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The role of vertical quasi-integration strategy in creating more sustainable supply-chains: the case of Procter and Gamble

of. Francesca Romana Ardui

SUPERVISOR

Prof. Alessandro Zattoni

CO-SUPERVISOR

Andrea Oliva (775681)

CANDIDATE

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ABSTRACT

Today's businesses face increasing uncertainty and risk in supply-chain management due to significant global disruptions, including the COVID-19 pandemic, geopolitical conflicts, technological advancements, and heightened demands for sustainability.

Specifically, governments and different stakeholders are now more than ever, exerting growing pressure on both global and local companies for sustainability.

In this context, companies must pursue innovative strategies that strengthen supply-chain resilience and enhance environmental sustainability.

Through the theoretical lenses of stakeholder and institutional theory, this thesis explores the strategic role of vertical quasi-integration in achieving sustainable supply-chain management, focusing particularly on environmental aspects and green logistics.

Using a qualitative single case study approach, the research aims to demonstrate how quasi-integration practices, such as strategic partnerships and collaborative supplier-customer relationships, may effectively address sustainability issues.

Overall, the analysis reveals that vertical quasi-integration supports sustainability goals by facilitating coordinated efforts, joint investments in resources, and aligning incentives among supply-chain stakeholders.

Essential factors for success include strong relational skills, innovative technological solutions, and effective management of trade-offs.

Moreover, the study emphasizes the critical role of building trust and flexible contractual arrangements in fostering sustainable logistics.

In conclusion, this research contributes to academic knowledge by linking theories of supply-chain integration with sustainability practices. It also offers actionable insights for managers aiming to implement effective and adaptable sustainability initiatives within their integrated supply-chain networks.

Introduction

Modern businesses grapple with a tremendously high level of risk in managing their supply chain, due to a variety of factors such as the COVID-19 pandemic, the Ukrainian war, the advent of generative AI, and the pressure for sustainability (Duong, Vo, et al. 2023).

Firms operating in an uncertain environment must cope with many disruptions (Duong, Pham, et al. 2023), which have made the supply-chain networks far more vulnerable, particularly with regards to sustainability issues (Ngo et al. 2024). In the last few years, a growing body of literature has highlighted the importance of sustainability for dealing with risks of disruption (Chaudhuri et al., 2023; Karmaker et al., 2023; Rasheed, 2022).

Socio-environmental problems such as climate change, air pollution and waste management are, now more than ever, an increasingly delicate and profoundly sensitive subject, which is considered to be the future of supply chain management (Khan et al., 2021).

The European Union (EU) and European companies are pursuing net-zero carbon targets by 2050, prioritizing decarbonization efforts, particularly in manufacturing, which accounts for 20% of the region's emissions, and, more broadly, in each step of supply chains, which underscores the field's pressing need for transformation, (Steiner et al. 2024).

Accordingly, in recent years the EU has promoted numerous regulatory initiatives to enhance the sustainability of supply chains, with a particular focus on decarbonisation, reduction of carbon emissions, and circular economy.

From a regulatory perspective, the EU is shifting from a transparency-based approach to one centred on mandatory action. Indeed, in the past, companies were primarily required to disclose their environmental impact while today’s directives aim to actively prevent and mitigate climate harm. For instance, the Corporate Sustainability Due Diligence Directive (CSDDD) introduces an obligation for large companies to adopt climate transition plans aligned with the Paris

Agreement. These plans must include short and medium-term emission reduction targets based on scientific evidence, as well as outline the decarbonization measures the company will implement, (Sinnig and Zetzsche 2025).

This regulatory framework marks a fundamental shift. The CSDDD moves the focus from disclosure obligations to the active prevention of adverse impacts across the supply chain.

In other words, companies will no longer merely report on their supply chain emissions but will also be required to implement concrete measures to reduce them, facing legal liability in cases of inadequate environmental due diligence.

Moreover, the Corporate Sustainability Reporting Directive (CSRD), which entered into force in January 2023, significantly expands and strengthens sustainability reporting requirements. This new regulatory framework mandates all large European companies, and eventually many listed SMEs, to publish detailed reports on their environmental, social, and governance (ESG) impacts. Replacing the 2014 Non-Financial Reporting Directive (NFRD), criticized for its inadequacy in supporting the Green Deal's objectives, the CSRD represents a critical step toward greater corporate accountability and transparency in sustainability practices, (Odobaša and Marošević 2023).

Indeed, the CSRD requires companies to disclose not only their emissions but also resource utilization, waste generation, climate-related risks, decarbonization strategies and circularity measures integrated into their business models.

This approach, designed by the new EU directives, combines public and private enforcement mechanisms, since both stakeholders and institutions are now, more than ever, deeply connected to the sustainability results of companies, (Sinnig and Zetzsche 2025).

In light of these considerations, the relevance of sustainability within today's socio-economic landscape becomes undeniably clear, especially when considering the potential impact of sustainable practices in affecting companies' corporate strategy and competitive advantage (Liao & Kuo, 2014).

Accordingly, research emphasize the importance of developing sustainability

strategies that can help navigating the evolving economic landscape characterized by high uncertainty and growing challenges (Sheth & Uslay, 2023). Indeed, companies are increasingly turning to innovative strategies to enhance sustainability within their supply chains, both internally and externally.

For example, many studies have investigated the development of collaboration and coordination strategies within the supply-chain in the context of circular economy (Chen et al., 2017; Sudusinghe & Seuring, 2022).

Despite the extensive body of literature on the topic, there are still many research opportunities in the area of collaboration and coordination mechanisms including contracts, long-term partnerships, knowledge management and value alignment with suppliers, customers, and other stakeholders (Farooque et al., 2019). In the literature, this type of strategic relationship often falls within the definition of vertical quasi-integration or supply-chain integration (Flynn et al., 2010). In order to fill this gap, it is crucial to better understand supply-chain integration strategies, which have often been neglected in the literature, and whether they can be helpful to reach the goal of developing more sustainable supply-chains. The present dissertation aims at investigating the nuances of vertical quasi-integration strategy, or supply-chain integration, illustrating how it could be beneficial in enhancing the sustainability of the supply-chain, with a specific focus on environmental implications. In order to contribute to the extension of supply-chain integration theory in relation to the sustainability topic, a case study approach has been deployed so that to offer insight into a real-world process that quantitative data could not have easily revealed (Eisenhardt & Graebner, 2007).

The dissertation is structured as follows: in Chapter 1 a literature review has been conducted to give evidence of the current state of knowledge on stakeholder and institutional theory, sustainable supply-chain management, vertical quasi-integration, supply-chain integration, collaborative practices; and, ultimately, to formulate the research question, which will be the basis for the next step of the study.

Within Chapter 2, the research methodology is presented, along with the data collection strategy adopted to conduct the qualitative research, the interviews and archival data analysis. Chapter 3 provides a detailed introduction to the case study conducted at Procter & Gamble, by outlining the company's sustainability strategy. Chapter 4 outlines the results and their discussion, providing an answer to the research question by taking into account the results retrieved. The findings contributes towards the extension of the existing literature on supply-chain integration and sustainabilty, while offering actionable insights that can help other companies, operating in the same or different industries, which are facing similar challenges and objectives to those analyzed throughout the case study. Concluding remarks, as well as future research directions, are given in Chapter 5.

CHAPTER 1: Literature Review

1.1 Theoretical background

In this chapter, the theoretical background supporting the present research is presented. More specifically, the framework for this study is based on both stakeholder and institutional theory, which will be used as theoretical lenses for the following analysis.

The rationale behind the use of these theories is directly tied to the scope of the research, that is to explore the role of collaborative strategies in shaping successful sustainable outcomes throughout the supply-chain.

Indeed, such theories allow to understand how institutional pressures influence the adoption and implementation of sustainability practices across supply chains, and how the collaboration between different stakeholders may help achieving mutually beneficial outcomes in the long term (Menke, Hüsemann, and Siems 2021).

Moreover, the following sections provide an overview of the existing literature on sustainable supply-chain management and vertical integration strategy.

1.2 Stakeholder Theory

Stakeholder theory states that businesses must account for the interests of all parties affected by their operations, not just shareholders, but also customers, suppliers, employees, regulators, non-governmental organizations (NGOs), communities, and others (Li et al. 2025).

Thus, every actor that possesses a legitimate claim or stake in an organization can be considered as a stakeholder (Siems, Seuring, and Schilling 2023).

Originally advanced by Freeman (1984) and later expanded by other researchers, this perspective emphasizes that a firm's success and legitimacy depend on how well it manages relationships with all these stakeholders (Li et al. 2025).

