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Making Green Logistics Actionable: Procurement and Operational Practices in Australia

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Abstract

Australia's freight and logistics sector supports significant economic activity but faces growing scrutiny for its emissions footprint and limited environmental traceability. Despite widespread commitment to "green logistics", the concept remains loosely defined, resulting in uneven priorities and fragmented implementation. This pilot study explores the organisational conditions that enable or constrain the translation of green logistics expectations into procurement and operational practices. Adopting a qualitative design, the study analyses semi-structured interviews with managers and sustainability specialists whose roles involve logistics-related activities. Drawing on self-determination, legitimacy and dynamic capabilities perspectives, the analysis identifies the mechanisms through which green logistics becomes operational practice. Three core findings emerge. First, organisations institutionalise environmental expectations by "contracting carbon": embedding emissions requirements into procurement specifications and supplier selection criteria, converting external pressures into auditable obligations. Second, implementation concentrates on a limited set of operational levers with measurable impact, including trials of alternative fuels and electrified equipment, efficiency-driven optimisation to reduce fuel consumption, and packaging substitutions that reshape distribution routines. Third, diffusion beyond focal organisations remains constrained. Many suppliers, particularly small and medium enterprises, lack clear standards, technical capacity and robust data systems to support environmental traceability and upstream emissions management. This study explains how external pressures, intrinsic motivations and organisational capabilities jointly shape green logistics adoption in Australia. It highlights the governance mechanisms and capability gaps that condition progress towards more consistent and embedded green logistics practices aligned with Sustainable Development Goal 12 (Responsible Consumption and Production).

Keywords: Green Logistics; Sustainable procurement; Supply networks; Australia

1 Introduction

Freight and logistics systems generate substantial economic value, but they also impose significant environmental pressures associated with greenhouse gas emissions and intensive resource use (Lindholm & Blinge, 2014). As public concern about environmental risks has intensified, green logistics (GL) has moved from a largely aspirational concept to a practical governance concern for organisations across supply chains. Although GL is commonly understood as a set of management and operational practices designed to reduce the environmental impact of logistics activities (Ruggerio, 2021), its implementation remains uneven and context-dependent. Organisations are no longer debating whether logistics activities should become greener, but how environmental expectations can be translated into concrete operational practice.

Prior research has identified a range of barriers and drivers shaping GL adoption, including technological readiness, organisational capabilities and external conditions such as subsidies (Khayyat, Balfaqih, Balfaqih, & Ismail, 2024). However, in the Australian context, the factors under which organisations convert GL expectations into operational decisions remain underexplored. Logistics and transportation support production and distribution across nearly all industries in Australia, while also representing a visible source of national emissions (Australian Logistics Council, 2022). This dual role creates governance and implementation challenges, particularly in how organisations identify, assess, and translate drivers and barriers into operational priorities and how sustainable

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logistics practices can be more widely diffused. Based on this motivation and aligned with the resource efficiency and waste reduction objectives of SDG 12, this study investigates the conditions under which organisations in Australia seek to advance GL and the actions that may support its implementation and diffusion. The paper addresses two research questions:

RQ1: What factors hinder the adoption of green logistics practices by organisations in Australia?
RQ2: What factors drive the adoption of green logistics practices by organisations in Australia?

Drawing on self-determination, legitimacy and dynamic capabilities perspectives as interpretive lenses, this pilot study employs semi-structured interviews with managers and sustainability specialists whose roles involve logistics-related functions. By examining both the barriers and drivers to GL adoption and the mechanisms through which these expectations are operationalised, the study provides a context-specific explanation of how GL is advanced in Australia. In doing so, it offers empirical insight into the organisational and governance conditions that enable more consistent and embedded GL practices.

