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Supply base financial dependence and environmental performance: a secondary data analysis

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ABSTRACT

This paper presents a secondary data analysis on how power dynamics in the supply base, measured in terms of financial dependence, affect the focal firm environmental performance. Our hypotheses are grounded in the Resource Dependence Theory (RDT). We distinguish between supplier financial dependence on the focal firm and focal firm financial dependence on suppliers. We expect these two dependence directions to influence the focal firm environmental performance. We also consider the influence of two moderating factors reflecting the orientation of the buyer within the broader institutional environment: the stringency of environmental regulations affecting the focal firm and its reputation. We tested our hypotheses on 109 US-based manufacturers and their supply base. While powerful buyers might be expected to enjoy certain advantages, our results show that the greater a focal firm's clout over its supply base (i.e., higher supplier financial dependence on the focal firm), the weaker its environmental performance tends to be. Focal firm financial dependence on suppliers has instead no significant role. We found significant effects for reputation and, only partially, for the stringency of environmental regulation. Reflecting on the channels linking environmental performance and resource dependence, and acknowledging institutional factors, we argue that buyer environmental performance is shaped by its pursuit of legitimacy through alignment with prevailing institutional logics. These logics are primarily determined by regulatory requirements and are also influenced by corporate reputation. This study contributes to the academic discourse by extending and empirically testing the explanatory power of RDT in the context of environmental performance. It also highlights the crucial role of supply chain relationships in sustainability for both managers and policymakers.

1. Introduction

Amid rising regulatory pressures and growing investor expectations, focal firms often struggle to meet their environmental targets due to dependencies created by their suppliers; a challenge well-documented in the business press. For example, the Wall Street Journal (Cleveland-Peck, 2024a, 2024b) reported that both tech giant Microsoft and global furniture manufacturer IKEA acknowledged that the majority of their environmental impact originated from their supply chains (SCs). Although both companies sought to improve supplier performance and practices, they were unable to terminate contracts with suppliers that failed to meet sustainability requirements. Instead, they continued searching for ways to engage those suppliers in improvement initiatives. Similarly, in 2024, many large firms retreated from their climate commitments, citing challenges in controlling and improving the emissions profiles of their SCs (Pucker, 2024). At the same time, however, there is awareness of how SC relationships can serve as catalysts for change when companies are able to leverage their influence over suppliers. This is exemplified by the words of IKEA's Chief Sustainability Officer, who commented on their hope to use "*the power of our value chain and our size and scale as a force for good*" (Cleveland-Peck, 2024a). Taken together, these examples suggest that environmental sustainability is shaped not only by technical capability, but also by the forms of power that determine whether buyers can mobilize suppliers toward change, particularly within the supply base (i.e., the network of first-tier suppliers).

Power in SCs has been extensively investigated through the lenses of Resource Dependence Theory (RDT) (Kim and Fortado, 2021). In its

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original formulation (Pfeffer and Salancik, 1978), RDT posits that dependence arises as organizations exchange to secure resources needed for operativity. In the supply chain management (SCM) literature, RDT has been extended to study how SC power dynamics affect focal firm outcomes and the effectiveness of practices meant to cope with supplier-induced dependence (Kim and Fortado, 2021; Pulles et al., 2023; Prajogo et al., 2020). Yet, despite its popularity, insights from applying RDT in SC contexts remain elusive (Kim and Wemmerlöv, 2015): buyers may impose conditions on suppliers, but suppliers may resist deep engagement; and extreme supplier dependence can dampen suppliers' incentives to innovate, with mixed effects on buyer outcomes (Brito and Miguel, 2017; Reimann and Ketchen, 2017). As a result, the net effects of dependence in SC contexts remain ambiguous.

There are at least three reasons behind ongoing ambiguity as to the effects of resource dependence on focal firm performance outcomes. First, power dynamics in the SC influence multiple, interrelated performance dimensions, so the effects of dependence may differ across financial, innovation, and environmental performance (Kim and Fortado, 2021). In transactional relationships, buyer power can boost profits at suppliers' expense (Kim and Wemmerlöv, 2015; Pu et al., 2023), yet it may simultaneously hinder innovation when highly dependent suppliers avoid co-investing for fear of buyer opportunism (Kim and Zhu, 2018; Krolikowski and Yuan, 2017). Second, SCs operate as conduits for institutional pressures (coercive, mimetic, normative) (Kauppi and Hannibal, 2017; Kauppi and Luzzini, 2022), yet the interplay between dependence dynamics within the SC and those arising from the broader institutional context remains underexplored. Third, SCM studies rarely examine the mechanisms linking dependence and performance. Drees and Heugens (2013) identified two key mechanisms in RDT: autonomy, which reduces uncertainty and limits vulnerability to opportunism, and legitimacy, which improves resource access through alignment with institutional logics and reputational benefits. While their meta-analysis of financial performance suggested that autonomy was a significant channel whereas legitimacy was not, these dynamics may unfold differently when other performance dimensions are examined.

Some of the ambiguity surrounding the application of the RDT is now being addressed by studies that leverage the extensive data on buyer-supplier relationships now accessible through databases such as Bloomberg and FactSet (Culot et al., 2023). Using these data, Elking et al. (2017) operationalized supply-base power through two complementary financial-dependence measures—*supplier financial dependence* on the focal buyer (share of supplier sales tied to the buyer) and *focal firm financial dependence* on suppliers (share of the buyer's manufacturing costs allocated to first-tier suppliers)—and found positive and negative effects, respectively, on focal firms' financial performance. Their approach helps address prior ambiguity because financial dependence directly captures the stakes of the exchange and provides an observable proxy for power dependence, namely how economically "locked in" each party is (Emery and Marques, 2011). This complements perceptual, structural, and investment-based measures of power from survey-based research that are often harder to compare across industries or scale to large samples (Dabhilkar et al., 2016; Maloni and Benton, 2000; Nyaga et al., 2013; Touboulic et al., 2014), making it appropriate to studies spanning a wide range of domains (e.g., innovation, sustainability, resilience). However, whether and how these dependence structures translate into environmental performance remains unclear, because sustainability outcomes hinge on supplier investment, cross-firm coordination, and legitimacy pressures; accordingly, this study addresses the following research questions (RQs):

RQ1: What is the relationship between financial dependence in the supply base and the environmental performance of the focal firm?
RQ2: How is this relationship affected by institutional factors?

Our research design adapts that of Elking et al. (2017). We developed two hypotheses to examine how *suppliers financial dependence* on the focal firm and the *focal firm financial dependence* on its suppliers affect the focal firm's environmental performance. Additionally, we posited that this main relationship could be affected by the stringency of environmental regulation affecting the focal firm (Lee and Bansal, 2024) and its reputation (Kumar et al., 2019). We tested our hypotheses on a sample of 109 US-based manufacturers. Consistent with our focus on sustainability-specific mechanisms, our results diverge from prior financial-performance evidence: supplier financial dependence on the focal firm is associated with worse buyer environmental performance, whereas focal firm financial dependence on suppliers is not significant; both environmental regulation stringency and reputation moderate key relationships. We interpret these findings through RDT's autonomy and legitimacy channels, emphasizing legitimacy as a critical mechanism for environmental outcomes (Drees and Heugens, 2013).

From a theoretical standpoint, we extend SC power research to environmental performance and show that the implications of dependence structures do not simply "carry over" from financial outcomes. By theorizing and testing environmental regulation stringency and corporate reputation as moderators, we identify when dependence is more (or less) likely to translate into sustainability improvements, thereby connecting supply-base power to the institutional context in which sustainability is evaluated (Lee and Bansal, 2024; Kumar et al., 2019). Finally, interpreting these patterns through RDT's autonomy and legitimacy channels (Drees and Heugens, 2013), we highlight legitimacy as a central mechanism for environmental outcomes explaining why prior RDT evidence based on profit-based metrics can be misleading when the dependent variable is sustainability performance.

To conclude, this study helps move beyond anecdotal evidence and the broader narrative of SC constraints limiting focal firms' progress toward sustainability. By foregrounding financial dependence as a measurable form of power dependence and showing when institutional forces amplify or reshape its effects, we extend SC power research from primarily financial outcomes to sustainability performance, where legitimacy and coordination are central.

2. Theoretical background and hypotheses

2.1. Focal firm performance and supply chain characteristics: the RDT perspective

In recent years, there has been a growing focus on examining how the characteristics of a focal firm's supply network influence its performance outcomes (Akın Ateş et al., 2022; Culot et al., 2023). This interest reflects a general trend to conceptualize such networks as systems where the results obtained by individual firms depend on how they engage themselves with customers and suppliers (Choi et al., 2001; Choi and Kim, 2008). Cast in this light, buyers' success hangs on resources, information, and capabilities held by suppliers. It also depends on how buyers manage processes that enable inter-organizational alignment and close collaboration (Jian et al., 2024; Prajogo et al., 2020). By the same token, suppliers need a steady inflow of buyers' financial resources, clarity on mutually prioritized objectives, and access to investments and expertise (Singh et al., 2011; Wilhelm and Villena, 2021).