Stakeholder theory provides a useful lens for understanding how power dynamics and relationship management shape decision-making across supply chain, thereby influencing its overall performance and resilience.

As firms increasingly rely on external partners for value creation, their ability to coordinate, negotiate, and align with a diverse set of stakeholders, has become essential to achieving operational and strategic objectives (Tapaninaho and Kujala 2019).

Recent empirical research supports this perspective, demonstrating that stakeholder engagement enhances supply chain collaboration, risk mitigation, and responsiveness, particularly in complex or globalized contexts (Foerstl et al. 2021).

Thus, stakeholder theory provides a conceptual foundation for viewing the supply chain as a network of interdependent stakeholders. Acknowledging each party's resources and claims leads to more coordinated governance and collaboration, and thus superior performance outcomes (Li et al. 2025).

When it comes to sustainability, the theory may provide a foundation for understanding why companies adopt environmentally and socially responsible practices. Indeed, as said before, firms are pressured to meet rising expectations from diverse stakeholder groups who demand better environmental stewardship and social accountability.

In other words, sustainable supply chain management (SSCM) can be seen as a strategic response to stakeholder demands for ethical, transparent, and eco-friendly supply chain practices.

Recent literature demonstrates that stakeholder pressures are a critical driver for implementing SSCM initiatives.

Indeed, both internal and external stakeholders such as governmental bodies and NGOs frequently act as key drivers, pushing firms to incorporate sustainability

criteria into procurement, manufacturing, and logistics decisions (Meixell and Luoma 2015).

Moreover, research indicates that pressure from powerful stakeholders, such as major suppliers, customers or government regulators, correlates with greater adoption of green supply chain practices and corporate social responsibility programs across industries (Hebaz, Oulfarsi, and Sahib Eddine 2024).

At the same time, stakeholders' related drivers are linked with competitive advantage. Indeed, firms that nurture interconnected relationship with their stakeholders, can obtain significant advantage in terms of both business and sustainability advantage (Qazi, Appolloni, and Shaikh 2024).

This suggests that managing stakeholder relationships is not only about external pressure but can align with strategic business benefits in sustainable supply chains.

Overall, stakeholder theory effectively explains why firms are motivated to integrate sustainability into supply chain management, that is to satisfy the demands and uphold the trust of those who have a stake in or influence on the supply chain's outcomes. It also explains that through proactive engagement with different actors along the supply chain companies can build capabilities, increase sustainability awareness, and jointly develop innovative solutions (Siems, Seuring, and Schilling 2023).

1.3 Institutional Theory

Institutional theory provides another lens to analyse why external pressures and norms shape sustainable practices.

The theory states that companies operate within a broader institutional environment of regulations, industry standards, cultural norms, and peer influences that can strongly determine their behaviour (Scott 2014).

To secure legitimacy and survival, firms often conform to these institutional pressures, which are usually categorized as coercive, normative, and mimetic (DiMaggio and Powell 2000).

Coercive pressures stem from formal mandates or rules, such as government laws, environmental regulations, and penalties that push firms to adopt certain sustainable practices (Saeed et al. 2018).

Normative pressures arise from values, expectations, and norms diffused by professional bodies, industry associations, or society at large.

Finally, mimetic pressures occur under uncertainty when firms imitate the behaviour of peers or competitors, especially those perceived as successful or legitimate, such as copying a leading company's sustainability strategy to stay competitive or credible (Saeed et al. 2018).

Research has shown that stronger coercive regulations, such as stricter environmental laws or mandatory emissions reporting, often correlate with higher adoption of green supply chain practices by companies operating in those jurisdictions (Zhu, Sarkis, and Lai 2013).

As an example, the before mentioned European Union's evolving regulatory framework, which is moving from voluntary transparency to mandatory action on supply chain due diligence and decarbonization, exerts coercive pressure that has prompted firms to integrate sustainability into logistics and sourcing decisions.

Furthermore, industries often develop sustainability norms and firms feel compelled to comply in order to be viewed as reputable by customers and partners.

Indeed, businesses usually act quickly to maintain their legitimacy when sustainable practices are accepted as standard operating procedures, or as licenses to operate, (Hebaz, Oulfarsi, and Sahib Eddine 2024).

The combined effect of these institutional forces is that sustainability becomes increasingly embedded in the routines and strategies of supply chain management, not merely as an optional innovation, but as an accepted and expected way of doing business, (Saeed et al. 2018).

In this sense, a company's sustainability performance is often a reflection of the institutional context it operates in, shaped by laws, norms, and the broader cultural environment that define acceptable business conduct.

Accordingly, institutional theory richly explains why organizations adopt sustainable practices, often to attain legitimacy or avoid sanctions.

However, researchers argue that while institutional theory is excellent for explaining external drivers of SSCM, it provides little guidance on how to implement sustainable practices effectively inside the firm, (Saeed et al. 2018).

Thus, from a theorical standpoint, the intersection between stakeholder theory and institutional theory may serve as an integrated perspective to understand not just the institutional "why", that is the external reasons driving sustainability, but also the managerial "how", the relationships and processes between stakeholders needed to truly achieve sustainable supply chain outcomes, (Shahzad et al. 2022).

1.4 Sustainable supply-chain management

As said before, the discussion on sustainability has gained growing attention over the past decades, emerging as an important strategic outlook (Negri et al., 2021).
For instance, the concept of 'net zero emissions', defined as the goal to reach overall carbon neutrality which leads to a zero-carbon footprint, has transitioned from being a subject of scientific discussion to serving as a guiding principle for international, national, subnational, and corporate initiatives to fight climate change (Matemilola, 2020; Oshiro et al., 2018).
An agreement among 196 nations, formalized in Paris in 2016, established a target to limit the global average temperature rise to well below 2°C above pre-industrial levels, with an additional aim of restricting the increase to 1.5°C above pre-industrial levels. Achieving the objectives of the Paris Agreement necessitates attaining net-zero CO2 emissions worldwide by 2050, which will require the implementation of robust policies and collective effort to address climate change (Matemilola, 2020).
Environmental concerns are becoming increasingly prevalent in the design of firms' strategy, since world-wide leaders are asked to improve the sustainability performance of their supply-chains.
However, the sustainability discussion does not only encompass environmental aspects but takes into consideration also social and economic aspects.
The convergence of these three dimensions into one main conception is commonly known as "triple-bottom-line" (TBL). The environmental dimension of sustainability is related to the impact on natural environment, which includes land, water, plants, and animals; the social aspect of sustainability focuses on human capital, emphasizing the importance of adopting and implementing practices that are equitable and beneficial for employees, the community, and the region where the company operates; the economic dimension of sustainability pertains to the financial benefits gained by stakeholders across the supply chain, including the

community, the region, and the countries where operations take place (Cristini et al., 2021).

Including all these elements in supply-chains seem to have become indispensable to guarantee a fast and reliable supply of raw materials and finished products to customers, which is *tout court* the main role and objective of supply-chain management.

Thus, the need to explore the intersection between sustainability and supply-chain management paved the way for the development of sustainable supply-chain management (SSCM).

When it comes to the definition of SSCM there exists a plurality of different interpretations (Khan et al., 2021).

Some authors defined SSCM has an extension to the SCM literature by adding social and environmental aspects into the discussion, while others highlight how SSCM deals with the management of information, capital flows, and materials, as well as cooperation between different firms along the supply-chain (Seuring and Müller 2008; Turker and Altuntas 2014).

Despite the heterogeneity of views in the literature, most researchers agree that SSCM should be considered a requirement rather than a choice, since a company's competitive advantage is now based also on how well it manages sustainability issues rather than just its internal corporate practices and actions.

Before diving into the various elements that compose SSCM, it’s important to investigate more detailly what the motives and the barriers are for implementing such practices. SSCM is usually motivated by a confluence of external forces and internal values (Sajjad, Eweje, and Tappin 2015).

Adopting SSCM methods internally is frequently based on the ethical beliefs and values of top leadership. As the "right thing to do" for their company, society, and the environment, senior managers usually see sustainability as a moral duty. Nonetheless, SSCM is accepted as a strategic instrument for risk management and long-term success in addition to ethical considerations. Companies view sustainability as a means of reducing operational disruptions, reputational hazards,

and the dangers of non-compliance or unethical supply chain activities (Cheung et al., 2009).

For instance, a company's reputation is protected, and its brand is differentiated in competitive marketplaces by avoiding associations with scandals like labour abuses or environmental violations.

Additionally, to improve resilience and advance a more sustainable future, a long-term orientation pushes businesses to work with supply chain partners and integrate sustainability into their core operations.