2 Conceptual Background

Green logistics refers to the strategic use of logistical resources to reduce emissions and resource intensity, particularly through transport, warehousing, packaging, purchasing, reverse logistics and related supply chain processes (M. Zhang, Sun, Bi, & Liu, 2020). In practice, GL overlaps with broader terms such as sustainable logistics and green supply chain management, but it places greater emphasis on the environmental impacts of logistics activities and on how these expectations are integrated in everyday decisions and coordination across organisations (M. Zhang et al., 2020). In this study, GL is examined in terms of the organisational conditions that shape how environmental expectations are enacted in practice.

Prior research identifies both external and internal drivers of GL adoption. On the external side, regulatory requirements and policy incentives can encourage organisations to invest in greener transport options, efficiency initiatives, and environmental management practices (Jefimovaitė & Vienažindienė, 2022; Khayyat et al., 2024). Stakeholder pressures, including customer demand for environmentally responsible services, competitive positioning concerns, and scrutiny from investors and the media, can prompt organisations to adopt visible GL practices to protect market share and reputation (Salomone, 2008). Internally, adoption is more likely when senior leadership prioritises sustainability, when organisations possess the resources and skills required for implementation, and when environmental initiatives are linked to operational improvement and long-term value creation (Khayyat et al., 2024). Meanwhile, the literature highlights persistent barriers that limit implementation and wider diffusion. Common constraints include high upfront costs, capability shortages, and limited managerial attention when short-term operational pressures dominate (Perotti, Prataviera, & Melacini, 2022). Implementation is also complicated by technical and data-related challenges, including system compatibility, data quality and security issues, and difficulties in establishing reliable environmental traceability across multiple actors (Abbasi & Nilsson, 2012). These constraints often become more pronounced beyond the focal organisation, where suppliers may face uneven standards, limited guidance, and resource constraints that restrict consistent measurement and upstream emissions management (Kumar, Raut, Narwane, Narkhede, & Muduli, 2022). The impact of these barriers also varies by organisational context. Smaller firms often face tighter resource constraints, while larger organisations encounter coordination challenges within complex, multi-tiered supply chains (Ren et al., 2020). Existing studies thus indicate that despite growing recognition of the value of GL, translating environmental expectations into consistent operational practice across supply chains remains difficult.

To interpret these mechanisms behind influencing factors, the study draws on three complementary perspectives as interpretive lenses. First, self-determination theory highlights how the quality and durability of action depend on whether sustainability initiatives are internalised as meaningful organisational priorities rather than treated as short-term compliance tasks (Deci, Olafsen, & Ryan, 2017). Applied to GL, it helps explain why some organisations sustain investment in greener logistics practices, while others adopt symbolic or short-lived measures. Second, legitimacy theory emphasises that organisations respond to social and institutional expectations to maintain credibility and a social licence to operate (Suchman, 1995). This perspective is useful for understanding why environmental requirements may be considered in procurement specifications and supplier selection, even when uncertainty and cost are present. Third, dynamic capabilities theory focuses on an organisation's ability to sense emerging pressures and opportunities, and to reconfigure resources and routines to implement change in shifting environments (Teece, Pisano, & Shuen, 1997). In the GL context, this lens helps explain the capability requirements for integrating GL objectives into operational routines, improving traceability, and coordinating implementation across organisational boundaries.

These perspectives support a focused examination of the barriers and drivers shaping GL adoption in Australia and the mechanisms through which environmental expectations are translated into actionable practice and extended beyond specific firms. This conceptual grounding positions the study to address both the adoption question and the practical actions that can support more consistent implementation and wider diffusion of GL practices.

3 Methodology

Given the exploratory focus of this study and the limited empirical understanding of the barriers and drivers shaping GL in Australia, a qualitative research design based on semi-structured interviews was considered appropriate. This approach enables in-depth explanation of organisational perceptions, decision-making processes, complex and context-dependent phenomena, such as sustainability practices in supply chains (King, Brooks, & Horrocks, 2018). Data were collected through 13 semi-structured interviews conducted between September and October 2025 with supply chain stakeholders in Australia. Participants included middle and senior level managers from public sector organisations, large enterprises, and SMEs, as well as individuals with sustainability-related responsibilities. All participants were directly or indirectly involved in logistics, procurement, operations, or strategic decision-making. This diversity allowed the study to capture insights across different organisational types and supply chain positions. Interviews were conducted online, audio-recorded with consent, and transcribed for analysis. Data collection continued until additional interviews no longer generated substantively new insights.