Within this view, and leveraging the growing availability of secondary data, a substantial body of research has operationalized specific supply chain characteristics at both the dyadic and network levels to examine their direct impact on the performance of the focal buyer, as well as their moderating role in shaping the effectiveness of managerial practices (e.g., Lu and Shang, 2017; Sharma et al., 2019, 2020). Our research builds on the work of Elking et al. (2017), who applied the RDT to examine how varying levels of resource dependence between focal firms and their supply base influence focal firms' financial performance. We apply a similar design to investigate focal firm environmental performance, aligning with prior research recognizing the importance of the context in which a focal firm operates in shaping sustainability outcomes (e.g., Bellamy et al., 2020; Gualandris et al., 2021; Jia et al.,

2024). Indeed, SC relationships affect multiple, interrelated performance dimensions in distinct ways (Kim and Fortado, 2021; Prajogo et al., 2020). As far as sustainability is concerned, trade-offs may emerge with financial goals and conflicting incentives (Jia et al., 2024; Zhu et al., 2021; Zhang et al., 2021), highlighting the need for a specific theoretical framing and empirical analysis.

The theoretical apparatus of the RDT was first codified by Pfeffer and Salancik in *The External Control of Organizations* (1978) building on prior works on social exchange (e.g., Emerson, 1962; Pfeffer, 1972a, 1972b; Thompson, 1967). The premise of the theory is that patterns of dependence emerge as organizations, each with its own interests and objectives, engage to acquire resources that are vital to their workings. These patterns have potentially detrimental effects as they pose limitations to the firm's actions and result in poor decision-making whenever the demands of multiple resource-providing parties are not aligned (David et al., 2007; Hambrick et al., 2005). In response, organizations attempt to absorb, diffuse, and coopt external constraints through inter-organizational arrangements that maximize control over crucial forces, such as board interlocks, alliances, joint ventures, vertical integration, and mergers and acquisitions (e.g., Santos and Eisenhardt, 2005; Casciaro and Piskorski, 2005).

Previous research in SCM has applied the RDT to investigate how power dynamics originated through dependence patterns in SC relationships influence performance, with a primary focus on financial performance, innovation performance, and operational performance outcomes (Kim and Fortado, 2021). It has also been used in understanding the implementation of practices and processes, such as information sharing, management systems, and supplier development programs (e.g., Krause et al., 2007; Sancha et al., 2019). Despite its popularity, the implications of resource dependence remain ambiguous (Kim and Wemmerlöv, 2015). While focal firms with highly dependent suppliers can gain greater bargaining power and favorable contractual conditions (Reimann and Ketchen, 2017), performance improvements also hinge on their ability to integrate suppliers' capabilities and involve them in joint projects. These outcomes may be difficult to achieve when suppliers perceive excessive risk in making long-term commitments or investments that primarily benefit a powerful buyer, potentially leading to lock-in situations (Brito and Miguel, 2017; Pulles et al., 2023). The puzzle becomes even more complex when considering that buyers might streamline their supply base to foster closer collaboration with fewer suppliers. This can increase focal buyer dependence on suppliers and heighten exposure to potential opportunistic behavior (Gulati and Sytch, 2007; Polyviou et al., 2023).

The ambiguous predictive power of RDT in SC relationships should not be viewed as a limitation but rather as an opportunity to explore the deeper complexities of these contexts. Specifically, our work considers that SCs serve as conduits for diverse pressures coming from the broader environment, such as regulatory demands, competitive pressures and standardization (Kauppi and Hannibal, 2017; Kauppi and Luzzini, 2022). How these pressures affect focal firms depends on dependence-based power dynamics between buyers and suppliers. Institutional theory has long stressed how organizations respond to external pressures in ways that promote similarity, often described as coercive, mimetic, and normative isomorphism (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). This perspective highlights how regulatory demands, professional norms, and competition lead firms to conform in order to secure legitimacy and survival. However, subsequent scholarship has problematized the view of organizations as passive recipients of external forces. Oliver's (1991) seminal work, for instance, underscored the importance of organizational agency by identifying a range of strategic responses to institutional processes, from acquiescence to manipulation. This shift opened the door to examining the broader organizational environment through the lens of the RDT (Pfeffer and Salancik, 1978). From this perspective, conformity is not inevitable; the degree and form of isomorphism depend on relative power, stakeholder configurations, and competing institutional demands (Greenwood et al., 2011; Pache and Santos, 2010). Consequently, recent studies increasingly examine institutional pressures not simply as homogenizing forces, but as influences that organizations may resist, blend, or selectively enact depending on their resource dependencies and strategic positioning within broader fields (Wry et al., 2013).

Although prior research has made important strides in integrating resource dependence theory with institutional theory (Oliver, 1991; Wry et al., 2013), the interaction between dependence dynamics within SCs and those shaped by the broader institutional environment remains relatively underexplored. These aspects are especially significant for focal firm sustainability performance. Firms often address environmental and social concerns following external pressures coming not only from regulators and investors, but also from buyers and suppliers (Kim et al., 2022; Wolf, 2014). Moreover, SC relationships can be leveraged by focal firms to meet or counteract institutional demands. For example, firms may transfer high-polluting activities to suppliers and obscure their identities to evade external scrutiny (De Stefano and Montes-Sancho, 2024; Liu et al., 2024a). Advancing our understanding of buyer environmental performance thus requires closer attention to how dependence patterns and institutional pressures interact within SCs from a RDT perspective.

Along these lines, one important aspect to consider is that the link between resource dependence and superior organizational performance may operate through multiple channels. Drees and Heugens (2013) conducted a meta-analysis that identifies two main ones: organizational autonomy and legitimacy. Autonomy derives from firms reducing uncertainty in their dealings with resource-controlling parties. This enables firms to meet diverse demands, build capabilities for unforeseen contingencies, and reduce vulnerability to opportunistic behavior (David et al., 2007; Ketchen and Hult, 2007; Oliver, 1991). Legitimacy stems from establishing agreements that align with prevailing institutional logics, thereby improving a firm's ability to attract resources due to perceptions of reliability and reputational advantages (Baum and Oliver, 1991; Deephouse, 1999; Heugens and Lander, 2009; Meyer and Rowan, 1977). Based on the analysis of 157 empirical tests, their findings show that autonomy matters for a focal firm financial performance, whereas legitimacy does not. However, buyer environmental performance might be subject to distinct dynamics. Because it is not yet widely recognized as a core performance dimension, it is frequently subordinated to profit-oriented metrics (Molinaro et al., 2024). Meeting environmental targets typically requires sizable up-front investments in technology, process redesign, and supply-chain adjustments, with benefits that are uncertain or long-term. These factors create tangible trade-offs with short-term financial objectives, which might lead firms to deprioritize sustainability when it conflicts with immediate earnings goals. As a result, companies might undertake sustainability initiatives primarily in response to institutional pressures rather than purely intrinsic motivations or because they expect a positive financial impact (Hoejmose et al., 2014). In this context, greater perceived legitimacy can encourage external collaboration beyond profit-driven motives (Kim et al., 2022; Liu et al., 2024b).

Summarizing, the RDT appears to be a powerful lens to investigate the relationship between characteristics and performance in SCs, provided that analyses account for institutional context and clearly articulate the channels linking dependence to specific performance outcomes. As illustrated below, we designed our research framework and subsequent data analysis to meet these criteria.

To conclude, before detailing the development of our hypotheses, it is important to briefly review the studies that closely align with ours. As clarified above, we drew inspiration from Elking et al. (2017) study on focal firm financial performance. As noted earlier, we anticipate that sustainability performance may follow different dynamics, both in terms of underlying mechanisms and potential outcomes. To the best of our knowledge, only two other studies developed large-scale secondary data analyses linking power dynamics between a buyer and its supply base

with the buyer's sustainability performance. The first is by Fang et al. (2024), which demonstrated that greater dependence on major suppliers and customers is associated with poorer circular economy (CE) performance. The second, by Jia et al. (2024), identified a U-shaped relationship between supply base concentration and environmental, social, and governance (ESG) ratings. Both studies examine manufacturing firms listed in China, thus presenting a different institutional context. The performance dimensions considered are different: Fang et al. (2024) looked only at circular economy, whereas Jia et al. (2024) presented findings that could be confounded by the distinct characteristics of each ESG dimension included in their analysis. Two additional papers (Adhikary et al., 2020; De Stefano and Montes-Sancho, 2024) explored the relationship between supply chain characteristics and greenhouse gas emissions. However, adopting a complexity perspective and not grounding their reasoning on power dynamics. Finally, although several authors have applied RDT to sustainability in SCs (e.g., Cao et al., 2024; Wilhelm and Villena, 2021; Zhu et al., 2021), most of them explored how buyer influence can drive the adoption and success of socially and environmentally responsible practices. Although these papers, which are primarily based on case studies and surveys, offer valuable insights into resource dependence, they largely overlooked the performance implications for the focal firm.