Increased demands from stakeholders, communities, and consumers have an external impact on organizations. Consumers today expect businesses to take social and environmental responsibility seriously, and they are demanding more transparency and sustainable practices. By making companies answerable for the wider effects of their supply chain operations, communities also play a vital role. Public campaigns, media attention, and non-governmental organizations (NGOs) have increased this pressure, making sustainability a non-negotiable factor for many companies (Sharfman, Shaft, and Anex 2009).

Furthermore, although they vary in their efficacy, government incentives and regulatory frameworks encourage businesses to implement SSCM. NGOs have taken direct action in several industries, as seen by campaigns that draw attention to the harm done to the environment and violations of human rights associated with unsustainable practices.

These external pressures force companies to implement SSCM procedures but also to communicate their efforts to maintain customer loyalty and public trust (Sajjad, Eweje, and Tappin 2015).

However, implementing SSCM is not without its obstacles. The lack of knowledge and comprehension of sustainability principles in enterprises is one of the major internal obstacles. Many managers and staff may oppose sustainability initiatives because they believe they are unnecessary or expensive. Efforts to shift to SSCM may be hampered by ingrained behaviours and attitudes in organizations,

especially when employees see sustainability as a secondary concern rather than a crucial component of corporate strategy (Wittstruck & Teuteberg, 2012).

These difficulties are worsened by unfavourable opinions as well as a lack of administrative expertise and resources for putting sustainable practices into action. Even when long-term advantages are expected, firms may find it difficult to justify the initial expenses for creating sustainable supply chain systems due to financial restrictions.

The external obstacles to SSCM implementation are just as intricate. Organizations find it challenging to integrate their whole supply chain with sustainability goals because supplier capabilities frequently fall short of what is needed to offer sustainable goods and services. Furthermore, firms and customers may be deterred by the higher costs of sustainable products, particularly in countries where there is still little demand for green alternatives. These problems are made worse by lax government rules and a lack of adequate policy support. Businesses find it more difficult to defend or expedite their SSCM initiatives when governments do not prioritize sustainability or provide sufficient incentives. Furthermore, it is difficult to establish uniform sustainable practices due to geographical differences, cultural differences among supply chain participants, and fragmented supply chains. Despite these challenges, SSCM offers organizations a path to reduce risks, enhance brand reputation, and meet the growing demand for responsible business practices. Overcoming these barriers requires collaboration between businesses, governments, and other stakeholders. Companies must address internal resistance through awareness programs, training, and leadership-driven initiatives, while also leveraging partnerships with suppliers to build capacity and drive collective sustainability goals. Policymakers, on the other hand, can play a vital role by providing clear regulations, financial incentives, and public awareness campaigns to support SSCM efforts (Sajjad, Eweje, and Tappin 2015).

By addressing these motivators and barriers, businesses can successfully transition toward a more sustainable supply chain, ultimately fostering long-term resilience and value creation.

Indeed, in the last few years a multitude of sustainable initiatives and practices have been successfully implemented in supply-chains.
In the next sections, evidence is given regarding the major SSCM components for each main function of the supply-chain, namely procurement,
manufacturing and logistics, with an emphasis on environmental issues.

1.4.1 Green procurement

Procurement is a key concept in supply-chain management, defined as a multipart process, which includes vendor certification and selection, requisition preparation and approval, order placement, goods receipt, reconciliation and payment of the invoice, and order archiving (Jr, 2005).
Green procurement, also referred to as green purchasing, is a sustainable approach that integrates environmental considerations into procurement decisions. The primary goal of green procurement is to minimize waste, reduce environmental impact, and enhance operational efficiency while maintaining cost-effectiveness and quality standard.
It extends beyond conventional procurement, which traditionally prioritizes quality, cost, and delivery, by incorporating environmental concerns such as resource sustainability, pollution reduction, and energy efficiency, (Rejeb et al. 2023).
Since green purchasing is concerned with acquiring sustainable inputs, accurate and effective supplier-management practices should be implemented to reach the goal of minimizing environmental impact.
For example, the implementation of sustainability scorecards is fundamental to evaluate and select the right suppliers.
Therefore, auditing suppliers via environmental performance metrics is key to ensure that suppliers efforts are aligned with the sustainability vision of a company. This alignment is crucial and, if not managed effectively, it may cause issues in supplier management, while being a barrier for implementing

sustainability initiatives. Sometimes suppliers are not fully capable to implement sustainable initiatives due to a lack of skills, infrastructural and technological support (van Keulen & Kirchherr, 2021).

Hence, it becomes clear that companies that are looking for more sustainable and environmental-friendly sourcing strategies should involve suppliers at an early stage of the purchasing plan. This requires both external coordination with suppliers but also internal coordination between the different functions of the supply-chain. More precisely, suppliers cannot provide recycle materials if not informed promptly. In the same way, it will be difficult for the procurement team to arrange sustainable materials if concerned departments, i.e. design and manufacturing, are not involved at the stage of need identification. The purchasing division should work closely together with the designers and manufactures to identify all the requirements and green resources needed for the final product.

Finally, green procurement is also related to the cost of materials, which is one of the most important factors in purchasing criteria. Tax exemptions and incentives could play a vital role in enhancing the propensity to purchase refurbished and recycle goods, thereby providing the procurement teams with a solution that could be both cost-efficient and environmental effective (Qazi & Appolloni, 2022).

1.4.2 Green design and manufacturing

Design and manufacturing can be defined as the input-output process through which resources are transformed into products available to the market. However, this system that converts elements into valuable products, also generates various types of waste and emissions as byproducts (Chu and Pan 2024).

Since the environmental impacts of manufacturing can be very large, green design and manufacturing pursue the goal of improving energy efficiency, enhancing material efficiency and circularity (Thiede, Damgrave, and Lutters 2022).

There are multiple strategies that can be explored to limit environmental damages. One is sustainable or eco-design which deals with the implementation of environmentally friendly alternatives from the early stage of the product life cycle. This system requires companies to design their products in a way that reduces and minimizes the environmental impact by making use of recycled materials, renewable energy and so on.

It comes with no surprise that innovation could play a vital role in facilitating this process. In the last few years, the advent of new disruptive technologies, such as AI and robotics has revolutionized many industry practices and operations, thereby offering multiple sources for greening design and manufacturing.

For example, some studies proposed a data-driven co-creation platform for designing environmentally friendly products (Zheng et al. 2019).

The user experience of the products can be visualized throughout the use of augmented reality, providing valuable feedback to manufacturers for design improvements through a cloud-based platform.

This experiment also highlights how the emergence of new customer preferences for sustainability can stimulate innovation of new products and vice versa (Chu & Pan, 2024).

Another great application of technology and green manufacturing can be found in a recent study focused on energy optimization of industrial equipment (Purmaissur et al. 2018).

The integration of virtual reality technologies with Internet of Things to monitor and visualize real-time energy consumption has been an effective approach on the shop floor, enabling production managers to identify potential power issues, save energy, and reduce operating costs (Chu and Pan 2024).

1.4.3 Green logistics

Logistics can be defined as the business processes that plan, control, and implement the flow of goods and related information between points of origin and points of consumption to meet customer demand.

As goods flow from origins to destinations through the logistics network, they are moved in planes, trucks, and ships, powered by fossil fuels, such as diesel or petrol. Energy used during storage and handling of goods also impacts the atmosphere, albeit not always directly but indirectly through non-renewable energy use.

The environmental impact of logistics is usually related to greenhouse gas (GHG) emissions that affect global climate, pollution of air quality and packaging waste (Bouchery et al. 2024).

In 2018, transport activities resulted in about 29% of total EU CO2 emissions (Oliveri et al. 2023). Other studies confirm that the transportation sector is one of the highest contributors to GHG emissions, with the main contributor being road freight (Bouchery et al. 2024; Hofer, Jäger, and Füllsack 2018).

The growing attention towards the environment and the continuous growth of goods movements have driven the logistics industry to rethink its impacts and emissions, leading to the emergence of green logistics (Oliveri et al. 2023).

Green logistics, or eco-logistics, is the set of actions aimed at minimizing the environmental consequences of logistics activities (Dzwigol, Trushkina, and Kwilinski 2021).

For example, transportation providers are expected to reduce greenhouse gas emissions from their vehicles, warehouse managers to focus on waste and energy reduction strategies, and products to be redesigned to increase recyclability and reuse, which require different inventory planning needs (Bouchery et al. 2024). These efforts may take many different forms, ranging from technological innovation such as replacing vehicle fleets from diesel to hybrid.

Other strategies involve better ways to plan and execute the movement of goods, such as increasing the utilization of trucks while maintaining inventory levels

under control or collaborative logistics models, in which multiple companies share transport resources, as it has been described in more detail in Chapter 4.