The analysis followed an inductive approach informed by the Gioia methodology (Gioia, Corley, & Hamilton, 2013). Interview transcripts were systematically examined to identify patterns and high frequency themes related to the factors influencing GL adoption. Initial concepts derived from the data were progressively grouped into higher level themes, which were then synthesised into aggregate dimensions reflecting the core underlying processes influencing GL implementation in Australia. This analytical process enabled a structured progression from observations to conceptual interpretation, directly supporting the study's focus on both influencing factors and their translation into practice.

4 Results and Discussion

This section summarises the empirical findings on GL adoption in Australia (see Fig. 1). The figure illustrates how participants consistently described GL adoption is shaped by interacting barriers and drivers rather than a single dominant factor. Barriers relate mainly to capacity, conceptual ambiguity, regulatory fragmentation, policy-practice gap and bureaucratism, while drivers stem from value commitment, market expectations and compliance pressures. Profit and loss considerations operate across both sides, functioning as either a constraint or an enabling condition depending on context. The following sub-sections explain how these factors influence organisational responses and related practices regarding green logistics in Australia.

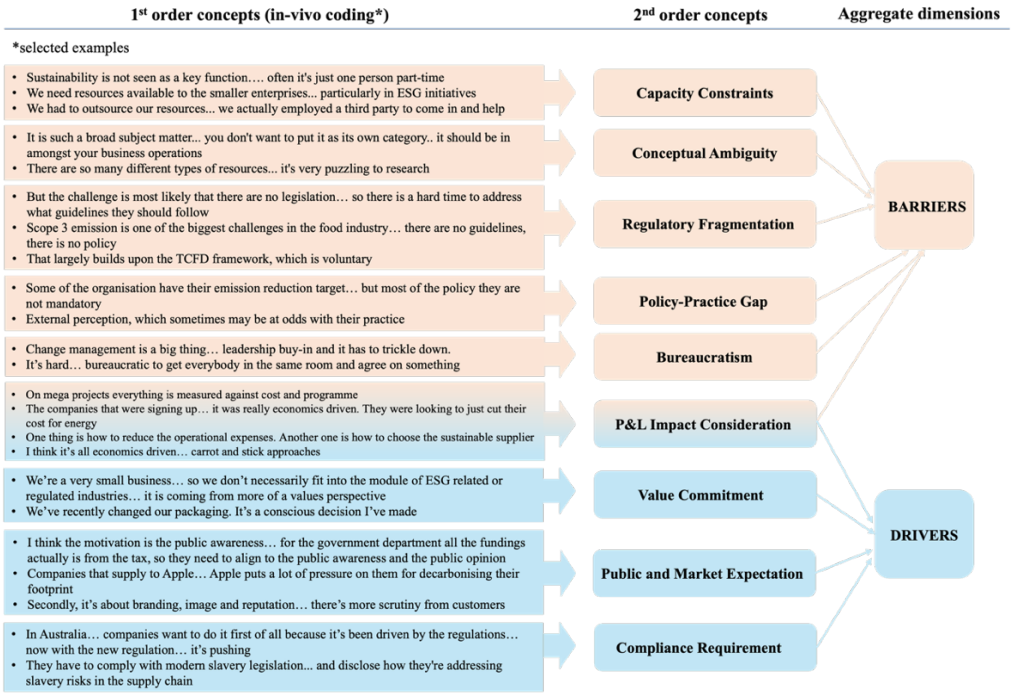

Fig. 1. Barriers and Drivers of Green Logistics adoption in Australia Overview

4.1 Barriers of GL adoption

Capacity constraints as one of the key barriers to GL adoption, particularly among SMEs. Participants consistently mentioned that sustainability-related responsibilities were rarely treated as core organisational functions and were often assigned as additional tasks to already stretched staff. As a result, GL initiatives were easily deprioritised in the face of immediate operational pressures. Over time, this limited human and organisational capacity weakened firms' ability to systematically identify opportunities, allocate resources, and embed environmental practices into routine logistics operations. Importantly, capacity constraints extended beyond simple resource shortages. They reflected a broader difficulty in translating sustainability intentions into workable processes. Several participants described situations in which environmental commitments were proposed at a strategic level but lacked the operational systems needed for implementation. In practice, GL often depends on a basic level of digital and technical support to enable monitoring, coordination, and continuous improvement across transport, warehousing, and procurement activities (Barreto, Amaral, & Pereira, 2017). Where such capabilities were underdeveloped, initiatives tended to remain symbolic or temporary rather than becoming daily routines. From a dynamic capabilities perspective, this suggests that the challenge lies not only in motivation but in the organisational ability to reconfigure existing systems to support green development objectives.

These findings indicate that addressing capacity constraints requires more than general calls for training or financial incentives. At the organisational level, efforts to develop GL appear more effective when capability development is aligned with core operational systems rather than treated as an extra burden. At the policy level, targeted support that lowers the initial capability burden for smaller firms may help reduce uneven adoption and facilitate more consistent implementation across supply chains (Nascimento et al., 2019).

