sites through enhanced energy efficiency and 100% renewable energy usage. Furthermore, L'Oréal is working towards enabling consumers to reduce their greenhouse gas emissions from product usage by 25% per average finished product, compared to 2016 levels, by 2030. The company has committed to making 100% of the water used in its industrial processes recyclable and reusable in a loop by 2030, addressing both the conservation and quality of water resources. L'Oréal aims to ensure that 100% of the bio-based ingredients for formulas and packaging materials are traceable and come from sustainable sources by 2030. The target includes a firm stance against deforestation and the promotion of biodiversity. By 2030, L'Oréal also plans to recycle or reuse 100% of the waste generated at its industrial sites, demonstrating a commitment to zero waste in production.

The company's social commitments include ambitious goals to improve the lives of people around the globe. By 2030, L'Oréal aims to benefit 3 million people through its brands' social engagement programs and help 100,000 people from disadvantaged communities gain access to employment. L'Oréal is committed to eco-designing 100% of its products by 2030, ensuring that every new product developed has a reduced environmental footprint.

Unilever's sustainability strategy, as outlined in its recent reports and updates, reflects a comprehensive and multifaceted approach designed to address a range of environmental and social challenges through ambitious goals. Unilever has set a target to achieve net-zero emissions across its value chain by 2039. To facilitate this, the company has introduced detailed plans such as the Climate Transition Action Plan (CTAP), which includes significant reductions in Scope 3 emissions, aiming for a 39% absolute reduction by 2030. Unilever's efforts extend to working closely with suppliers to encourage them to adopt science-based targets for reducing their emissions. The company is committed to reducing plastic waste and improving the recyclability of its products, pledging to ensure all its plastic packaging is reusable, recyclable, or compostable by 2025. Moreover, Unilever is investing in circular economy solutions to reduce overall waste and increase the sustainability of its packaging materials. The company aims to implement water stewardship programs that reduce water usage and improve water management across its operations, particularly in water-stressed areas. This involves enhancing the efficiency of water use in its manufacturing processes and adopting technologies that support sustainable water management. Unilever places a strong emphasis on enhancing the livelihoods and well-being of people across its value chain, which includes improving health, nutrition, hygiene, and overall quality of life through various initiatives and programs. Additionally, Unilever is dedicated to ensuring fair labor practices and enhancing diversity and

inclusion within its workforce. The company is also focused on sustainable sourcing practices, which includes efforts to ensure that the raw materials used in its products are sustainably sourced, with particular attention to preventing deforestation and promoting biodiversity.

Henkel's 2022 sustainability efforts are encapsulated in its "2030+ Sustainability Ambition Framework," which outlines a comprehensive approach aimed at major ecological and social advancements. Henkel has made significant strides in increasing the use of renewable energy across its operations, aiming for greater sustainability in energy consumption. The company has entered into a 10-year virtual Power Purchase Agreement with IGNIS to ensure the supply of around 200 GWh per year of renewable energy to their European sites. Henkel is focusing on enhancing the sustainability of its packaging, including the relaunch of the Schauma hair care brand, where the PE bottle bodies now consist of 50% recycled plastic, and the PET bottle bodies consist of at least 98% recycled plastic. Additionally, Henkel has invested in an innovation fund from Emerald Technology Ventures to support the development of sustainable packaging technologies. Henkel's "Sustainability at Heart" program aims to educate and engage employees more deeply on sustainability issues. The company has also launched extensive aid initiatives, such as a partnership with Habitat for Humanity to support refugee families in Romania. Henkel has improved the traceability rate for palm-based raw materials to 89%, reflecting its commitment to greater transparency and sustainability in its supply chains. The company has strengthened collaboration with customers and partners in sustainability through platforms like the Innovation & Sustainability Days event and the Henkel Inspiration Center in Düsseldorf. These initiatives facilitate cross-industry exchanges and the development of sustainable solutions. Table 2 shows the consolidated efforts and agendas of the reviewed organizations.