Regardless of the specificities of each initiative there are five main levers that, when combined, drive the environmental impact of logistics, namely distance, transportation mode, equipment type, load quantity, and operation quality (Bouchery et al. 2024).

By strategically locating warehouses, distribution centres, and production facilities, firms can reduce the total distance travelled by goods, thereby lowering fuel consumption and carbon emissions. This approach also contributes to cost savings and improved efficiency, as shorter distances lead to lower transportation expenses and faster delivery times.

Another critical aspect is modal shift, which refers to the transition from more carbon-intensive transportation modes, such as road freight, to more sustainable alternatives, including rail, maritime, or even multimodal transport. Rail transport, for instance, is significantly more fuel-efficient than road transport over long distances, while waterborne shipping, despite being slower, has a lower environmental footprint per ton-kilometre (Björk, Vierth, and Cullinane 2023). Encouraging such shifts requires investments in infrastructure and coordinated efforts between logistics providers and policymakers (Bouchery et al. 2024).

Furthermore, vehicle efficiency and technological advancements are fundamental in reducing the carbon footprint of logistics operations. This includes the adoption of fuel-efficient trucks, electric or hybrid vehicles, and alternative fuel sources such as biofuels or hydrogen. Moreover, improved aerodynamics, lighter vehicle materials, and smart logistics technologies can enhance fuel efficiency and lower emissions (Leach et al. 2020).

In addition to vehicle efficiency, load optimization plays a vital role in sustainable logistics. The underutilization of cargo space leads to unnecessary additional trips, increasing both costs and emissions. Companies are encouraged to use advanced logistics planning tools, such as load consolidation and route optimization software, to ensure that vehicles operate at maximum capacity.

Finally, the green logistics literature underscores the significance of supply-chain redesign, routing and scheduling improvements. Poorly planned routes and delivery schedules contribute to congestion, fuel waste, and excessive emissions. By leveraging real-time data, artificial intelligence, and predictive analytics, firms can develop more efficient routing plans that minimize travel distances and avoid peak traffic periods (Dikshit et al. 2023). Additionally, nighttime deliveries, urban consolidation centres, and last-mile delivery innovations, such as the use of cargo bikes or electric delivery vans, offer viable solutions to reduce emissions in urban logistics (Gonzalez-Calderon et al. 2022).

1.5 Vertical quasi-integration strategy

The previous sections briefly mention some strategies that could be effective in reducing the environmental impact of some operations along the supply chain. These strategies, whether they are made at the strategic, tactical, or operational level, strictly depend on the supply-chain configuration of a certain company.

Nowadays, supply-chain configurations are increasingly disintermediated, adopting partial or quasi-integration rather than pursuing more traditional, full vertical integration (Mason, Doyle, and Wong, 2006).

For example, the so-called global network-firm unifies a set of legally independent firms positioned along a single supply chain to design and manufacture complex and specific products (Chassagnon, 2014).

The recent trends of quasi-integration and the need for a holistic view of supply chain configuration have led researchers to rethink the boundaries of the make-or-buy paradigm, which characterizes the vertically integrated firm.

In the economics literature, transactions cost theory has been developed with the key objective of identifying suitable supply chain configurations by understanding their boundaries within markets.

According to Williamson (1980), firms choose vertical integration when the cost of transacting in the open market (i.e. contracting suppliers or distributors) exceeds the cost of internalizing those activities within the firm.

Thus, vertical integration refers to a firm's decision to expand its control though ownership over multiple stages of the supply chain to minimize transaction costs.

However, when it comes to such decision, companies can opt for several intermediate types of vertical relationship which may combine the benefits of both market transactions and internalization.

These hybrid forms of vertical integration, or quasi-integration, depend on a company's reactive resources and capability strengths.

Different forms of vertical quasi-integration can be classified according to two major criteria: formalization and degree of commitment.

Supplier and customer partnerships involves managed relationships based on trust and goal congruence. By converting inter-firm relationships into partnerships, companies can shape the actions of their trading partners without bearing the costs and asset risks linked to ownership (Mason, Doyle, and Wong 2006).

Although they require a high degree of commitment, the level of formalization of these agreements is usually low.

On the other hand, franchising and joint ventures are much more formalized and demand a significant level of collaboration.

Franchising is a method of selling products, services, and/or technology based on a formal agreement between two independently owned companies. The franchisor grants the franchisee the right and imposes the obligation to operate the company in line with the franchisor's philosophy and business strategy (Grzelak and Matejun 2013).

Equity joint ventures are arrangements in which two or more firms pool resources to establish a separate legal entity which is jointly owned by the sponsoring firms. Activity is organized between firms but is hierarchically controlled within the joint venture itself (Beamish and Banks 1987).

The great number of alternative strategies for implementing quasi-integration

is indicative of the complexity of the problems firms face in vertical relationships. Vertical integration provides a firm with the highest level of control. By becoming vertically integrated, a company can oversee and regulate all aspects of its relationships with suppliers or buyers. Pure market exchange and vertical integration serve as the traditional "make or buy" choices, representing opposite ends of the spectrum-ranging from independent transactions to full internalization, and from flexibility to control.

Hybrid configurations, or quasi-integration, reflect the necessity, in a world of uncertainty, to make trade-offs between flexibility and control (McWilliams and Gray 1970).

1.6 Supply-chain integration

The discussion on vertical integration has been evolving ever since, with innumerate contributions and different perspectives among the literature.

In the last few years, the notion of a more applied and functionally integrated perspective of integration has emerged, often called supply chain integration, which suggests both an operational and cross-functional focus (Stonebraker and Liao 2004).

In a sense, supply-chain integration could be considered as an application and extension of vertical integration theory, emphasizing the role of logistics and communication efficiencies.

The traditional configuration of the supply-chain usually involves five stages of activity: creation of raw materials, manufacture of parts and components, assembly of finished goods, distribution of goods and services, and customer service.

These stages may involve several serial production and distribution activities, or steps, and each activity will likely involve internal functions of purchasing, operations, and logistics (Stonebraker and Liao 2004).

Each stage may involve multiple activities or processes, or they may be entirely separate. Moreover, supply chain flows operate in both directions: while products,

often supplemented with a variable service component, move forward, information flows both backward (customer demand requirements, including design and volume) and forward (product promotional details and availability).

Therefore, it is evident that the concept of the supply chain highlights non-ownership and the relatively informal nature of connections at all stages, regardless of the size of the firms involved.

Accordingly, supply chain integration might be defined as the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra and inter-organization processes (Flynn, Huo, and Zhao 2010).

The objective here is to ensure efficient and effective flows of products, services, information, money, and decisions, delivering maximum customer value at minimal cost and high speed.

This definition of supply chain integration as a quasi-integration strategy, in the form of strategic partnerships between different actors among the supply-chain, underscores the significance of collaboration and mutual trust, contract duration, and efficient conflict resolution, as well as the sharing of information, rewards, and risks.

The partnership between P&G, the supplier, and Walmart, its customer, is a great example of supply-chain integration. By implementing collaborative planning, forecasting, and replenishment (CPFR), Wal-Mart and P&G have significantly reduced operating costs and inventory levels. This has led to notable improvements, including an increase in Wal-Mart's inventory fill rate from 87% to 98% and a 48% boost in P&G's sales revenue (Min 2015).

Indeed, through collaborative partnerships firms within supply chains can access more resources, including expertise and information, from their partners to enhance their performance and share risks. By engaging in such agreements, companies can lower operational costs, maximize usable capacity, expand market reach, and strengthen their operational capabilities (Xu et al. 2023).

Furthermore, supply chain integration can be consolidated into three key components: customer integration, supplier integration, and internal integration.
Customer and supplier integration together form external integration, which reflects the extent to which a manufacturer collaborates with external partners to align inter-organizational strategies, practices, and processes into cohesive, synchronized operations.
Customer integration centers on developing core competencies through coordination with key customers, while supplier integration focuses on core competencies related to collaboration with essential suppliers.
In contrast, internal integration refers to activities within the manufacturer itself, representing the extent to which it structures its internal strategies, practices, and processes into unified, synchronized operations to effectively meet customer demands (Flynn, Huo, and Zhao 2010).

1.7 Research question

Building upon the literature review, it is evident that growing environmental concerns, regulatory challenges, and the complexity of global supply networks have prompted businesses to look for creative ways to achieve sustainability. Traditional approaches to supply-chain management, such as full vertical integration or market-based transactions, present both opportunities and challenges. Full integration lowers operational flexibility and frequently necessitates a large capital investment, even though it provides more control over operations. On the other hand, market-based transactions can lead to fragmented sustainability efforts throughout the supply chain and misaligned incentives, even when they allow for adaptability.
As a strategic alternative to these constraints, businesses are increasingly engaging in vertical quasi-integration, which blends aspects of hierarchical control with market transactions. Long-term partnerships, joint ventures, strategic alliances,

and supplier-customer collaborations are examples of quasi-integration strategies that let businesses improve coordination, share resources related to sustainability, and align incentives throughout the supply chain without the limits of full vertical integration.