A second major barrier relates to the lack of clarity around the meaning and scope of GL. Participants often described the concept as broad and loosely defined, which made it difficult to translate into concrete organisational action. This ambiguity created uncertainty about whether GL should be treated as a distinct strategic priority or embedded within operational routines. As a result, managers struggled to define clear objectives and consistent performance indicators. Without shared definitions, sustainability commitments were often disconnected from specific logistics practices, such as low-emission transport, green warehousing, or structured reverse logistics. While GL is commonly defined as the organisation of logistics activities in ways that reduce environmental harm and improve energy efficiency, variations in how its scope is interpreted contribute to practical uncertainty (Ren et al., 2020). In the Australian context, this conceptual breadth was experienced less as flexibility and more as operational ambiguity. When managers were unclear about what should be prioritised or measured, initiatives tended to remain fragmented rather than systematically adopted.

When the scope and priorities of GL in each industry are clearly defined, firms can better reconfigure routines and embed sustainability criteria into daily logistics processes and share them across departments. Framing GL around specific operational domains and measurable indicators helps organisations move from abstract commitments to concrete practice. Digital systems that support monitoring and coordination across core logistics functions, such as transport management and route optimisation tools, can make environmental objectives more visible and actionable (Barreto et al., 2017).

Regulatory fragmentation further complicates the integration of GL within organisational practice. Participants referred to unclear legislation and limited official guidance on sustainability requirements. Existing frameworks in Australia were often perceived as difficult to interpret, particularly by SMEs, and poorly aligned with daily operational realities. In supply chains that operate across regions and industries, inconsistent standards intensified compliance uncertainty and increased perceived risk. Faced with unclear expectations and potential cost exposure, firms tended to adopt a cautious attitude, slowing the uptake of GL initiatives. From a legitimacy perspective, unclear regulation blurs expectations, making it harder for firms to judge which practices will be recognised as socially legitimate. Beyond direct compliance costs, fragmented regulation also shaped organisational attitudes towards digitalisation. As firms increasingly rely on digital systems and data to demonstrate emissions reductions and environmental compliance, uncertainty around standards, data governance and security heightened perceived implementation risks. In such contexts, investment in digital technologies was often postponed or scaled back, not necessarily due to lack of interest, but due to concerns about regulatory volatility and future liability (Orji, Kusi-Sarpong, Gupta, & Okwu, 2019). It means that policy inconsistency can indirectly constrain GL by undermining confidence in supporting technological systems.