2.2. Hypotheses development

Environmental sustainability is a multidimensional construct assessing both operational impact (i.e., metrics related to resource use and emissions) and green product innovation, including processes and risk factors related to suppliers. Under this premise, the following hypotheses are articulated by dimension, where applicable, in line with prior literature. The first two are related to RQ1 and explore the direct relationship between the level of dependence on the supply base and the focal firm's environmental performance. By testing whether power dynamics between a buyer and its supply base affect buyer's performance, regardless of any actions taken by the focal firm to manage it, we align our design with that of Elking et al. (2017) on financial performance. For each hypothesis, we first outline arguments from research on other performance dimensions and then translate them for environmental performance specificities. This approach enabled us to more effectively identify potential differences in sustainability outcomes. We subsequently formulated two hypotheses for RQ2 regarding the moderating influence of institutional factors, capturing the interplay between the broader external environment and resource dependence within the supply base. These hypotheses are informed by Oliver's (1991) framework and later insights into how firms manage relationships and relative power positions to navigate institutional pressures (Wry et al., 2013).

As far as **supplier financial dependence** on the focal firm is concerned, this determines greater buyer bargaining power, which in turn determines control over suppliers' behaviors (Huo et al., 2017; Shou et al., 2022). Buyers can thus exert pressure to influence suppliers' strategic and operational decisions (Galbraith and Stiles, 1983; Wei et al., 2024) and are more likely to successfully involve suppliers in collaborative projects (e.g., information sharing, joint investments) while gaining a significant share of resulting benefits (Chen et al., 2014). Similarly, when considering innovation, they can drive suppliers' action according to their agenda (Cox, 1999). In such situations, suppliers are subject to state uncertainty, namely uncertainty about the future actions of external parties they rely on for their survival (Milliken, 1987). While suppliers that depend heavily on a single buyer experience reduced autonomy, they can adopt strategies to sustain the relationship by prioritizing that buyer's needs (Casciaro and Piskorski, 2005; Hillman et al., 2009). Against the risk of a discontinuation, suppliers are more inclined to accommodate the requests of high-volume buyers and allocate resources with the hope of tying them to the relationship (Brito and Miguel, 2017; Sutton et al., 2021). This can involve providing enhanced service levels, quicker restocking, prioritizing the buyer during disruptions, delivering higher quality products, and similar efforts (Crook and Combs, 2007; Han et al., 2022). Dependent suppliers are also expected to be more inclined to allocate innovation-related assets and capabilities to the focal buyer relative to competing ones (Krolikowski and Yuan, 2017; Pulles et al., 2023).

Current research on sustainability performance generally supports the idea that having highly dependent suppliers can foster focal firm environmental performance. Indeed, powerful buyers are expected to have the levers to align suppliers to their requests and implement collaborative projects to unlock the resources, expertise, and capabilities that are needed to develop new products or services that are environmentally sustainable (Esfahbodi et al., 2016). Earlier studies have demonstrated this to be especially relevant in the case of environmental product/process innovation (Jia et al., 2024). We thus expect a positive relationship for the following hypothesis (H):

H1. There is a significant positive relationship between the level of supplier financial dependence on the focal firm and the focal firm environmental performance.

With respect to **focal firm financial dependence** on suppliers, theory indicates that buyers that rely heavily on their suppliers' resources will have a disadvantage deteriorating their performance because of a loss of autonomy (Hillman et al., 2009; Pfeffer and Salancik, 1978). Dominant suppliers can impose demands and influence the buyer's decisions in ways that alleviate pressure on their own resources and prioritize their own interests (Elking et al., 2017). Moreover, high focal firm financial dependence is often related with lock-in situations with suppliers controlling critical resources and capabilities; such situations lower a buyer's bargaining power (Choi and Krause, 2006; Narasimhan et al., 2009; Reimann and Ketchen, 2017). When considering focal firm's innovation, there are little incentives for suppliers to invest (Delgado and Mills, 2020; Kim and Fortado, 2021). Such conclusions are supported by several empirical studies (e.g., Cao et al., 2024; Handfield and Bechtel, 2002; Lin and Deng, 2024).

Prior research on sustainability performance has provided evidence of negative implications. Jia et al. (2024) showed a U-shaped relationship with environmental, social, and governance scores, and Fang et al. (2024) showed a negative relationship with circular economy performance. Taken together, this suggests that greater focal buyer dependence on suppliers can undermine buyer environmental performance. We therefore posit:

H2. There is a significant negative relationship between the level of focal firm financial dependence on suppliers and the focal firm environmental performance.

The first two hypotheses concern the effects of resource dependence patterns on environmental performance (RQ1) considering the power buyers wield over their suppliers and how suppliers respond to dependence dynamics by anticipating buyers' expectations. By testing them, we expect to deliver insights on whether the dynamics underlying environmental performance differ from those driving financial performance highlighted by Elking et al. (2017). Environmental focus remains a relatively recent concern, where the focal firm's commitment cannot be taken for granted nor can the existence of specific actions to influence suppliers. This aspect can be addressed by testing the hypotheses on large, well-known firms, based on the assumption that such firms are more closely scrutinized by investors and public opinion.

To further understand how varying levels of institutional pressures experienced by the focal firm (RQ2) shape our results, we introduced two moderators. Hypotheses were built referring to prior elaborations of the RDT to analyze the complexities of the broader external environment (Greenwood et al., 2010; Oliver, 1991; Wry et al., 2013).

The first moderator we propose is the **stringency of environmental regulations** affecting the focal firm. Regulatory stringency can shape how financial dependence translates into the focal firm's environmental performance because it not only represents a clear call to action for focal

firms but may also alter their ability and incentives to engage their suppliers. From an RDT perspective, greater regulatory stringency can reconfigure dependence relations by increasing the focal firm's discretion to mobilize, condition, or withhold critical resources from suppliers. This can shift responses toward acquiescence or compromise rather than avoidance or defiance (Oliver, 1991). Theoretically, this can be explained in terms of enhanced legitimacy (Drees and Heugens, 2013; Suddaby et al., 2017; Vaara et al., 2024). Heightened regulatory stringency enhances the focal firm's perceived appropriateness and authority, which can make its sustainability-related requests appear more rational and defensible to suppliers and, in turn, strengthen the focal firm's confidence in seeking cooperation (Kim et al., 2022; Liu et al., 2023; Wolf, 2014). Accordingly, it is more likely for buyers to align on long-term sustainability goals with their suppliers and improve their own environmental performance. Prior evidence is consistent with this logic: regulatory pressure on buyers has been shown to stimulate suppliers' green innovation (Lin et al., 2024), and suppliers are more inclined to adopt eco-design when their dependence on a buyer is coupled with institutional drivers (Prajogo et al., 2020). We thus posit:

H3a. The positive relationship between supplier financial dependence on the focal firm and focal firm environmental performance is stronger when the stringency of environmental regulations affecting the focal firm is higher.

From an RDT perspective, focal firm financial dependence on suppliers shifts power to them, limiting the focal firm's ability to obtain cooperation for costly environmental improvements and thereby worsening its environmental performance. However, greater stringency of environmental regulation constitutes a strong coercive institutional pressure that reduces managerial discretion and raises the costs of noncompliance (Marculetiu et al., 2023). Under heightened regulatory stringency, the focal firm's exposure to sanctions and reputational fallout increases. This makes it riskier to tolerate supplier-driven inertia. Stringent regulation can also be leveraged as an external mandate that legitimizes tougher buyer requirements even when the buyer is relatively dependent (Wolf, 2014). Finally, regulatory stringency is often accompanied by guidance, best-practice information, and incentives that can partially offset the resource constraints associated with dependence and facilitate supplier development or compliance-oriented investments (Hannibal and Kauppi, 2019). Hence:

H3b. The negative relationship between focal firm financial dependence on suppliers and focal firm environmental performance is weaker when the stringency of environmental regulations affecting the focal firm is higher.

The second moderator concerns the **reputation** of the focal firm. Although not featured in *The External Control of Organizations* (Pfeffer and Salancik, 1978), some authors have noted that firms can actively cultivate their reputational assets to manage external dependence (Lawrence, 1998; Wang et al., 2008; Wry et al., 2013). Reputation is a valuable intangible asset that helps firms attract critical resources and build competitive advantage (Deephouse, 2000; Gibson et al., 2006), partly because resource-controlling parties usually prefer to be connected with well-regarded firms (Baum and Oliver, 1991; Drees and Heugens, 2013). Drawing on Oliver's (1991) typology of strategic responses, a strong reputation can broaden the focal firm's agency by expanding the set of feasible and credible responses to external demands.