Table 7. Organizational comparison: Sustainability goals

Sustainability Topic	Procter & Gamble	Unilever	Johnson & Johnson	L’Oréal	Henkel	Colgate-Palmolive
Climate Action	Carbon neutral operations by 2030; Reduce GHG emissions 50% by 2030	Net zero emissions by 2039	100% renewable electricity in Europe	Carbon-neutral sites by 2025	65% reduction in carbon footprint by 2025	Net Zero carbon emissions by 2040
Sustainable Packaging	100% recyclable/reusable packaging by 2030	100% reusable, recyclable, or compostable	Sustainable product packaging	100% of plastic packaging from recycled or bio-based	100% recyclable or reusable packaging by 2025	Transition to recyclable toothpaste tubes

		packaging by 2025		sources by 2030		
Water Stewardship	Enhancing water efficiency by 35% in products	Improve water management and reduce usage by 40%	20% water reduction in operations	100% of water in industrial processes recycled/reused by 2030	Improve water efficiency at production sites	Significant reductions in water usage
Waste Reduction	Zero manufacturing waste to landfill	Reduce waste and increase recycling	100% recycle or reuse all industrial waste	100% waste recycling at industrial sites	Increase proportion of recycled materials	Enhance recyclability of products
Social Impact	Partnerships to enhance sustainability	Improve livelihoods and well-being globally	Global health equity and access to healthcare	Social engagement programs benefiting millions	Commitment to social responsibility	"Colgate Bright Smiles, Bright Futures" program
Sustainable Sourcing	Supply chain emissions reduction, 100% renewable electricity	100% sustainable sourcing with zero deforestation focus	Ethical sourcing and supplier engagement	Traceable and sustainable sourcing of bio-based ingredients	Sustainable sourcing practices	Promoting broader adoption of sustainable practices

Source: Own editing based on organizational reports

The commitment of major multinational companies like Procter & Gamble, Unilever, Johnson & Johnson, L'Oréal, Colgate-Palmolive, and Henkel to the United Nations Sustainable Development Goals (SDGs) underscores their strategic approach to sustainability. Each of these organizations integrates various SDGs into their operations and sustainability reporting, reflecting their focus on addressing global challenges through corporate action. Procter & Gamble actively supports SDGs related to clean water and sanitation (SDG 6) through its water conservation initiatives and to responsible consumption and production (SDG 12) with its commitment to sustainable packaging and reduced greenhouse gas emissions, integrated into their broader "Ambition 2030" goals. Unilever's sustainability strategy, the Unilever Compass, directly addresses a broad range of SDGs, including SDG 3 (Good Health and Well-being) through their product formulations that aim to improve health outcomes, and SDG 13 (Climate Action) by setting ambitious targets to reduce carbon emissions across their value chain by 2039. They also focus on SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities) by fostering inclusive work environments and supporting diverse communities.

Johnson & Johnson emphasizes SDG 3 through their extensive global public health programs and supports SDG 13 by sourcing renewable energy and striving for carbon neutrality in their operations. Additionally, their focus on SDG 5 is reflected in initiatives to empower women within healthcare settings and beyond. L'Oréal commits to SDG 12 by improving the environmental impact of their products through sustainable sourcing and eco-design. Their strong commitment to SDG 13 is evident in their aggressive carbon reduction targets and efforts to achieve carbon-neutral manufacturing sites. Colgate-Palmolive prioritizes SDG 6 with programs aimed at reducing water use and improving water conservation techniques within their operations. Their commitment to SDG 12 is highlighted through efforts to make packaging more recyclable and the development of sustainability innovations such as recyclable toothpaste tubes. Henkel demonstrates a strong alignment with SDG 12 by promoting circular economy principles across its product lines and focusing heavily on reducing waste and increasing the recyclability of its packaging materials. Henkel also supports SDG 7 (Affordable and Clean Energy) by entering long-term agreements to use renewable energy sources for their operations.