Addressing this barrier requires greater coordination in standards and clearer guidance on data and reporting expectations. More consistent technical and regulatory alignment can reduce uncertainty for firms investing in traceable and verifiable systems. At the organisational level, prioritising digital tools that enhance transparency and auditability may help shift sustainability from a compliance concern to a more credible and embedded

operational practice. By relying on traceable and auditable data, regulatory clarity becomes a critical condition for reducing perceived risk and enabling sustained investment in GL.

Participants also highlighted a persistent gap between Australia's climate ambitions and the practical implementation of GL. Although national targets are widely recognised, many policy measures remain voluntary or loosely enforced. From a self-determination perspective, voluntary policy limits the translation of sustainability goals into organisational priorities. GL initiatives may therefore take the form of symbolic or externally oriented actions rather than substantive internal change. This weakens the alignment between public sustainability commitments and everyday logistics practices within organisations. More structured policy instruments, such as targeted subsidies or procurement requirements linked to measurable environmental outcomes, can provide clearer expectations and stronger motivation for adoption (Ren et al., 2020; W. Zhang, Zhang, Zhang, Zhou, & Zhang, 2020).

Narrowing this gap requires governments closely link subsidies, tax benefits, and green procurement opportunities to verifiable emissions reductions in transportation and warehousing. By aligning these incentives with Industry 4.0 data systems, firms would be able to show their practices fit the policy requirements through standardised digital evidence verified by government, such as transport management system data (Zaman & Shamsuddin, 2017).

Lastly, bureaucratism were identified as a further barrier to advancing GL. Participants noted that organisational change often requires multiple layers of approval and cross-partners coordination, slowing adaptive capacity. In a sector that depends heavily on inter-organisational collaboration, prolonged decision-making processes can significantly delay green initiatives implementation and reduce internal ability to reconfigure established routines. These challenges are not limited to formal approvals. Delays in information sharing and fragmented communication channels among firms, regulators and other stakeholders reduce coordination efficiency and complicate efforts to integrate GL practices into routine logistics operations (Boons & Lüdeke-Freund, 2013). In such settings, GL risks being treated as an additional administrative burden rather than triggering meaningful resource reallocation or an operational priority.

Addressing this barrier requires simplifying procedures and improving the integration of digital processes that support timely information exchange. Clearer workflows and more streamlined reporting mechanisms can reduce unnecessary coordination costs and make environmental initiatives easier to embed within everyday logistics activities. By lowering administrative burden, organisations are better positioned to move from fragmented efforts towards more coherent and sustained GL practices.

4.2 Drivers of GL adoption

Participants identified value commitment as a significant internal driver of GL adoption, particularly among smaller or founder-led firms not yet subject to strict regulatory pressure. In these cases, environmentally oriented initiatives were described as conscious choices rooted in organisational values rather than responses to external enforcement. GL was framed as part of the firm's identity, shaping procurement and operational decisions even when short-term financial benefits were uncertain. Some participants referred to voluntary sourcing of ethically produced inputs despite higher immediate costs, reflecting a willingness to prioritise long-term environmental considerations.

This pattern aligns with self-determination theory, which argues that sustained engagement is more likely when actions are internally endorsed rather than externally imposed (Deci et al., 2017). When GL is perceived as an autonomous organisational commitment, implementation appears more stable and less dependent on regulatory pressure. In this sense, intrinsic motivation strengthens the likelihood that environmental practices are adopted in everyday logistics activities rather than remaining just compliance driven. From a policy view, supporting this internal motivation requires more than enforcement. Visible recognition of proactive practices may help firms translate value-based intentions into consistent operational routines, reinforcing the role of organisational identity in advancing GL.