When suppliers are financially dependent on the focal firm, reputation can raise the benefits of association and the perceived costs of sanction for suppliers. This reputational leverage enables more proactive responses, such as setting private environmental standards, conditioning purchase volumes on certification, investing in supplier capability building, and credibly threatening exit (Aguilera et al., 2021). As firms increasingly prioritize environmental strategies (Kumar et al., 2019), suppliers may be more willing to engage in environmental initiatives with reputable buyers to preserve the relationship and avoid reputational loss (Wilhelm et al., 2016). Accordingly, higher focal-firm reputation should strengthen the positive effect of supplier dependence on the focal firm's environmental performance; as captured in the following hypothesis:

H4a. The positive relationship between supplier financial dependence on the focal firm and focal firm environmental performance is stronger when the reputation of the focal firm is higher.

When the focal firm is financially dependent on suppliers, its lower relative power can undermine its ability to secure cooperation for costly environmental improvements, creating a negative association between buyer dependence and environmental performance. In this context, however, a strong reputation can mitigate this disadvantage because suppliers may value affiliation with a well-regarded buyer and fear reputational contagion in cases of environmental failure. This provides the focal firm with greater latitude to negotiate greener practices, to signal credible expectations, and to seek external support or alternative partners, when necessary, thereby weakening (and potentially offsetting) the negative effect of dependence on suppliers (Czinkota et al., 2014). Hence:

H4b. The negative relationship between focal firm financial dependence on suppliers and focal firm environmental performance is weaker when the reputation of the focal firm is higher.

To conclude, competing arguments are also possible for all the hypotheses. With respect to the main relationships, supplier financial dependence on the focal firm (H1) may not necessarily translate into better environmental outcomes whenever highly dependent suppliers face limited competitive pressure and may be reluctant to commit additional resources to a powerful buyer, especially for buyer-specific investments that can function as exit barriers (Kim and Zhu, 2018; Ma et al., 2021; Rokkan et al., 2003). Regarding focal firm financial dependence on suppliers (H2), buyers may deliberately concentrate their supply base to reduce complexity and increase control (Bode and Wagner, 2015; Gulati and Sytch, 2007), which can yield efficiency gains through lower coordination costs and higher economies of scale (Han et al., 2022). However, these benefits typically hinge on strong buyer–supplier process alignment (e.g., just-in-time and information sharing) that needs to be actively pursued (Brandon-Jones et al., 2015; Zhou and Benton Jr, 2007).

Competing arguments also apply to the moderators. With respect to environmental regulatory stringency, Oliver's (1991) framework suggests that a buyer's relative power vis-à-vis suppliers determines how easily it can buffer or decouple compliance requirements along the supply chain. For H3a, when suppliers are financially dependent on the focal firm, higher regulatory stringency may still lead to buffering or decoupling. The focal firm can indeed leverage its power to prioritize symbolic compliance rather than substantive upstream changes, weakening the expected positive moderation. For H3b, when the focal firm is financially dependent on suppliers, suppliers' stronger bargaining position can make it harder to cascade environmental requirements even under stringent regulation, forcing compromises that prioritize traditional performance metrics over costly upgrades and thereby muting the intended disciplining effect of regulation. Considering reputation, an alternative view is that reputation can function as a shield, buffering focal firms from external scrutiny and institutional pressures (Delmas and Toffel, 2008; Perrault and Clark, 2016; Walker and Wan, 2012), which could weaken both H4a and H4b by enabling more symbolic responses, for example easing the need to pressure dependent suppliers (H4a) or to confront powerful suppliers despite dependence (H4b).

Nonetheless, consistent with our theoretical framing, we expect the mechanisms developed above to be the predominant ones in our empirical setting. As environmental sustainability becomes increasingly salient, focal firms face stronger incentives to ensure that actual practices withstand external scrutiny. Partners face greater exposure to

relational spillovers when environmental shortcomings emerge. These conditions make purely symbolic responses harder to sustain over time and increase the payoff to substantive coordination with suppliers. Accordingly, while the competing arguments are theoretically plausible, we expect their influence to be second-order relative to the dependence- and legitimacy-based mechanisms motivating H1–H4.

3. Data and methods

To test our hypotheses, we conducted a secondary data analysis utilizing ordinary least squares (OLS) regression. The analysis draws on buyer-supplier relationship data from the Bloomberg SPLC database, focal firm environmental performance data from the LSEG Environmental, Social, Governance database (previously named Refinitiv ESG), and financial data from LSEG Eikon. By leveraging these large-scale databases, this methodological approach enhances both the robustness and depth of our analysis (Gualandris et al., 2021; Bellamy et al., 2020). Moreover, the use of externally validated data ensures the objectivity of the measurements, thereby avoiding biases typically associated with self-reported (perceptual) data, such as those commonly found in primary methods (e.g., surveys) (Culot et al., 2024). To further strengthen the validity of our findings, we performed a series of robustness checks, which are detailed in the online Supporting Material.

3.1. Data collection

The 2022 Fortune 500 list (based on total revenues reported for the fiscal year 2021 – Fortune, 2025) served as an ideal sampling frame, offering a comprehensive annual ranking of the largest and most influential companies in the US. The prominence and scale of these firms guarantee high visibility among external stakeholders, thereby increasing data availability and enhancing the reliability of our dataset (e.g., Culot et al., 2023; Gualandris et al., 2021). We specifically selected companies operating within the manufacturing sector (NAICS codes 31–33). By focusing exclusively on manufacturing, we reduced the risk of unobserved heterogeneity among cases, such as a reduced emphasis on supply chains (Swift et al., 2019), customer-supplier duality (Sampson and Froehle, 2006), and other characteristics typically found in service and primary industries.

As for the data sources, the Bloomberg SPLC database offers comprehensive insights into SC relationships, providing for each included firm visibility into their suppliers and customers across different industries and countries (Culot et al., 2023; Bloomberg, 2019). These disclosures are standardized by analysts into individual records, ensuring uniformity in how the data is aggregated and classified. As of November 2024, the database contains details on roughly 490,000 active buyer-supplier connections, linking approximately 28,000 publicly traded firms (data sourced from Bloomberg helpdesk). The breadth of this data makes Bloomberg SPLC the most important database available to explore the composition of supply chains. Previous use of Bloomberg SPLC can be found, among others, in Gualandris et al. (2021), De Stefano and Montes-Sancho (2024), and Feng and Zhu (2024).

The LSEG ESG scores are designed to objectively and transparently evaluate a company's sustainability performance (LSEG, 2024). These scores are calculated using over 630 company-level ESG metrics, sourced from publicly available data such as annual reports, company websites, stock exchange filings, sustainability assessments, and relevant news sources (LSEG, 2024). As of October 2024, the available data covers over 90 % of the global market capitalization, encompassing more than 15,500 companies. This data source has been used in various studies, including those by Molinaro et al. (2024), Podrecca et al. (2021), and Wang et al. (2024).

For what concerns the data retrieval (Fig. 1), we started from the 156 manufacturing firms included in the 2022 Fortune 500 list and applied a series of filters. First, we excluded non–US-based companies, as well as delisted or privately held firms, to avoid issues related to data availability and coverage (Culot et al., 2023). We also removed firms incorporated after 2019, as these entities were not yet operational during the reference year for our SC data (see next paragraph). These steps resulted in a sample of 146 focal firms.

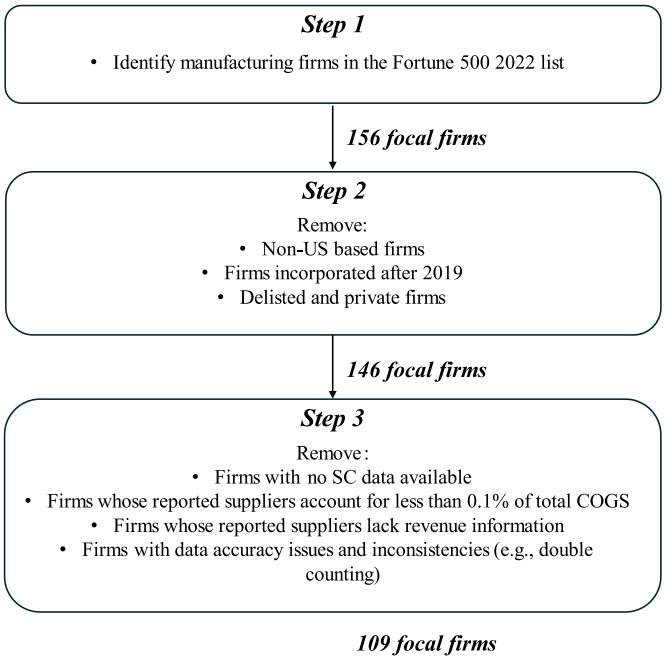

Fig. 1. Data collection and cleaning steps.