By investigating the role of vertical quasi-integration in sustainable supply-chain management, the present qualitative research provides empirical evidence through a case study approach, ultimately offering some potential to help organizations achieve breakthroughs in sustainability performance.

Indeed, the dissertation seeks to address the following research question,

RQ: How does vertical quasi-integration contribute to the development of a more sustainable supply chain?

While providing an answer to such research question, the goal of this research is to narrow the gap between theory and practice, offering useful insights to professionals in academia and industry. The results will add to the body of knowledge on supply-chain sustainability while providing useful advice for businesses looking to improve sustainability through partial integration and strategic cooperation. Lastly, this study aims to demonstrate how quasi-integration, and its different modes, can be a versatile and scalable strategy for managing a sustainable supply chain, encouraging creativity and adaptability at a time of growing economic and environmental instability.

CHAPTER 2: Research Methodology

2.1 Research design

Considering the main research objective of assessing the impact of vertical quasi-integration strategy on sustainability performance of the supply-chain, a qualitative method through a case study approach was employed and deemed appropriate as it allows to identify multiple insights and nuances from a real-world business case that could not be apprehended through a simple quantitative analysis. A case study serves as a research method designed to create a detailed, multi-dimensional comprehension of a specific topic within its actual setting (Crowe et al. 2011).

Since the case study approach may offer additional insights into what gaps exist in a particular field or why one implementation strategy might be chosen over another, it in turn could help develop or refine the existing theory of supply-chain integration and sustainability.

Moreover, researchers have highlighted how case studies can fit as one of the most suitable research designs when it comes to analysing topics of corporate strategy (Lavarda and Bellucci 2022).

Indeed, case studies allow to examine an in-depth phenomenon and to go inside the organization where things are being performed by people to understand how these phenomena occur.

According to Whittington (2006), strategy can be viewed as something that people do instead of something the firm has. Thus, more researchers are required to have a closer look at organizations, observing the daily routines and activities, claiming for qualitative analysis more than large statistical databases.

Considering the previously mentioned benefits of using a case study approach to investigate strategy and its implications, the present research was sought to be done via a single-case study, with the aim of richly describing a real-world example of a vertical quasi-integration strategy and assessing its potential to enhance supply-

chain sustainability. The case was selected due to its potential to provide potentially revelatory insights, and to be an exceptional chance for unique research access. Indeed, being part of P&G as an intern in the Product Supply function during the thesis writing, allowed the author to immerse himself in the core business processes under investigation, both through direct accounts from managers and first-hand observation on the field.

2.2 Data Collection

Case study research allows to use any method of data collection which is in line with the purpose of the investigation (Lavarda and Bellucci 2022).

Thus, this research employs a combination of primary and secondary data sources to ensure methodological triangulation, which enhances the robustness and credibility of the findings. (Priya 2021).

The primary data was obtained through seven semi-structured, in-depth interviews with key managers and executives at Procter & Gamble (P&G), who were directly involved in strategic initiatives and could have provided valuable insights related to the company's approach to sustainability.

The semi-structured nature of the interviews allowed for flexibility in exploring new themes that emerged during the discussions while maintaining a structured approach to cover key areas of interest (Eisenhardt and Graebner 2007). Indeed, interviewees were encouraged to not only answer the questions they were being asked but also to freely express their opinions and ideas about relevant issues.

Interviews were conducted in English and Italian, lasted between 30 to 60 minutes and were recorded and transcribed for subsequent thematic analysis.

Additionally, secondary data sources were employed to complement and validate the primary data. These sources included corporate sustainability reports, press releases, and publicly available documents on P&G initiatives.

To further ensure credibility, publicly available media articles and expert analyses on green logistics and collaborative transportation models were reviewed. This secondary data helped to cross-verify the statements provided by interviewees, ensuring a holistic understanding of the case study.

Table 1. *Interviews' sample*

Interviews' Sample				
Interview	Role	Date	Type of interview	Duration
1	Spain's Transportation Director	20nd of March 2025	Video Call - Microsoft Teams	50 min
2	EU Sustainability Manager	27th of March 2025	Video Call - Microsoft Teams	35 min
3	Europe Customer Supply-Chain Manager	8th of April 2025	Video Call - Microsoft Teams	40min
4	Italy's Customer Supply-Chain Manager	18th of April 2025	Video Call - Microsoft Teams	55 min
5	Italy's Customer Supply-Chain Manager	22nd of April 2025	Video Call - Microsoft Teams	45 min
6	Italy's Transportation & Sustainability Manager	30th of April 2025	Video Call - Microsoft Teams	35 min
7	Former Vice-President Supply-Chain Europe	8th of May 2025	Video Call - Google Meet	45 min

Table 2. *Interviews questions sample*

Sample of questions asked during the interviews
What it is P&G overall strategy when it comes to sustainability?
What is P&G's most ambitious or challenging sustainability targets and what is the timeline for achieving them?
What is the main challenges P&G has faced in implementing its sustainability strategy?
What do you think are the key success factors that ensure to reach long-term sustainability goals?
What are the main drivers that pushes P&G to partner with a specific retailer?
How are specific sustainability goals (e.g., emissions reductions, waste reduction) defined and agreed upon before a partnership is formalized?
How are agreements structured from a corporate strategy perspective?
How are responsibilities and risks distributed among P&G and retailers?
What are the main benefits derived from these partnerships, in terms of both sustainability and business impact?
What specific data or metrics are used to quantify the benefits of such initiatives?
What could be the main risks when engaging in such partnerships?
What do you think are the main challenges and obstacles that prevent companies from engaging in such collaborative agreements?
What role does trust play in these partnerships, and how can companies build and maintain trust with their partners?

2.3. Reliability and Validity

Ensuring the reliability and validity of research findings is a critical aspect of any empirical study, particularly in qualitative research where data interpretation plays a significant role in shaping conclusions. Reliability refers to the consistency and replicability of research findings, meaning that if the study were to be repeated using the same methodology, similar results should be obtained (Gibbert and Ruigrok 2010). Validity, on the other hand, concerns the accuracy of the research in capturing what it is intended to measure, ensuring that the study truly reflects the phenomenon being investigated. In the present research, multiple strategies have been employed to enhance both reliability and validity, particularly given the qualitative and case study-based nature of the research design.

To ensure reliability, a standardized protocol was followed for data collection, interview procedures, and data analysis. All interviews were conducted using a semi-structured format with open-ended questions.

In terms of validity, both internal and external validity were considered throughout the research process. Internal validity was strengthened through pattern matching and explanation building, two well-established techniques in case study research that allow to establish causal relationships between variables (Priya 2021). By comparing the case study findings with theoretical predictions from the literature, the study enhances its credibility and ensures that the observed outcomes align with broader theoretical constructs.

External validity, which refers to the generalizability of the findings beyond the specific case under investigation, was addressed through theoretical generalization rather than statistical generalization (Eisenhardt and Graebner 2007).

Although case studies typically have limited external validity in terms of broad statistical representativeness, this research contributes to theory-building by providing insights that can be applied to other companies and industries facing similar sustainability challenges.

Furthermore, respondent validation, or member checking, was conducted by sharing interview transcripts and preliminary findings with key participants to confirm the accuracy of the recorded data and interpretations (Birt et al. 2016). This process ensured that the perspectives of the interviewees were accurately represented, thereby reinforcing construct validity.

All things considered, the study guarantees the validity and relevance of its conclusions by using a thorough research design that includes the validation techniques above mentioned. Although there is always some subjectivity in qualitative research, the methodological precautions taken in the research increase the reliability of its findings and add to the body of knowledge regarding sustainable supply-chain, stakeholder and institutional theory.

CHAPTER 3: Case study presentation

In the following paragraph, with the aim of creating context for the case study being examined, describing the business environment in which the company operates on a daily basis, an initial profile of the company will be outlined, and its sustainability strategy will be traced through the acquisition of publicly available data and primary data by direct accounts of managers within the company.
Accordingly, this chapter reports a brief introduction of P&G which encompasses the company's present framework for sustainability and concerns for the future.