Market and societal expectations are also considered as a strong driver of GL adoption in Australia, especially among larger firms exposed to reputational scrutiny. Participants mentioned that government agencies and high-profile clients like Apple and Adidas increasingly assess the carbon performance of their supply chain partners. In response, firms integrate environmental criteria into procurement processes and supplier selection, not only to meet formal requirements but to protect reputation and maintain commercial relationships. Unlike regulatory mandates, these pressures operate through reputational exposure and relational dependence. Supplier screening becomes a strategic response to market expectations, with sustainability performance shaping partner selection

and continued collaboration. Firms seeking to remain competitive are expected to demonstrate visible environmental efforts, such as investment in lower emission technologies. Through these dynamics, GL norms diffuse upstream, reshaping competitive criteria within supply chains even in the absence of direct legal obligations.

This pattern reflects the logic of legitimacy theory, which suggests that organisations adjust practices to align with stakeholder expectations and secure "social licence" (Suchman, 1995). In this context, GL functions not only as a compliance activity but as a mechanism for maintaining credibility and reinforcing market position. When green commitments are visibly integrated in procurement and supplier management, they signal alignment between public commitments and operational practice, strengthening organisational legitimacy across supply networks.

As certain sustainability requirements in Australia shift from voluntary guidelines to mandatory regulations, compliance has become a stronger driver of GL adoption. Participants pointed to modern slavery legislation and state level environmental requirements as key influences that require more systematic monitoring and disclosure of supply chain risks. Unlike voluntary initiatives, these mandatory obligations increase legitimacy pressures by increasing the risks of non-compliance and scandals. Firms thus need to move beyond symbolic GL commitments for meeting legal requirements and maintaining social licence to operate. Moreover, compliance increasingly extends beyond internal reporting and into procurement and supplier governance. Participants noted that public infrastructure projects and government-linked contracts often require certified environmentally responsible materials, such as asphalt with at least level two recycled content requirements. In response, firms embed environmental criteria into supplier evaluation procedures and contractual terms, ensuring that partners meet defined sustainability standards.

Clearer alignment between regulatory expectations and reporting standards may further strengthen compliance as a driver by reducing uncertainty and aligning with societal norms across regions. Industry bodies could develop standardised supplier screening frameworks to support smaller firms in meeting regulatory obligations without excessive administrative burden.

4.3 Profit and Loss Impact Consideration as a dual influencing factor

Profit and loss considerations is recognised as a dual factor shaping GL adoption in Australia. Financial reasoning did not reflect resistance to environmental goals, but an evaluation of expected economic impact. Participants indicated that decisions about GL were typically assessed against operational costs and anticipated returns. Sustainability measures were more readily adopted when they reduced energy use, improved efficiency, or lowered operating expenses. Environmental commitment thus was closely tied to long-term financial performance rather than framed solely as a moral obligation.

As a driver, anticipated cost savings and efficiency gains strengthened incentives for adoption. Practices such as route optimisation or resource efficiency improvements were viewed favourably when they aligned with broader organisational financial outcomes (Agyabeng-Mensah, Ahenkorah, Afum, Dacosta, & Tian, 2020). From a capability perspective, firms able to adjust logistics systems to capture these efficiencies were better positioned to integrate green practices into routine operations. Anticipated financial benefits therefore reinforced the institutionalisation of GL while supporting economic resilience in a market increasingly shaped by carbon constraints (Nguyen et al., 2023). Conversely, profit and loss considerations became a barrier when initiatives required substantial upfront investment with uncertain or delayed returns. The acquisition of specialised assets for GL often requires substantial capital expenditure, leading to hesitation due to long payback periods, especially among SMEs with limited financial flexibility (Hrovatin, Dolšak, & Zorić, 2016; Perotti et al., 2022). Under such conditions, GL investments were often postponed despite recognised environmental benefits. These findings suggest that the economic framing of GL strongly conditions its adoption: when financial value is visible and credible, implementation accelerates, but when returns are uncertain, progress slows.