As for the SC data, we followed the recommendations of Culot et al. (2023). We collected SC data from the Bloomberg SPLC database through multiple extraction rounds conducted between 2022 and 2023 (Gualandris et al., 2021). To ensure proper temporal alignment and data completeness, we focused on relationships referring to fiscal year 2019. This decision reflects Bloomberg's data processing practices: while some ties are added continuously (e.g., from press releases), the most structured and reliable disclosures derive from annual filings and typically appear in the database with a delay of up to two years. Therefore, extracting data in 2022–2023 enables the reliable capture of SC characteristics as of 2019. To validate the stability of the extracted supply bases, we compared records obtained across different collection waves. In line with prior research (e.g., Gualandris et al., 2021), we observed only minimal short-term variation, confirming the assumption of relative supply base stability. We also implemented several methodological precautions to ensure the reliability and relevance of the data. We retained only relationships classified as Cost of Goods Sold (COGS), which indicate suppliers deeply embedded in a firm's core operations and are therefore most pertinent for analyses of buyer environmental performance (Adhikary et al., 2020; Elking et al., 2017). We further verified the absence of inconsistencies such as double counting (i.e., cases where component suppliers sell to contract manufacturers, but Bloomberg attributes both the component and assembly costs directly to the focal firm, thus reporting the same transaction twice and inflating COGS values) and poor data availability (i.e., firms with no supplier data, firms whose reported suppliers account for less than 0.1 % of total COGS, or firms whose suppliers lack revenue information) (Culot et al., 2023). This process resulted in the identification of 109 companies.

Finally, to mitigate simultaneity concerns, we introduced a two-year temporal lag between independent and dependent variables. Focal firm environmental performance was measured using LSEG ESG scores for fiscal year 2021, thereby ensuring a clear chronological ordering between SC variables and subsequent sustainability outcomes (Wooldridge, 2016).

3.2. Variables

The dependent variable is the focal firm *Environmental score* for fiscal year 2021 provided by LSEG ESG (LSEG, 2024). This score reflects a firm's environmental sustainability performance and initiatives in three key areas: emissions, resource use, and environmental innovation, with values ranging from 0 to 100 (see LSEG, 2024 for more details on the operationalization procedure).

As for the independent variables, these were operationalized following Elking et al. (2017) and refer to fiscal year 2019. *Supplier dependence* on the focal firm was measured by identifying the annual percentage of total revenue that each supplier within a focal firm's supply base received from the focal firm and then averaging those percentages across all suppliers. Conversely, *Focal firm dependence* on the suppliers was calculated by identifying the yearly percentage of the focal firm's COGS spent with each supplier and averaging those percentages over the entire set of focal firm suppliers.

Both moderating variables refer to fiscal year 2019. *Environmental regulations* was calculated as a weighted average of the environmental regulatory stringency faced by a focal firm's operational locations. To construct this measure, we relied on the CMAP function provided by Bloomberg, which offers detailed information on a company's facilities and classifies them into four categories: administrative, logistic, production-related, and R&D-related (Bloomberg, 2020). We considered the company's headquarter and production-related facilities. Each location was individually verified to ensure that it was still active and involved in manufacturing operations. To further ensure completeness and avoid omissions, we cross-checked this information with local unit-level data from Orbis. Environmental regulatory stringency scores for each country were retrieved from the World Bank (2024). We then computed a weighted average based on the proportion of verified manufacturing-related locations in each country. For example, if a focal firm had 11 verified production facilities in the US and its headquarter was also located there – resulting in a total of 12 relevant locations out of 25 worldwide – the US regulatory score was weighted by 12/25. This procedure was repeated for every country in which the firm operated, and the final score was computed as the sum of these weighted values (Lee and Bansal, 2024; Brunel and Levinson, 2016). As far as the second moderating variable is concerned, *Reputation* was measured through a binary indicator equal to 1 if the focal company was included in the Top 50 of Fortune's "Most Admired Companies" list and 0 otherwise (Kim and Davis, 2016).

To ensure the robustness of our analyses, we included a comprehensive set of control variables referring to fiscal year 2019. The first set of controls pertains to firm-level characteristics. *Foundation year* was included to capture how a company's sustainability focus evolves over time, typically gaining prominence as the organization matures (Balasubramanian et al., 2021). The *COGS/Sales* ratio was introduced as a proxy for cost efficiency: lower values suggest better cost management and the potential to reallocate resources to environmental initiatives (Golicic and Smith, 2013). We included return on assets *(ROA)* to account for the role of profitability in influencing environmental performance, with prior studies documenting both positive and negative associations (Adhikary et al., 2020; Carroll and Shabana, 2010). *Firm size*, measured as the natural logarithm of total assets, was also considered, as larger firms tend to exhibit higher levels of sustainability performance (Drempetic et al., 2020; Podrecca et al., 2021). Lastly, *Leverage*, calculated as the ratio of total liabilities to total assets (Fang et al., 2024), was included, as access to external financial resources may support firms in undertaking sustainability-oriented investments (Liu et al., 2023).

The second set of controls accounts for SC and industry-related factors. These include *SC position*, as firms located closer to the end customer typically experience stronger stakeholder expectations and public scrutiny, leading to higher environmental engagement (Schmidt et al., 2017; Gualandris et al., 2021). Following the approach of Culot et al. (2024) and Schmidt et al. (2017), two authors independently classified each firm position based on its industry (NAICS code), information available on the company's website, and SEC filings. To ensure rigor and enhance inter-rater reliability, an external researcher was included in the process. A three-tier classification scale was developed: (1) raw material suppliers, (2) component suppliers, and (3) original equipment manufacturers. We also considered *Industry size*, operationalized as the natural logarithm of total assets in the firm's industry, since firms in larger sectors often face more intense scrutiny (Hartmann and Vachon, 2018; Terlaak and King, 2006). The *Availability of alternative buyers* was measured using the 1–HHI index of the focal firm's 4-digit NAICS industry: higher values indicate more buyer substitutability, which may reduce the firm's centrality and bargaining leverage over its suppliers (Elking et al., 2017). In contrast, *Availability of alternative suppliers* was operationalized as a firm-level index that reflects the breadth and redundancy of sourcing options. For each focal firm, we grouped suppliers by their 4-digit NAICS industry, computed the share of COGS allocated to each industry, and multiplied it by the number of distinct suppliers within that industry (Elking et al., 2017).

To conclude, to account for variation in data coverage from the Bloomberg SPLC database, we included the binary variable *Less than three suppliers*, which takes the value 1 if fewer than three suppliers were reported for a given firm, and 0 otherwise (Culot et al., 2023).

Table 1 presents an overview of the variables included in the model, while Table 2 reports the descriptive statistics and the correlation matrix.

4. Results

In line with Gualandris et al. (2021), we tested our hypotheses using OLS regressions with the dependent variable lagged by two years (Table 3). This lag structure helps address potential simultaneity concerns, by ensuring that the measurement of dependence temporally precedes the assessment of focal firm environmental performance (Hill et al., 2021; Wooldridge, 2016). To mitigate potential concerns related to heteroscedasticity, we employed robust standard errors. This approach relaxes the assumption that errors are independent and identically distributed, allowing for valid statistical inference and accurate interpretation of p-values even when the variance of the error term is not constant across observations (Huber, 1967). Moreover, independent variables and the continuous moderator (*Environmental regulations*) were standardized prior to estimation following the approach of Bellamy et al. (2020).

Starting with Model 1, it emerges that *Supplier dependence* has a significant but negative relationship with the focal firm environmental performance (H1 *not* supported). On the contrary, *Focal firm dependence* has no significant effect (H2 *not* supported).

Models 2 to 4 introduce the interactions between the two independent variables and the two moderators. Notably, the main relationships observed in the study remain consistent and stable throughout the different models, further reinforcing the robustness of these findings. Regarding the moderating effects, *Environmental regulations* show a positive interaction with *Supplier dependence*, while no significant effect is found with Focal firm dependence (H3a partially supported, H3b not supported). A significant interaction is observed for Reputation: it positively moderates the relationship with Supplier dependence and negatively moderates the relationship with Focal firm dependence (H4a partially supported, H4b partially supported).

To further validate and interpret our results, we examined changes in the adjusted R^2 values and analyzed the interaction plots (Yang and Jiang, 2024). Starting with the adjusted R^2 values, when compared to Model 1, we observe a notable increase across all models where significant moderating effects were identified. Specifically, the adjusted R^2 increases as moderators are included in the model, reaching up to a 23 % increase when all moderators are considered simultaneously (Model 4).

The interaction plots are presented in Fig. A1–Online Appendix. For

Table 1
List of variables included in the main model.