3.1 P&G Sustainability Strategy

Procter & Gamble (P&G), founded in 1837, is a multinational consumer goods corporation headquartered in Cincinnati, Ohio. With a portfolio of iconic brands spanning beauty, grooming, health care, fabric care, and home care, P&G operates in over 180 countries, serving approximately five billion consumers worldwide. As one of the largest fast-moving consumer goods (FMCG) companies globally, P&G's extensive supply chain encompasses raw material sourcing, manufacturing, distribution, and retail partnerships, making sustainability integration both a strategic imperative and an operational challenge.
P&G's sustainability strategy is rooted in the triple-bottom-line (TBL) framework, which emphasizes the interdependence of environmental stewardship, social responsibility, and economic performance (Cristini, Zerbini, and Salvietti 2021). The company's approach reflects a broader industry shift toward sustainable supply chain management (SSCM), where environmental and social metrics are no longer peripheral but central to long-term competitiveness (Khan et al. 2021). At the core of P&G's strategy is a commitment to achieving net-zero greenhouse gas (GHG) emissions across its value chain by 2040, with interim targets including a 50% reduction in operational emissions by 2030 and a transition to 100%

renewable electricity in manufacturing facilities within the same timeframe (P&G Sustainability Report, 2023). These goals align with the Paris Agreement's 1.5°C pathway, underscoring the company's recognition of climate change as a material risk to business continuity (Matemilola 2020).

To operationalize these targets, P&G has adopted a multi-pronged approach that leverages technological innovation, circular economy principles, and collaborative partnerships.

In product design, P&G has prioritized circularity through initiatives such as the incorporation of post-consumer recycled (PCR) plastics into packaging and the development of concentrated formulations that reduce material and water use. For instance, Tide Eco-Box, a lightweight detergent format, has achieved a 60% reduction in packaging weight and a 30% decrease in water consumption during use (Chu and Pan 2024). These innovations are supported by lifecycle assessments (LCAs) to quantify environmental impacts and identify optimization opportunities. Procurement practices further illustrate P&G's quasi-integration strategy, where supplier relationships are governed by sustainability scorecards that evaluate environmental and social performance. Rather than pursuing full vertical ownership, P&G engages in long-term partnerships with suppliers to co-develop sustainable materials, such as bio-based surfactants, and shares risks through joint investments in renewable energy infrastructure. The same logic applies for green logistics, the "science" that enables the planning and control of the flow and storage of goods, has now gone beyond its traditional role. Today, it seeks to provide answers to the demand for environmental sustainability, playing a leading role in the future of the planet, and, according to Pietro D'Arpa (2025), former Vice President Supply Chain Europe at Procter & Gamble, this is possible only if all essential public and private stakeholders come on board, each ready to do their part.

This model mirrors the collaborative approach seen in P&G's logistics operations, where partnerships with retailers like Carrefour have enabled innovations such as the "mega trucks" initiative in Spain, consolidating shipments to reduce CO_2

emissions by 30% while maintaining cost efficiency (Bouchery et al. 2024). The execution of P&G's sustainability strategy relies on robust internal governance structures that ensure alignment across functions. As an example, a Chief Sustainability Officer (CSO), reporting directly to the CEO, oversees the integration of sustainability metrics into corporate performance evaluations, with key performance indicators (KPIs) linked to executive compensation.

Cross-functional teams, comprising R&D, procurement, and logistics personnel, collaborate on initiatives such as the "HolyGrail 2.0" project, which employs digital watermarking to improve packaging recyclability.

The first step is redesigning the supply chain and training those who will manage it, with mobility managers who can chart the course and workers capable of moving goods daily, prioritizing shipments and assigning the most suitable transport method, whether truck, train, ship, or plane, for each order. This internal integration enables P&G to translate strategic objectives into operational practices, fostering innovation at the intersection of sustainability and efficiency.

Despite its progress, P&G faces systemic challenges in scaling sustainability across its global supply chain. Supplier capability gaps, particularly among small-tier vendors, hinder the adoption of decarbonization technologies, while cost premiums associated with sustainable materials, such as PCR plastics, which remain 10-15% more expensive than other alternatives (Qazi and Appolloni 2022), pose economic trade-offs. Regulatory fragmentation further complicates efforts, as divergent recycling policies across markets necessitate localized adaptations to circular economy strategies.

To mitigate these barriers, P&G has embraced quasi-integration mechanisms that balance control with flexibility. Long-term supplier contracts, coupled with shared R&D investments, reduce transaction costs and align incentives, while participation in industry coalitions, such as the Alliance to End Plastic Waste, facilitates knowledge sharing and standardization.

P&G's sustainability strategy exemplifies the potential of vertical quasi-integration to reconcile the competing demands of environmental responsibility and operational efficiency. Thus, the company's experience offers a replicable model for firms seeking to embed sustainability into their supply chains while maintaining agility in a dynamic global market.

CHAPTER 4: Analysis and Discussion

As outlined in the previous chapters, this study aimed to gather and evaluate perspectives on sustainability concepts and supply-chain integration from professionals across different supply chain roles. The goal was to analyse how customer integration and its different modes could turn into a winning strategy for sustainability through practical application of corporate strategies. By synthesizing these role-specific insights, the research provides a deeper understanding of sustainable supply chain management and broader sustainability principles.

To accomplish this objective, the study employed a mixed-methods approach, including observations, interviews, and analysis of corporate documents.

The present chapter outlines the discussion of the results obtained though the analysis of the data retrieved from the interviews.

As explained in the previous chapter, the interviews were conducted with P&G managers and who were involved in sustainability projects that required direct customer engagement in the logistics sector.

All the managers interviewed provided valuable insights and fresh perspectives, as each had worked on different projects, with different customers, in different teams and markets.

Such projects span from transportation initiatives, aimed at reducing the empty miles or increasing the vehicle fill rate, to technology improvement plans designed ad-hoc for the customers to ensure a smoother order management process.

This diversity greatly enriched the findings and supported the goal of the analysis, which is to identify a common thread across these projects that could answer the research question:

“How does vertical quasi-integration contribute to the development of a more sustainable supply chain?”.

However, before deep diving into the analysis addressing the research question, it is necessary to briefly outline the contextual framework underpinning these considerations.

As it has been said, the focus of this research is to understand how integration strategies and their different modes can enhance supply chain sustainability.

As briefly mentioned in previous chapters, within the scope of this study, the term *sustainability* primarily refers to the environmental aspects of the ESG (Environmental, Social, and Governance) paradigm. However, it is important to acknowledge the significant role played by social and governance factors in the objectives pursued by P&G and all companies committed to achieving ambitious sustainability goals.

Another important clarification involves defining the scope of supply chain integration as intended in this study.

Specifically, the analysis will focus particularly on explaining the role of this integration strategy within the logistics domain, thereby reducing the attention on other supply chain phases, such as procurement or production.

In this context, the research will specifically contribute to the narrow green logistics literature, as defined in Chapter 1.4.3, within the broader field of sustainable supply chain management.

4.1 General Findings

From the analysis of the projects carried out by P&G in the field of green logistics, several shared general traits emerge that shed light on the processes inside one of the world's largest multinationals in the FMCG sector and explain how vertical quasi-integration may contribute to the development of a more sustainable supply chain.

First, all projects conducted with clients to enhance supply-chain sustainability on the transportation and warehousing side point to an institutionalised decision heuristic, that is the Service-Cost-Sustainability (SCS) triangle. Striking a balance between these three areas is no easy task and demands considerable effort to pass

the “hard gate” that marks the transition from concept to efficient and long-term strategies.

More specifically, when referring to service, we mean the need to provide customers with excellent service which is, unsurprisingly, one of the key pillars of P&G’s corporate strategy, shortly captured by the motto “*Superior Retail Execution*”. Providing service generally means ensuring that orders are delivered on time, meeting the agreed lead time, minimizing rejections, and guaranteeing the highest possible reliability in the flow of goods.

The other two pillars of the SCS paradigm cover all the aspects related to net supply-chain cost encompassing freight, detention charges, inventory buffers, and related efficiency drivers, and to environmental sustainability, measured in terms of absolute and intensity-based CO_2 emission reduction, etc.

Although they may seem like distinct goals, it’s critical to emphasize that sustainability and cost are, in fact, two sides of the same coin.

Successful sustainability initiatives deliver a dual advantage**:** they drive environmental progress while cutting operational costs.

In practice, well-executed sustainability measures, such as optimizing transport routes or increasing the vehicle fill rate (VFR), not only lower environmental impact but also directly decrease expenses.

As highlighted in the interviews, finding an effective balance between these priorities is often challenging, yet it is precisely this equilibrium that enables both suppliers and retailers to achieve shared objectives and mutual benefits.