Table 8. Organizational comparison: SDG goals

SDG Topic	Procter & Gamble	Unilever	Johnson & Johnson	L'Oréal	Colgate-Palmolive	Henkel
SDG 3: Good Health and Well-being	Health hygiene education programs	Product formulations to improve health	Global public health programs	Products improving health outcomes	Health and hygiene education programs	Safety and health standards at workplaces
SDG 5: Gender Equality	Diversity and inclusion initiatives	Programs for empowering women in communities	Workplace diversity initiatives	Initiatives for gender parity in employment	Programs supporting women's leadership	Gender diversity and inclusion efforts
SDG 6: Clean Water and Sanitation	Water conservation initiatives	Water stewardship in production	Water use reduction efforts	Sustainable water management practices	Significant water reductions in operations	Water efficiency and recycling practices
SDG 7: Affordable and Clean Energy	Renewable energy initiatives	Renewable energy targets	Commitments to carbon neutrality	Commitments to renewable energy usage	Energy efficiency improvements	Renewable energy contracts
SDG 12: Responsible Consumption and Production	Sustainable packaging; Waste reduction	Circular economy focus; Waste reduction	Sustainable sourcing and recycling practices	Eco-design of products; Recycling initiatives	Recyclable packaging and waste reduction	Circular economy practices; Waste management
SDG 13: Climate Action	Carbon neutrality goals	Net-zero emissions strategy	Renewable energy and carbon reduction	Carbon reduction targets	Net Zero carbon emissions commitment	Climate protection initiatives

Source: Own editing based on organizational reports

In pursuing their sustainability agendas while maintaining supply chain resilience, companies like Procter & Gamble, Unilever, Johnson & Johnson, L'Oréal, Colgate-Palmolive, and Henkel face significant challenges and compromises, as communicated in their reporting. Balancing these dual objectives often requires navigating complex trade-offs, where advances in one area might necessitate concessions in another. Investing in sustainable technologies and processes can be expensive. Upfront costs for renewable energy installations, sustainable sourcing, and advanced recycling technologies may impact short-term financial performance.

Building resilience often involves diversifying suppliers and increasing inventory levels to guard against disruptions. However, these strategies can conflict with goals such as reducing emissions and waste associated with increased logistics and production. Simplifying the supply chain to improve sustainability can sometimes reduce its resilience against global disruptions, such as those seen during the COVID-19 pandemic. The shift towards sustainable materials, for example, biodegradable or recyclable packaging, can conflict with performance and durability standards required for supply chain efficiency. Sustainable materials may not yet have the same performance characteristics as traditional materials, potentially compromising product quality or shelf life, which is critical for maintaining supply chain effectiveness.

As companies expand into new markets, they must navigate varying regulatory environments that may not always align with their sustainability goals. For instance, some regions might lack the infrastructure for recycling or renewable energy, which complicates efforts to maintain a consistent sustainability standard across all operations. The drive for rapid innovation and faster product development cycles to stay competitive can conflict with the thorough assessment and integration of sustainability principles. Ensuring that new products or processes are both sustainable and resilient can require more time and resources, potentially slowing down innovation cycles. Balancing stakeholder expectations can be challenging. Investors may seek quick returns, whereas sustainability initiatives often require long-term investments with delayed payoffs. Similarly, consumers demand sustainable products but are not always willing to pay a premium for them, placing additional pressure on profit margins.

The reviewed multinational organizations communicate a range of practical strategies to ensure both supply chain resilience and sustainability. Unilever and Henkel are investing in localizing their production and sourcing to reduce dependency on long supply chains, which minimizes transport emissions and enhances resilience by spreading risk. Procter & Gamble implements diversified sourcing strategies to mitigate risks from geopolitical issues or natural disasters affecting specific regions. Johnson & Johnson and L'Oréal have committed to significant increases in their use of renewable energy, reducing greenhouse gas emissions and enhancing energy independence, which contributes to both sustainability and operational resilience. Colgate-Palmolive aims for net-zero carbon emissions by 2040, which includes transitioning to renewable energy sources across its operations.