Variable	Year	Operationalization	Data source	Supporting reference
Environmental score	2021	Composite score (0–100) capturing emissions, resource use, and environmental innovation	LSEG ESG	Molinaro et al. (2024)
Supplier dependence	2019	Average percentage of each supplier's total revenues generated from the focal firm	Bloomberg SPLC	Elking et al. (2017)
Focal firm dependence	2019	Average percentage of the focal firm's total COGS allocated to each supplier	Bloomberg SPLC	Elking et al. (2017)
Environmental regulations	2019	Weighted average of country-level environmental regulatory stringency based on the geographic distribution of the focal firm's headquarters and production-related facilities	Bloomberg CMAP + Orbis	Lee and Bansal (2024)
Reputation	2019	Dummy variable equal to 1 if the firm appears in Fortune's "Most Admired Companies" Top 50 list, 0 otherwise	Fortune's Most Admired Companies list	Kim and Davis (2016)
Foundation year	2019	Year of firm establishment	LSEG Eikon	Balasubramanian et al. (2021)
COGS/Sales	2019	Ratio of cost of goods sold to total sales	LSEG Eikon	Golicic and Smith (2013)
ROA	2019	Ratio of net income to total assets	LSEG Eikon	Adhikary et al. (2020)
Firm size	2019	Natural logarithm of total assets	LSEG Eikon	Drempetic et al. (2020)
Leverage	2019	Ratio of total liabilities to total assets	LSEG Eikon	Fang et al. (2024)
SC position	2019	Categorical variable capturing firm position in the supply chain (1 – raw material supplier/2 – component supplier/3 –OEM)	LSEG Eikon + Company websites + SEC filings	Schmidt et al. (2017)
Industry size	2019	Natural logarithm of total assets at the 4-digit NAICS industry level	LSEG Eikon	Hartmann and Vachon (2018)
Availability of alternative buyers	2019	1 – Herfindahl–Hirschman Index of the focal firm's 4-digit NAICS industry	LSEG Eikon	Elking et al. (2017)
Availability of alternative suppliers	2019	Sum across 4-digit NAICS industries of the focal firm's COGS share allocated to each industry multiplied by the number of distinct suppliers in that industry	Bloomberg SPLC	Elking et al. (2017)
Less than three suppliers	2019	Dummy variable equal to 1 if the focal firm has less than three suppliers than three, 0 otherwise	Bloomberg SPLC	Culot et al. (2023)

the dummy variable (*Reputation*), we plotted the interactions for both levels (0 and 1). In the case of *Environmental regulations*, we depicted the interaction effects using values two standard deviations above and below the mean, representing high and low stringency levels. The graphical outcomes align with the findings emerging from Table 3.

In addition to the main findings, we conducted some supplementary analyses by examining the three components of the focal firm Environmental score separately (Table 4). Specifically, we re-estimated the models using the Resource use score, Emission score, and Environmental innovation score as dependent variables.

Starting with the Resource Use score (Model 5), the results reveal a significant negative relationship with *Supplier dependence*, while no significant effect is found for *Focal firm dependence*. Regarding the moderating effects, we identified significant interactions between *Supplier dependence* and *Reputation* (positive) and *Focal firm dependence* and *Reputation* (negative).

Turning to the Emission score (Model 6), *Supplier dependence* has a significant negative relationship, while *Focal firm dependence* a positive one. We also observed significant interactions between *Supplier dependence* and *Environmental regulations* (positive); *Supplier dependence* and *Reputation* (positive); and *Focal firm dependence* and *Reputation* (negative).

As for Environmental Innovation (Model 7), no significant results were found.

To conclude, we also performed several robustness tests (reported in Online Appendix) to further verify the stability and reliability of our results. In particular, we examined: (i) potential differences between included and excluded firms due to data availability; (ii) the correlation between supply chain data coverage and environmental performance; (iii) alternative model specifications addressing potential omitted variable bias; (iv) alternative operationalizations of the variable *Environmental regulations*; (v) an extended temporal definition of *Reputation*; (vi) an alternative dependent variable; (vii) the inclusion of industry fixed effects; (viii) the inclusion of a lagged dependent variable; and (ix) a reduced model specification to address concerns related to model complexity.

5. Discussion

Amid growing debate on how SC power dynamics influence progress toward environmental sustainability under increasing regulatory and market pressures, this study provides a large-scale secondary data analysis of the relationship between focal firms' sustainability outcomes and resource dependence within their supply base. We also examined the moderating role of institutional factors. The main hypotheses were built on the core tenets of the RDT and leveraging prior literature (e.g., Jia et al., 2024; Kim and Fortado, 2021; Reimann and Ketchen, 2017). We motivate our moderators by drawing on scholarship that integrates RDT as a lens for a firm's relative power position vis-à-vis its environment, moving beyond portrayals of the firm as a passive recipient of institutional pressures (Oliver, 1991; Wry et al., 2013). Overall, we built our hypotheses taking into consideration Drees and Heugens (2013) study on the channels linking resource dependence with organizational performance.

The results for the main relationships show that the greater the financial dependence of suppliers, the lower the environmental performance of the focal firm (H1). While we cannot directly observe whether environmental sustainability was a strategic priority for every firm in our sample, the issue has become increasingly prominent among large manufacturing firms (KPMG, 2024; Eccles and Klimenko, 2019; Center for Audit Quality, 2025). Our findings therefore suggest that greater bargaining power over suppliers does not automatically translate into improved environmental outcomes. As for H2 (i.e., the relationship between focal firm financial dependence on suppliers and focal firm environmental performance), the results are instead not significant. These findings differ from the financial-performance evidence reported by Elking et al. (2017) and do not fully align with much of the RDT-based SCM literature (Kim and Fortado, 2021). In this section we reflect on our results considering the peculiarities that might characterize environmental sustainability with respect to other performance dimensions.

Supplier dependence on the focal firm has been associated with improved financial performance (Elking et al., 2017). Our findings for H1 suggest a different mechanism for buyer environmental performance. Buyer power may be exercised to secure price concessions and demand service levels (e.g., short lead times, small lots, safety stocks,

Table 2
Summary statistics and correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Environmental score	1														
(2) Supplier dependence	−0.100	1													
(3) Focal firm dependence	−0.049	0.280**	1												
(4) Environmental regulations	−0.063	−0.079	−0.110	1											
(5) Reputation	0.120	0.045	−0.058	−0.082	1										
(6) Foundation year	−0.210*	0.110	0.150	0.160	−0.160	1									
(7) COGS/Sales	−0.270**	−0.028	−0.190*	0.240*	−0.130	0.150	1								
(8) ROA	0.270**	0.036	0.130	−0.091	0.071	−0.093	−0.420***	1							
(9) Firm size	0.290**	0.120	−0.220*	−0.018	0.300***	−0.039	−0.230*	−0.180	1						
(10) Leverage	0.180	0.018	−0.032	−0.110	0.150	−0.360***	0.073	0.059	−0.014	1					
(11) SC position	0.240*	−0.120	0.010	−0.061	0.220*	−0.270**	−0.450***	0.200*	0.110	0.21*	1				
(12) Industry size	−0.044	0.030	−0.067	0.076	−0.120	0.240*	0.071	0.040	0.170	−0.21*	−0.190	1			
(13) Availability of alternative buyers	−0.180	0.067	−0.077	0.072	−0.110	0.180	0.033	−0.091	0.049	−0.27***	−0.300**	0.360***	1		
(14) Availability of alternative suppliers	−0.065	−0.028	0.009	−0.140	0.110	0.046	0.012	−0.088	0.210*	0.040	0.065	0.260**	0.001	1	
(15) Less than three suppliers	−0.072	−0.110	−0.023	0.150	−0.044	0.005	0.052	0.039	−0.230*	−0.063	−0.080	−0.290**	0.052	−0.086	1
min	17.084	0.046	0.068	4.026	0	1806	13.600	−6.400	15.140	26.604	1	25.661	73.208	1	0
max	97.623	21.732	4.810	5.978	1	2019	95.671	32.600	19.709	127.002	3	29.172	98.244	22.674	1
mean	69.456	3.072	0.713	5.218	0.064	1931	63.798	8.127	17.057	66.401	2.358	28.256	93.997	2.985	0.028
st.dev.	17.173	3.867	0.862	0.383	0.246	48.739	20.020	6.920	1.045	16.611	0.752	0.818	4.386	3.901	0.164

Note: *p < 0.05, **p < 0.01, ***p < 0.001.

expedited shipments, and stringent yield targets). In response, financially dependent suppliers may face thinner margins and greater state uncertainty. They may therefore reallocate scarce slack away from environmental upgrades and toward meeting operational mandates (Narasimhan et al., 2009). This substitution might in turn increase material waste, rework, and energy intensity across the dyad and trigger more carbon-intensive operations (Esfahbodi et al., 2016). This interpretation is consistent with the observed declines in resource-use and emissions scores from our additional analysis on the diverse components of the environmental sustainability score (Table 4). At the same time, high supplier dependence on the focal buyer can also dampen suppliers' incentives to develop new green capabilities, as their reliance on a single buyer shields them from competitive market pressures. Finally, although our cross-sectional design does not allow us to observe this directly, even powerful buyers may struggle to rapidly reconfigure their supply bases when supplier portfolios were built before environmental criteria became central (Kim and Henderson, 2015; Jia et al., 2024; Gualandris et al., 2021).