Empirical evidence shows that balancing these priorities inherently involves trade-offs. Cost and sustainability’s gains frequently come at the expense of service quality (i.e. higher lead time), a pain point for retailers.

Many times, green logistics embodies a structural paradox. As an example, customers want faster, cheaper deliveries, yet rail and alternative fuels often slow transit or add costs.

Vertical quasi-integration may help navigating the paradox by distributing ownership and control to whichever node can mitigate the downside.

As an example, rail lead-time risk can be buffered by retailers with strong DC automation, while fuel cost risk is absorbed by P&G when it secures higher volumes.

Accordingly, mitigating these aspects requires strategic supplier-client collaboration focused on end-to-end supply chain integration.

Indeed, most sustainability initiatives can only be achieved through integrated strategies between clients and suppliers.

These strategies, which, as noted, require negotiated trade-offs, tend to yield more efficient outcomes when both parties share aligned sustainability goals.

Sustainability objectives have only recently become part of corporate global strategies, which is why many clients have yet to fully prioritize them. This inherently complicates the management of such integrated approaches when sustainability isn’t a shared priority for both sides.

This hurdle can be overcome by leveraging the very ability to develop effective integration strategies, ones capable of breaking through partners' initial reluctance to collaborate on sustainability initiatives.

Resource-based theorists have started to recognise relational routines, such as trust, information-sharing, joint problem-solving, as scarce resources.

The capability, the “how” of collaborating, appears to travel better than physical assets, positioning collaborative capacity as an intangible asset with longevity far beyond any single green project.

As an example, P&G was able to successfully lead a contractual bundle that lowered the logistics allowance paid to retailers and simultaneously raised the minimum order quantity (MOQ) that unlocks that allowance.

Another key insight emerging from the interviews concerns how these collaborative agreements are structured.

Literature review reveals that hybrid forms of supplier-customer integration have evolved in supply chain management in recent years, including long-term partnerships, joint ventures, strategic alliances, and supplier-customer collaborations.

In the P&G's case, these integration models, such as co-managed logistics programs or vendor managed inventory (VMI), where suppliers monitor and replenish stock for customers, are governed by long-term contracts that formalize collaborative commitments while ensuring operational stability.

Moreover, P&G Italy does not own transport capacity, nor it enters equity joint ventures. Instead, the company stitches together hybrid contracts combining, long-run volume commitments, shared KPI dashboards (service, cost, CO_2, weight-fill rate), and asset-control permutations (i.e. dedicated trailers; shared loco-leasing under European intermodal systems).

This structure produces a downside-protected option: upside is captured rapidly, yet either party can pivot if the network is redesigned, market volumes collapse, or regulatory subsidies expire. As an example, P&G partnered with a key retailer through a collaborative agreement that was aimed at reducing empty mileage and improving greenhouse gas efficiency by designing a dedicated roundtrip and installing the so-called jumbo trucks (vehicles that allows a maximum load of 60 tons compared to the current 40 tons of a conventional truck). Despite the success of the partnership, after two years P&G underwent a sudden logistics network restructuring, resulting in the formal discontinuation of the initiative.

This case underscores the vulnerabilities associated with clear-low-formality agreements. Despite their operational flexibility, the lack of formal safeguards increases the risk of one-party inflicting damage on the other due to unforeseen disruptions.

As previously mentioned, these agreements depend significantly on the supply-chain structure of each individual company and on their strategic decisions related to the cost-benefit analysis of potential integrations. Generally, it has emerged that a fundamental advantage of vertical integration with customers, from a logistical perspective, lies in achieving deeper market penetration. This penetration goes far beyond the mere sharing of logistics or transportation activities. In fact, by engaging in a joint management of operations, for instance in transportation, companies like Procter & Gamble can develop a much deeper understanding of

customer needs, enabling the extension of collaborative efforts to other functional areas such as marketing, sales, inventory management, and product development. Such cross-functional cooperation creates a substantial competitive advantage that becomes challenging for competitors to replicate. However, ensuring that this advantage remains sustainable, and the partnership endures over time requires the establishment of mutual trust mechanisms. These mechanisms, which extend beyond simple contractual terms, involve a shared commitment to long-term strategic goals, transparent communication, and consistent reliability in meeting reciprocal obligations.

A clear example of these trust-based mechanisms can be observed in Vendor Managed Inventory (VMI) systems. Through VMI, P&G directly manages the customer's orders and inventory in an integrated and transparent manner. This allows the optimization of order management in terms of logistics and sustainability. Specifically, it facilitates the creation of well-planned orders, significantly increasing load density by ensuring that trucks leave warehouses fully loaded, thus enhancing the "pallet per load" ratio.

This form of integration inherently depends on a strong relationship of trust between the supplier and retailer, as the retailer effectively delegates the management of their critical inventory to P&G. Such delegation would be impossible without confidence in the supplier’s operational reliability and transparency.

Furthermore, the key enabler of this complex trust-based integration is technological and process innovation. Without advanced digital tools, real-time data sharing, predictive analytics, and integrated inventory software, achieving efficient sustainable logistics outcome would not be feasible.

For instance, P&G collaborates with startups that utilize AI to design the supply-chain sustainably by optimizing routes and reducing the kilometres travelled for each trip, thereby lowering CO2 emissions.

Another example involves data sharing among P&G, retailers, logistics providers, and in some instances, even competitors, facilitated by a third-party organization

acting as a neutral intermediary to ensure privacy and trust among the parties involved. This approach enables synergistic benefits in terms of both cost reduction and decreased CO_2 emissions.

Hence, technology emerges as another essential element for successfully operationalizing sustainability initiatives, especially when companies pursue ambitious strategies.

These advanced technological capabilities allow suppliers and customers to build joint visibility into demand patterns, manage risks proactively, and maintain the high level of trust required to ensure sustainability goals are not only met but continuously improved over the long term.

4.2 Discussion

The discussion of the findings from this qualitative analysis of green logistics strategies reveal several important themes and insights that are essential for enhancing and understanding how vertical quasi-integration contributes to the development of a more sustainable supply chain.

The previous chapters outlined several levers for reducing the environmental impact of logistics operations. Many of the strategies discussed, such as optimizing routes, maximizing load efficiency, using appropriate equipment and resources, are well-known to logistics professionals. These principles have long been applied to cut costs and enhance service quality. Today, as sustainability has become a disruptive priority for businesses, it is necessary to recalibrate the traditional cost-service paradigm. Especially in green logistics, sustainability is not a standalone initiative but an integral part of the same paradigm, summarized by the SCS triangle (Service, Cost, Sustainability). It is precisely on this triangle that customer relationships are shaped, and sustainability plays a fundamental role in uncovering new trade-offs, as well as new sources of value and cost reductions.

Indeed, green logistics involves not only identifying the optimal solutions for environmental performance but also reassessing traditional strategies through an environmental perspective (Bouchery et al. 2024).

In the previous chapter, it was shown how integration strategies between customer and supplier within the supply chain can lead to tangible sustainability outcomes in various ways. Most of these strategies rely on the importance of technological advancement, mutual trust between the parties involved, and the need for a shared commitment centred on sustainability.

Therefore, the role of digitalization, and more broadly, innovation, is crucial in making all this possible.

The findings indicate that approximately one in five trucks travels empty, which is an absurd waste and a pollutant that digitalization can solve by matching demand and availability in real time.

New platforms must connect production, raw material processing, and transport industries 24/7, enabling data sharing, because innovation starts with shared data analysis.

On the other hand, innovation often demands substantial investments and a supportive organizational culture.

The substantial upfront costs associated with green technologies and infrastructure pose a major challenge, especially for small and medium-sized enterprises (SMEs) (Reynolds 2024).

However, when it comes to sustainability, the push for innovation seems to be a necessary requisite.

As an example, P&G has invested decisively, for instance partnering with a shipping group that uses biofuel-powered vessels, even paying a premium to support greener transport.

Indeed, without those willing to invest in improvements, there will never be any progress.

Overall, the main areas of convergence of the findings highlight how vertical quasi-integration through strategic partnerships enhances sustainability outcomes by leveraging stakeholder relationships and institutional pressures.

However, to enable such partnerships, companies should embrace a cultural change, where sustainability is seen as a core component of the overall corporate strategy and collaboration as a source of competitive advantage. Indeed, firms that can overcome the traditional reluctance in collaborating and sharing information, can build an edge over those that does not fully understand the potential of such cultural shift.