Procter & Gamble, L'Oréal, and Henkel focus on sustainable packaging solutions, aiming to make all packaging recyclable or reusable by 2030. This initiative not only addresses waste reduction but also ensures the supply chain's adaptability to evolving regulatory environments concerning packaging waste. Henkel emphasizes increasing the recyclability of materials used

in their products by incorporating more recycled plastics and reducing packaging weight. Unilever utilizes sophisticated forecasting tools to predict demand more accurately, allowing for more efficient inventory management. This strategy reduces waste and ensures product availability, balancing the goals of sustainability and resilience. Johnson & Johnson employs robust scenario planning to manage inventory efficiently across its global supply chain, ensuring that they can respond to sudden market or operational changes without excessive stockpiling.

Colgate-Palmolive and Unilever work closely with their suppliers to build capacities in sustainable practices and ensure compliance with environmental standards. This collaboration not only fosters more sustainable supply chains but also enhances their resilience by creating more reliable and compliant supplier networks. Henkel runs training and engagement programs with suppliers to promote sustainable development and ensure a stable supply of sustainably sourced materials. L'Oréal has invested heavily in the development of new, sustainable product formulas and manufacturing processes that reduce environmental impact and improve efficiency. Procter & Gamble collaborates with external partners to innovate in areas like low-resource laundry solutions, demonstrating a commitment to sustainability that also offers potential resilience benefits through reduced dependency on water and energy.

These strategies reflect how these companies integrate sustainability into their core operational practices while enhancing the resilience of their supply chains. The approaches are diverse and tailored to each company's specific operational needs and strategic goals, showcasing a sophisticated understanding of the dual challenges of sustainability and resilience in today's global market environment.

5. Discussion

The research has explored insights by reviewing the available theoretical frameworks discussed in the literature review and the practical applications and strategies deployed by leading multinational organizations in the house care product sector. The synthesis of the discussion section reveals both the complexities and the innovative approaches that bridge the gaps between sustainability goals and supply chain resilience.

The literature review highlighted the evolving nature of sustainability, traditionally defined by the triple bottom line approach, encompassing environmental, social, and economic dimensions, as well as the critical importance of resilience in maintaining supply chain continuity amidst disruptions (Sahota, 2014). Organizations are increasingly required to

integrate these sometimes contradictory goals to thrive in a volatile global market. The real-world application of these theoretical concepts by companies like Procter & Gamble, Unilever, Johnson & Johnson, L'Oréal, Colgate-Palmolive, and Henkel illustrates a strategic alignment of sustainability initiatives with resilience tactics. From the organizational reports, it is evident that companies face significant challenges such as cost management, regulatory compliance, and stakeholder expectations in their journey toward sustainability. For instance, efforts to reduce resource consumption and greenhouse gas emissions must be carefully balanced against the need for robust supply chains that can withstand various disruptions. These companies often resort to innovative solutions such as diversifying suppliers, investing in renewable energy, and redesigning products with sustainable materials to maintain both their competitive edge and operational readiness.

The comparative analysis reveals that companies are employing several innovative strategies to meet their sustainability and resilience goals. Companies are making strides in implementing closed-loop systems where resources are reused to minimize waste (Chen et al., 2021), exemplified by Henkel's investment in sustainable packaging technologies. To reduce emissions from transportation and improve supply chain agility, firms like Unilever and Henkel are increasingly localizing their manufacturing and sourcing operations. The use of AI and IoT to predict disruptions and optimize resource use is becoming prevalent, as seen in Johnson & Johnson's scenario planning for inventory management. Effective stakeholder engagement, highlighted as a crucial element in the literature, is validated by the practices observed in these organizations (Srinivasan et al., 2022). Through collaborations with NGOs, government bodies, and other partners, companies are not only enhancing their resilience capabilities but also advancing their sustainability agendas (Hall et al., 2022). For example, Colgate-Palmolive's "Bright Smiles, Bright Futures" program demonstrates a commitment to social impact, aligning with global health and education goals.