Regarding H2, we hypothesized that focal firms highly dependent on their suppliers would experience reduced autonomy and increased vulnerability to opportunistic behavior, as powerful suppliers may prioritize their own interests over buyers' objectives. Nevertheless, greater dependence on suppliers can also stem from a strategic choice to reduce complexity and deepen integration with fewer suppliers (Bode and Wagner, 2015; Gulati and Sytch, 2007). These conflicting dynamics may counterbalance each other, potentially leading to a neutral overall effect. On the one hand, concentrating most COGS with a few suppliers reduces the buyer's autonomy and creates lock-in. On the other hand, such concentration is often a deliberate design choice that yields tighter coordination, lower transaction costs, and scale economies in data sharing, process alignment, and certification. Moreover, large, strategic suppliers also tend to possess more advanced environmental management systems and reporting capabilities (Gimenez and Tachizawa, 2012). Looking at the single components of environmental sustainability (Table 4), our results show a positive association between focal firm financial dependence on suppliers and the emission score. A plausible interpretation is that concentrating most COGS with a few strategic suppliers simplifies carbon coordination and measurement (Vieira et al., 2024). Because carbon has become the focal metric for regulators and investors, both sides face heightened legitimacy pressures and align on carbon-first initiatives. These mechanisms jointly explain why emissions improve under high supplier dependence while the composite environmental performance remains statistically indistinct, as gains on emissions can be offset by non-significant effects on resource use and environmental innovation scores.

With respect to moderators, our analysis indicates that greater regulatory stringency has a positive effect on the association between supplier financial dependence on the focal firm and the focal firm's environmental performance (H3a). We interpret the findings as evidence that regulation strengthens a legitimacy channel (Drees and Heugens, 2013) through which buyer power is converted into environmental performance. This effect is manifest only for the emission score (Table 4). Carbon reductions are the most regulated, standardized, and they are increasingly targeted by SC initiatives (Wieland and Creutzig, 2025). Under stronger institutional pressures, focal firms gain external legitimacy, clear targets, and measurement practices. When suppliers are financially dependent, this legitimacy might convert into acquiescence (Oliver, 1991). By contrast, resource-use improvements are more entangled with service mandates (e.g., short lead times, small batches, safety stocks), which can increase scrap and energy intensity. Regulation may not fully reconfigure these trade-offs in the short term, so moderation is weak or nil. Environmental innovation typically exhibits longer lags and appropriation concerns: dependent suppliers prioritize buyer-specific adaptations and documentation over generalizable green innovation, blunting near-term effects and yielding a non-significant moderation.

Table 3
Results of the analysis.

Dependent variable = Environmental score	OLS (*n=109*)							
	(1) Independent variables only		(2) Moderation Environmental regulations		(3) Moderation Reputation		(4) Full moderation	
	Estimated coefficients (Robust standard errors)	P-value	Estimated coefficients (Robust standard errors)	P-value	Estimated coefficients (Robust standard errors)	P-value	Estimated coefficients (Robust standard errors)	P-value
Explanatory variables								
Supplier dependence	−2.725 (1.304)	0.039*	−2.304 (1.104)	0.040*	−2.921 (1.287)	0.026*	−2.629 (1.110)	0.020*
Focal firm dependence	0.830 (1.538)	0.591	1.879 (1.975)	0.344	0.976 (1.517)	0.522	2.133 (1.943)	0.275
Moderation variables								
Environmental regulations			0.485 (1.363)	0.722			0.333 (1.353)	0.806
Reputation					−16.227 (3.828)	0.000***	−15.506 (4.121)	0.000***
Supplier dependence* Environmental regulations			3.332 (1.204)	0.007**			3.207 (1.296)	0.015*
Focal firm dependence* Environmental regulations			3.289 (2.490)	0.190			3.651 (2.504)	0.148
Supplier dependence*Reputation					30.229 (6.478)	0.000***	33.456 (6.828)	0.000***
Focal firm dependence* Reputation					−31.304 (7.135)	0.000***	−29.918 (7.816)	0.000***
Control variables								
Foundation year	−0.029 (0.032)	0.371	−0.032 (0.031)	0.309	−0.026 (0.033)	0.423	−0.030 (0.032)	0.347
COGS/Sales	−0.034 (0.104)	0.744	0.013 (0.118)	0.910	−0.025 (0.105)	0.812	0.027 (0.119)	0.822
ROA	0.674 (0.224)	0.003**	0.737 (0.214)	0.001***	0.725 (0.237)	0.003**	0.772 (0.230)	0.001**
Firm size	6.300 (1.587)	0.000***	6.538 (1.576)	0.000***	6.606 (1.614)	0.000***	6.858 (1.605)	0.000***
Leverage	0.123 (0.085)	0.152	0.129 (0.081)	0.116	0.135 (0.086)	0.122	0.146 (0.081)	0.075
SC position	1.092 (2.525)	0.666	0.627 (2.466)	0.800	1.183 (2.551)	0.644	0.694 (2.489)	0.781
Industry size	0.405 (2.025)	0.842	−1.364 (1.936)	0.483	−0.214 (2.200)	0.923	−1.810 (2.126)	0.397
Availability of alternative buyers	−0.404 (0.371)	0.279	−0.247 (0.327)	0.452	−0.395 (0.364)	0.281	−0.216 (0.316)	0.496
Availability of alternative suppliers	−0.595 (0.623)	0.343	−0.616 (0.529)	0.247	−0.529 (0.641)	0.412	−0.542 (0.540)	0.318
Less than three suppliers	0.264 (8.462)	0.975	−1.660 (8.187)	0.840	−0.473 (8.543)	0.956	−2.050 (8.255)	0.804
Adjusted R^2	19.61 %		22.64 %		20.81 %		24.18 %	

Notes: 1) *p < 0.05, **p < 0.01, ***p < 0.001 2) The variance inflation factors (VIF) of the independent and the moderating values were always <5) indicating the absence of multicollinearity issues

The non-significant result for H3b can be interpreted by contrasting external pressures from the institutional context and from business partners. Stricter environmental regulation increases coercive pressure and can enhance the focal firm's legitimacy. However, the RDT implies that translating such expectations into operational change hinges on who controls critical resources. Oliver's (1991) framework reconciles these views: institutions set the pressure to comply, while dependence relations delimit the feasible responses. Thus, when the focal firm is financially dependent on a small set of dominant suppliers, regulation may heighten pressure on the buyer without increasing its leverage upstream. Suppliers can resist or renegotiate requests for process changes, cleaner inputs, traceability, or compliance with specific standards by narrowing scope, extending timelines, or shifting costs back through prices and contract terms. In this setting, higher regulatory stringency is unlikely to generate measurable improvements in focal firm (buyer) environmental performance.

Finally, the significant moderation effect of corporate reputation (H4a/H4b; positive and negative effects, respectively) suggests that well-regarded firms have greater autonomy in responding to sustainability pressures from both the broader institutional environment and supply base power dynamics. Regarding H4a, high-reputation buyers operate under a brighter public spotlight, which increasingly concerns attention over environmental issues. When suppliers are financially dependent, affiliation with a reputable buyer becomes more valuable, and the reputational and economic costs of noncompliance increase. This matters for buyer environmental performance because many buyer outcomes depend on upstream inputs and processes. Supplier compliance and proactivity can enable cleaner materials and components, lower embedded emissions, improved traceability and risk mitigation, and the diffusion of environmental process innovations across the supply base. In times when environmental management is a core component of a firm's license to operate (Aguilera et al., 2021), dependent suppliers have stronger incentives to align with the buyer's environmental goals and to implement practices that translate into measurable improvements in buyer environmental performance.

By contrast, H4b suggests that reputation can also function as buffering capital. It may help the buyer to satisfy external audiences through disclosure and risk messaging (Delmas and Toffel, 2008; Perrault and Clark, 2016; Walker and Wan, 2012), consistent with discursive legitimation (Vaara et al., 2024). In this sense, highly reputable firms may treat credibility as a partial substitute for additional operational effort when they are financially dependent on powerful suppliers. This can reduce incentives to pursue costly upstream changes. This interpretation is consistent with the finding that the effect emerges for resource use and

Table 4
Results of the analysis with Resource use, Emission, and Environmental innovation.