Indeed, the integration of supplier-customer partnerships in logistics, aligns incentives and fosters coordinated actions, resulting in substantial operational efficiencies and sustainability benefits (Min 2015). This aligns with stakeholder theory which argues that effective stakeholder engagement through mutual goal alignment significantly enhances supply chain responsiveness and collaboration, (Li et al. 2025). Moreover, these practices emerge as strategic responses to the coercive and normative pressures outlined by institutional theory (Saeed et al. 2018), specifically regarding EU regulatory frameworks such as the Corporate Sustainability Due Diligence Directive (CSDDD) and Corporate Sustainability Reporting Directive (CSRD). Indeed, proactive engagement in sustainability-focused vertical quasi-integration can be interpreted as both a strategic adaptation to external regulatory mandates (Sinnig and Zetzsche 2025) and a response to normative pressures, whereby companies adopt widely accepted sustainability practices to maintain legitimacy and competitive advantage (Hebaz, Oulfarsi, and Sahib Eddine 2024).Therefore, integrating collaborative strategies, relational trust-building (Siems, Seuring, and Schilling 2023), and advanced technological solutions (Chu and Pan 2024) not only enhances operational sustainability but also enables firms to navigate complex stakeholder and institutional environments successfully.

CHAPTER 5: Conclusions

5.1 Managerial implications

Based on the research findings previously discussed, the following insights can be presented to practitioners and policymakers as actionable recommendations.

From a managerial perspective, an integrated approach between supplier and customer delivers significant advantages in terms of sustainability, and beyond.

This approach puts the emphasis on the critical role of collaboration and partnerships, emphasizing the need to work closely with suppliers, logistics providers, and other stakeholders to exchange best practices, launch joint initiatives, and capitalize on shared strengths.

As highlighted in the previous chapter, supply chain integration enables deeper customer penetration. This creates potential for optimizations that extend far beyond the scope of any single initiative, unlocking systemic efficiencies across the entire business of the firms.

Despite the numerous benefits of such integration, the findings also highlight several challenges.

As previously discussed, the mutual dependence between partners in a collaborative agreement can create vulnerabilities, where structural changes by one party may negatively impact the other.

Findings also emphasize the role of relational capabilities. Managers should prioritize developing and maintaining strong relational ties with key supply chain partners. Trust and effective communication mechanisms are indispensable for successful quasi-integration and the achievement of shared sustainability objectives.

Another key point is related to the role of regulation and infrastructure, which can be considered as the backbone of sustainable logistics.

Governments have a dual role in fostering a culture of collaboration between companies through regulation, which is neglected in most recent directives concerning sustainability, and guarantying investments in infrastructure that facilitate such collaboration for sustainability.

The issue of construction projects is one that businesses, which rely on efficient connections to stay competitive, have been highlighting for years.

Indeed, constant dialogue with institutions is needed, ensuring timely responses and simplifying bureaucracy, which often slows progress.

Ambitious sustainability targets can be reached only when all key public and private stakeholders are engaged and committed to fulfilling their role.

5.2 Theoretical contribution

As mentioned in previous chapters, this research extends the literature on sustainable supply chain management and supply chain integration through a qualitative investigation of the logistics strategies implemented by P&G and its customers, aiming to achieve both business and sustainability benefits.

Drawing on stakeholder and institutional theory, the research demonstrates how P&G's collaborative green-logistics initiatives align the interests of diverse supply-chain stakeholders while responding to evolving regulatory and normative pressures.

More specifically, long-term collaborations and jointly managed logistics initiatives allowed P&G to achieve a balance between service efficiency, cost savings, and sustainability targets, demonstrating how companies can integrate environmental objectives into their core business activities in response to institutional requirements.

The study contributes to institutional theory, highlighting the central role of institutions in driving incentives for sustainability, both through shared industry

standards and in the implementation of concrete sustainability plans themselves, via targeted investments.

It also extends stakeholder theory by illustrating how relational capabilities, such as trust, joint problem-solving, and information-sharing, can foster alignment of stakeholder incentives, transforming sustainability from a unilateral corporate goal into a shared objective across the supply chain.

The research further enriches stakeholder theory by conceptualizing collaborative governance as a dynamic process where power asymmetries are mitigated through formal and informal mechanisms.

This aligns with (Li et al. 2025) who argue that stakeholder engagement enhances supply chain resilience but extends their work by showing how relational routines translate stakeholder pressures into actionable sustainability strategies.

Thus, the study bridges gaps in the literature by demonstrating how these theories collectively explain not only why firms adopt sustainability practices but also how they operationalize them through collaborative strategies.

Moreover, this study brings new insights into the sustainable supply chain management literature by demonstrating how vertical quasi-integration through long-term partnerships, co-managed logistics arrangements, and digital co-innovation between different actors of the supply-chain can unlock sustainability-oriented efficiencies.

By grounding these insights in empirical evidence from P&G sustainability strategy, the research bridges theory and practice which has been rarely done within the contemporary SSCM literature.

Thus, this study makes a significant contribution to the on-going research that relates quasi-vertical integration across the supply-chain to sustainability outcomes in a specific business context by the inclusion of the aforementioned collaborative green logistics strategies as major enablers of sustainability.

5.3 Limitation and future research direction

While the research provides comprehensive insights, several limitations must be acknowledged. The case study approach, although detailed and contextually rich, inherently limits broader generalizability.

The investigation is based on a qualitative case study of P&G within the FMCG industry. While offering rich insight, the generalizability to other sectors (e.g., heavy manufacturing, retail, or services) remains to be tested. Future studies could employ multiple case comparisons to examine whether the mechanisms identified here hold across diverse industries and cultural contexts.

Moreover, the study focused exclusively on logistics within the supply chain, potentially overlooking how vertical quasi-integration affects other critical supply chain areas such as procurement, manufacturing, or product design.

Future research could extend this study by exploring these additional areas, evaluating how vertical quasi-integration impacts sustainability across the entire supply chain lifecycle. Moreover, comparative case studies across different industries could provide deeper insights into the effectiveness and adaptability of quasi-integration strategies in diverse operational contexts.

For example, since differences in regulatory frameworks, subsidy schemes, and infrastructure availability can shape the feasibility and design of quasi-integration contracts, comparative studies across regions with varying policy regimes would shed light on institutional contingencies that either enable or constrain sustainable collaboration and integration strategies.

Finally, quantitative analyses could further validate and enrich the qualitative findings, offering more generalizable conclusions and stronger empirical support for vertical quasi-integration as a strategic pathway to achieving sustainable supply chains.

5.4 Conclusions

The purpose of this research was to elicit and analyse the different modes of supply-chain integration and their potential to enhance the sustainability of global supply-chains. As seen in the previous chapters, sustainable goals are increasingly becoming a core component of corporate strategies.

However, achieving sustainability requires having to deal with tough challenges and can be successfully addressed only through effective strategies.

This dissertation argues that supply-chain integration might represent an opportunity for firms to reduce the environmental impact of their logistics activities, aiming to provide companies with actionable insights from a case study directly conducted by the author at P&G as an intern in their logistics department.

In order to provide an answer to the research question "How does vertical quasi-integration contribute to the development of a more sustainable supply chain?", a qualitative analysis has been conducted, interviewing seven managers and directors at P&G who had worked on green logistics projects that involved the direct participation of customers. The results show that vertical quasi-integration fosters deeper collaboration between companies and their strategic partners, enabling the alignment of sustainability goals across the supply chain. Such partnerships, formalized through long-term contracts and shared objectives, facilitate coordinated sustainability initiatives, which yield substantial environmental benefits. Cooperative agreements, like those analysed throughout this research, show how integrated approaches can dramatically reduce environmental impacts through optimized logistics management, improved load efficiencies, and minimized transportation emissions.

As seen, quasi-vertical integration with customers yields significant benefits and, in many cases, becomes essential for achieving ambitious sustainability goals. However, implementing projects that require customer integration demands several key prerequisites, including complex trade-offs in balancing service quality, cost efficiency, and sustainability goals.

Other disadvantages of such collaborative partnerships could be related to structural adjustments in one partner's logistics strategy which may adversely affect the other.

Furthermore, the role of government is crucial to foster a culture of collaboration for sustainability.

The most recent European regulation neglects the role of public entities in stimulating collaboration between companies across the supply-chain.

Public intervention is also fundamental in creating efficient infrastructure that can sustain private endeavours for sustainability.

Indeed, initial costs associated with implementing sustainable innovations and infrastructure pose notable barriers, especially for smaller partners within the supply chain.

Lastly, the findings also the importance of technology as a pivotal enabler in quasi-integration strategies. Advanced technological tools, such as real-time data sharing platforms, predictive analytics, and digital inventory management systems, are indispensable in ensuring the effectiveness of integrated sustainability initiatives. The innovative use of digital solutions to manage logistical operations not only enhances environmental sustainability but also significantly reduces operational costs, reinforcing the interdependence of cost efficiency and sustainability.

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