From the analysis of both the literature and the sustainability reports of prominent multinational organizations, it is clear that there are several trending efforts towards increasing sustainability. These efforts include a significant push towards reducing carbon emissions, with most companies setting ambitious goals to achieve net-zero emissions within the next few decades (Ivanov, 2020). For example, Procter & Gamble aims to be carbon neutral by 2030, while Unilever has set a target for net-zero emissions across its value chain by 2039. Water stewardship is also prominent, with companies like Henkel investing in technologies and practices that reduce water usage and increase recycling in their operations. Additionally, these

companies focus on sustainable sourcing to ensure that the materials they use, such as palm oil, are obtained in environmentally friendly and socially responsible ways.

Sustainable packaging is another major focus, with companies like L'Oréal committing to making all their plastic packaging from recycled or bio-based sources by 2030. Similarly, Johnson & Johnson, Henkel and Colgate-Palmolive are enhancing their product packaging to improve recyclability and reduce environmental impact.

Multinational organizations balance sustainability efforts with supply chain resilience through several strategic approaches. One common strategy is diversifying sourcing and enhancing local production to minimize dependency on long, complex supply chains, which reduces both emissions and vulnerability to global disruptions (Sahu et al., 2016). For instance, Unilever and Henkel are investing in localizing production, which not only supports sustainability by reducing transport emissions but also enhances resilience by spreading supply chain risks. Another strategy is investing in renewable energy and energy efficiency to not only reduce greenhouse gas emissions but also improve energy independence, crucial for maintaining operational continuity in the face of disruptions. For example, Johnson & Johnson is achieving carbon neutrality in its operations by sourcing 100% of its electricity from renewable sources.

Technological integration plays a critical role as well, with advanced forecasting and inventory management systems being used to efficiently balance inventory levels, thereby reducing waste and ensuring product availability (Ivanov et al., 2017). Unilever's use of sophisticated forecasting tools is a prime example of how technology can align sustainability with resilience. Supply chain collaborations and partnerships are also vital. These organizations work closely with suppliers to foster sustainable practices and build capacities that ensure compliance with environmental standards, which in turn supports supply chain resilience by creating a more reliable and compliant supplier network.

Overall, the drive to balance sustainability with resilience is leading these organizations to innovate and continuously adapt their strategies to meet both environmental and operational challenges effectively. This synthesis of strategic approaches demonstrates a nuanced understanding of the dual objectives within the framework of current global trends and organizational behavior. These insights not only enrich the academic discourse on supply chain management but also offer practical frameworks for companies aiming to enhance their sustainability and resilience in a complex global market.

6. Conclusion

The intertwining of sustainability and supply chain resilience in the house care product sector forms the backbone of this study, addressing the apparent contradictions between these two essential organizational objectives. While sustainability initiatives often focus on long-term environmental and social benefits, resilience strategies emphasize the robustness and quick recovery of supply chains from disruptions. The research utilized a scoping literature review combined with a content analysis of annual and sustainability reports from top multinational companies in the house care products industry. This method allowed for an in-depth examination of how these corporations integrate sustainability into their business models while maintaining resilient supply chains.

The findings highlight that leading multinational organizations are actively engaging in various sustainability efforts, such as adopting renewable energy sources, implementing sustainable packaging, and enhancing supply chain transparency. These companies balance these sustainability efforts with supply chain resilience through strategic diversification, robust risk management frameworks, and innovative supply chain designs that incorporate flexibility and adaptability.

The study primarily relies on data from officially published company reports, which may present a polished view of corporate activities, potentially overlooking internal challenges and external criticisms. The focus on only the top six companies in the house care product sector also limits the generalizability of the results across the entire industry or to smaller enterprises with different resources and influence.

Future studies could adopt a more quantitative approach to rigorously assess the impacts of sustainability and resilience strategies on organizational performance and supply chain efficiency. Additionally, expanding the research to include a wider range of companies, including small and medium-sized enterprises, could provide a more comprehensive understanding of the industry's challenges and innovations. Further exploration into the trade-offs and synergies between different sustainability goals and resilience strategies would also enrich the academic and practical knowledge base, supporting the development of more integrated and effective business practices. This study advances the understanding of how sustainability and resilience can be synergized within the house care products sector, offering a blueprint for other industries aiming to navigate the complex interplay between environmental stewardship and operational robustness.

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