	OLS (n=109)					
	(5) Resource use score		(6) Emission score		(7) Environmental innovation score	
	Estimated coefficients (Robust standard errors)	P-value	Estimated coefficients (Robust standard errors)	P-value	Estimated coefficients (Robust standard errors)	P-value
Explanatory variables						
Supplier dependence	−4.231 (1.517)	0.006**	−3.375 (1.638)	0.042*	−0.203 (2.926)	0.945
Focal firm dependence	3.807 (2.140)	0.079	5.868 (1.645)	0.001***	−2.015 (3.939)	0.610
Moderation variables						
Environmental regulations	0.100 (1.481)	0.946	−0.466 (1.512)	0.759	−3.763 (2.306)	0.106
Reputation	−16.460 (5.715)	0.005**	−19.782 (8.186)	0.018*	3.454 (9.155)	0.707
Supplier dependence* Environmental regulations	−0.739 (1.461)	0.614	3.713 (1.592)	0.022*	3.637 (2.378)	0.130
Focal firm dependence* Environmental regulations	3.848 (3.014)	0.205	2.116 (1.788)	0.240	4.645 (3.793)	0.224
Supplier dependence*Reputation	17.375 (8.266)	0.038*	43.793 (15.072)	0.005**	23.33 (11.436)	0.044*
Focal firm dependence*Reputation	−36.758 (9.304)	0.000**	−38.603 (15.810)	0.017*	−7.196 (13.174)	0.586
Control variables						
Foundation year	−0.025 (0.033)	0.446	0.035 (0.042)	0.404	−0.009 (0.062)	0.890
COGS/Sales	0.003 (0.136)	0.983	−0.024 (0.120)	0.842	0.331 (0.200)	0.101
ROA	0.399 (0.291)	0.174	0.679 (0.270)	0.014*	0.928 (0.476)	0.054
Firm size	7.590 (1.770)	0.000***	7.410 (2.072)	0.001***	5.204 (2.749)	0.062
Leverage	−0.080 (0.093)	0.392	0.301 (0.105)	0.005**	0.193 (0.153)	0.212
SC position	9.325 (2.790)	0.001**	2.003 (3.011)	0.508	−6.233 (4.424)	0.162
Industry size	−2.226 (2.532)	0.382	1.874 (2.747)	0.497	−2.207 (3.961)	0.579
Availability of alternative buyers	−0.407 (0.330)	0.221	0.381 (0.368)	0.303	−0.663 (0.608)	0.279
Availability of alternative suppliers	−0.559 (0.738)	0.451	−1.111 (0.504)	0.030*	0.686 (0.707)	0.335
Less than three suppliers	6.635 (8.069)	0.413	13.072 (5.984)	0.032*	−3.010 (21.744)	0.890
Adjusted R^2	29.70 %		21.82 %		3.10 %	

Notes: 1) *p < 0.05, **p < 0.01, ***p < 0.001 2) The Resource use score reflects a company's performance and capacity to reduce the use of materials, energy, or water, and to find more eco-efficient solutions by improving SC management. The Emission score measures a company's commitment and effectiveness toward reducing environmental emissions in its production and operational processes. The Innovation score describes a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products (LSEG, 2024).

emissions, but not for environmental innovation (Table 4).

Taken together, our results indicate that power dynamics within the supply base shape buyer environmental sustainability performance in ways that diverge from financial outcomes (Elking et al., 2017). From a RDT perspective, financial performance effects typically flow through the autonomy channel. Lower dependence increases managerial discretion and bargaining latitude, which is associated with stronger financial outcomes (Drees and Heugens, 2013). In this sense, buyers' greater power (high supplier dependence, low focal firm dependence) tends to translate into more autonomy and stronger financial results (Elking et al., 2017). By contrast, environmental outcomes appear to operate through both autonomy and legitimacy-related mechanisms. Legitimacy is closely tied to institutional theory, which emphasizes conformity to coercive, mimetic, and normative pressures (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). This perspective has been widely echoed and further developed in SCM research on sustainable practices and performance (Kauppi and Hannibal, 2017; Sayed et al., 2017). However, as expounded by Oliver's (1991) influential work, institutional pressures can be addressed through a range of strategic responses beyond mere conformance, including avoidance, defiance, and manipulation. Responses depend on the degree of organizational agency enabled by varying levels of power. This view aligns with our findings, particularly given the moderating roles of environmental regulation and corporate reputation. Regulatory stringency can legitimize buyer requests and sharpen focus on measurable domains such as emissions. Reputation can expand discretion, enabling action in some contexts while facilitating buffering in others. Cast in this light, buyer power seems to arise from the alignment with external expectations and to be shaped through a process of social construction based on buyer relative power within its supply network. To conclude, echoing Oliver (1991), the influences of resource dependence and institutional pressures on environmental performance should not be assumed linear or uniform: they emerge from configurational combinations of supply-network dependence, regulation, and reputation; patterns we analyze in this study and that warrant further investigation.

6. Conclusions

6.1. Contributions to theory

Motivated by ongoing tensions in the existing literature, namely persistent ambiguity about whether and how supply base power affects sustainability outcomes, limited clarity on the mechanisms through which dependence translates into environmental rather than financial performance, and the under specified role of institutional pressures in shaping these effects, this study advances RDT based SCM research in three ways. First, by applying financial dependence measures to buyer environmental performance, we show that dependence structures associated with financial gains do not straightforwardly translate into sustainability improvements as higher supplier financial dependence on

the focal firm is associated with lower buyer environmental performance, whereas focal firm financial dependence on suppliers is not significant. This directly challenges the carry over assumption from prior financial performance evidence (e.g., Elking et al., 2017) and clarifies why examining dependence through a sustainability lens is necessary.

Second, we connect dependence to the institutional context by demonstrating that environmental regulation stringency and corporate reputation condition when buyer supplier dependence is more likely to relate to environmental outcomes, thereby addressing the gap on how supply base dependence interacts with external pressures. This expands the theoretical application of RDT in line with Oliver (1991) and related works at the crossroad with institutional theory (Lawrence, 1998; Wang et al., 2008; Wry et al., 2013).

Third, we specify how the relevant RDT channels differ by performance domain, focusing on the role of legitimacy as a complement of autonomy in sustainability (Drees and Heugens, 2013). By examining the components of environmental performance (i.e., resource use, emissions, and environmental innovation), we show that dependence and institutional pressures map unevenly onto sustainability domains, with emissions emerging as a particularly salient domain under current regulatory and market scrutiny, thereby clarifying which sustainability outcomes are most tightly coupled to legitimacy demands.

6.2. Contributions to practice

The findings provide valuable insights for managers and decision-makers. First, the analysis reveals that greater financial dependence of suppliers on the focal firm can lead to poorer focal firm environmental outcomes. This suggests that managers should avoid excessive control that might undermine suppliers' autonomy and commitment to environmental practices.

Second, the absence of significant effects for focal firm financial dependence on suppliers highlights that reliance on key suppliers alone may not inherently drive good or poor environmental outcomes. Additionally, managers can derive from our findings a better understanding of reputation, which can enhance a firm's influence over suppliers, but also reduce the perceived need to engage on environmental issues.

Third, with respect to the institutional context, our results show that stringent environmental regulations act as a key external force that strengthens the focal firm's ability to manage dependencies for environmental performance. These regulations enhance the firm's legitimacy, aligning its practices with institutional expectations and justifying sustainability demands on suppliers. For managers, this highlights the importance of deeply understanding the legislative context and identifying strategies to leverage regulatory frameworks to enhance legitimacy, enforce compliance, and drive environmental improvements.

To conclude, policymakers can find in our study further evidence on the role of regulation in driving change, while reflecting on what areas to prioritize given the current emphasis on carbon reduction. Additionally, our study calls for further reflection on the monitoring and screening of companies that rely on high reputational assets.

6.3. Limitations and future research

This study has limitations that point to promising directions for future research. First, while secondary data enable large-scale tests, they limit our ability to directly observe the causal mechanisms linking dependence to environmental performance, particularly legitimacy-related pathways; future work could combine alternative methods and richer designs, including longitudinal data, quasi-natural experiments, or discontinuity-based approaches where feasible, to strengthen causal identification and open the black box of how legitimacy is built and translated into sustainability outcomes (Lu and Shang, 2017).

Second, because relatively few buyers fall into the "reputable" category, estimates of reputation's moderating role rely on a narrow set of observations. Our insights could be further validated and extend using alternative reputation measures, longer observation windows, or complementary approaches such as surveys that capture reputational dynamics more continuously.

Third, our empirical setting focuses on Fortune 500 firms, which supports data completeness but may constrain generalizability. It would be interesting to test whether the observed dependence–performance patterns hold for smaller firms, other industries, and contexts with different institutional infrastructures, including emerging economies. Specifically, our study suggests to further investigate how firms operating in different contexts leverage legitimacy (Vaara et al., 2024): against growing pressures towards environmental performance, reputation might not only represent a mitigating factor but also a potential barrier, depending on the nature of external demands and internal priorities.

Fourth, the weak results for environmental innovation suggest that dependence alone is unlikely to explain innovation-oriented sustainability outcomes. Hence, there are opportunities incorporate additional dimensions such as suppliers' capabilities, routines, incentives, and governance mechanisms, and leverage more granular environmental measures, including Scope 1, 2, and especially Scope 3 emissions, to better capture the relationship of SC dynamics with decarbonization and broader sustainability trajectories.

CRediT authorship contribution statement

Matteo Podrecca: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Giovanna Culot:** Writing – review & editing, Writing – original draft, Conceptualization.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pursup.2026.101110.

Data availability

The data underlying the study are available in Bloomberg and LSEG Eikon and ESG databases.

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