5 Implications

5.1 Theoretical Implication

This study clarifies how different forms of institutional pressure shape organisational responses to GL in Australia. Market and societal expectations operate mainly through reputational exposure and relational dependence, encouraging firms to adjust procurement and supplier practices to maintain legitimacy. In contrast, compliance requirements cause influence through formal rules and reporting obligations, prompting more formalised and auditable procedures. This distinction suggests that organisational responses vary not only in intensity but in form, depending on whether institutional signals are reputational or regulatory in nature.

The analysis also highlights the role of organisational capabilities in translating external expectations into operational practice. Supplier screening and procurement standards function as mechanisms that convert abstract

sustainability demands into structured governance arrangements. From a dynamic capability perspective, GL adoption depends on a firm's ability to interpret evolving pressures and reconfigure routines accordingly. Capability development therefore conditions whether environmental commitments remain symbolic or become embedded in daily operations. Finally, the findings underscore the importance of motivational foundations. Where GL initiatives align with organisational values, practices tend to be more deeply integrated and sustained. When driven primarily by external pressure, adoption is more likely to remain compliance oriented. These insights indicate that the depth and durability of GL adoption are shaped by the interaction between institutional signals, organisational capabilities and intrinsic commitment.

5.2 Practical Implication

The findings indicate that effective GL adoption depends on recognising the nature of institutional signals. Reputational pressures require credible transparency and consistent supplier governance, whereas regulatory pressures demand formal integration of sustainability criteria into procurement and operational systems. Clear differentiation between these pressure types can help organisations avoid fragmented responses and align resources with the form of external expectation they face. Implementation also depends on reducing capability gaps and clarifying operational scope. Lowering the organisational threshold for adoption, especially among smaller firms, can facilitate more consistent integration of environmental criteria into routine logistics decisions. Translating broad sustainability ambitions into clearly defined performance standards and measurable indicators reduces ambiguity and strengthens internal coordination. Moreover, aligning environmental objectives with financial logic remains critical. When cost savings, efficiency gains and risk reduction are made visible, GL is more likely to be sustained. Similarly, predictable and coherent regulatory signals can reduce perceived uncertainty and support longer-term investment decisions. These conditions suggest that advancing GL requires not only stronger ambition, but clearer signals, embedded capabilities and credible economic alignment.

6 Limitations and Future Research

This polit study has some limitations. First, the findings are grounded in the Australian institutional context and reflect the specific regulatory and market conditions shaping GL in that setting. While this context allows for a focused examination of how different pressures interact, the identified mechanisms are context-specific and invite comparative examination across other governance systems can be considered in the future. Second, the analysis is based on qualitative descriptions of managerial decision-making, capturing perceived drivers and constraints rather than directly observable behavioural or performance outcomes. Integrating objective indicators, such as emissions data or procurement records, could further assess how these mechanisms translate into measurable change. Finally, the cross-sectional design does not trace how GL practices evolve over time. Longitudinal research could deepen understanding of how organisational capabilities and motivational dynamics develop as institutional conditions shift.

7 Conclusion

Green logistics adoption in Australia emerges as a process shaped by multiple and interacting pressures rather than by a single dominant driver. Market expectations operate largely through reputational exposure and supply chain relationships, while compliance requirements introduce more formal and enforceable obligations. However, the presence of pressure alone does not ensure implementation. Whether environmental expectations become embedded in logistics routines depends on organisational capability, conceptual clarity, and the capacity to translate abstract sustainability goals into concrete governance practices. Across this process, financial reasoning plays a dual role. When green initiatives align with cost efficiency, risk reduction, or longer-term competitiveness, economic logic reinforces adoption. When expected returns remain uncertain, the same logic constrains investment and narrows implementation. The findings therefore suggest that GL in Australian develops when institutional signals, internal motivation, and organisational capability align. Where these elements remain fragmented, adoption is more likely to remain partial or symbolic. Overall, the study clarifies the organisational conditions under which GL can move beyond aspiration and contribute in a tangible manner to responsible production and consumption.

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