



A review of greenwashing and supply chain management: Challenges ahead

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ABSTRACT

As being environmentally responsible is a potential source of competitive advantage, incorporating genuine environmental practices across the supply chain may help firms capitalize on the growing demand for corporate accountability and consumer awareness. Therefore, it is important to understand to what extent firms are using greenwashing to mislead their stakeholders in the supply chain. The purpose of this paper is to review the existing literature regarding greenwashing in supply chain management (SCM) to shed light on the main thematic groups addressed in the literature, understand its challenges and develop a framework that highlights the key drivers that companies need to tackle to prevent greenwashing in supply chains. For this purpose, we have conducted a systematic literature review, following a three-stage method. It was possible to identify possible solutions to prevent greenwashing across four main dimensions of SCM: consumers/customers; relationships between focal firms and suppliers; certification programs and reporting assessment; and corporate leadership. We provide a framework to help firms develop their sustainable strategy and prevent greenwashing along the supply chain. This paper synthesizes the challenges that firms face when implementing a sustainable supply chain, suggests solutions to prevent greenwashing and provides future research avenues.

1. Introduction

Although companies' environmental concerns are not new, as they emerged in the second half of last century (Shantora, 1983), public concerns about the role organizations play in environmental issues have dramatically increased recently. Governments, consumers and non-profit organizations are increasingly aware of environmental problems, pressing companies to adopt environmentally friendly practices (Pizzetti et al., 2021; Tseng et al., 2019). Moreover, the stakeholders' pressure is increasing, driven by regulatory and market pressure for firms to address environmental issues (Tseng et al., 2019). The importance of sustainable development goals (SDGs) (Johnsson et al., 2020) and the increasing recognition stakeholders have regarding greenwashing and its impact on firms (Pizzetti et al., 2021) is growing, as investors are increasingly attracted to companies that ostensibly care about the environment (Pizzetti et al., 2021). Hence, environmental responsibility has become a potential source of competitive advantage,

prompting companies to incorporate environmental concerns, not only at the company level, but also at the supply chain level. It is also crucial for firms to set science-based targets, assigning significant investments to decarbonize operations to achieve a comprehensive environmental strategy within the supply chain.

Indeed, as stakeholders' environmental awareness is increasingly pressuring firms to enhance their environmental performance, companies are expected to minimize their operations' negative environmental impact (Tseng et al., 2019) pursuing sustainable practices (Ahi and Searcy, 2013). Therefore, supply chains have become a focal point for many companies, as they significantly impact the environment by involving a continuous flow of information, materials and capital from raw materials sourcing to production, packaging and distribution of products or services to the end-user (Ahi and Searcy, 2013). So, effective supply chain management (SCM) is imperative if companies want to become more sustainable, improve their environmental performance, and minimize their impact on environmental degradation. This requires

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collaboration with both upstream and downstream supply chain partners, which involves difficult challenges and different outcomes when trying to develop a sustainable supply chain management (SSCM), incorporating economic, environmental and social concerns (Ahi and Searcy, 2013; Moreira et al., 2022; Tseng et al., 2019).

Companies' communication strategies (such as sustainability reports or institutional communications), certification programs, characteristics, environmental culture and involvement with their partners across the supply chain partners may be heterogeneous. Even though sometimes firms claim to be sustainable, they do not incorporate environmental concerns throughout the supply chain, resulting in a gap between companies' strategic intentions and real actions (Carbone and Moatti, 2011). This can lead to different levels of greenwashing. As greenwashing can be perceived as a difference between a company's claims and actual behavior to minimize the environmental impact (Kapitan et al., 2019), it is clear that greenwashing frequently occurs at the supply-chain level (Pizzetti et al., 2021). Some illustrative examples can be traced back to 1997 with Nike's sweatshop scandal (Bartley, 2009), to 2013 with the Rana Plaza disaster, with low implications for retailers as they do not have economic incentives to move sourcing out of low-cost economies (Chowdhury, 2017; Jacobs and Singhal, 2017). More recently Zara, a fast-fashion giant, was found announcing a new platform, Zara Pre-Owned, designed to give Zara clothing articles a new life, through second-hand purchase and repairs, which was found later on throwing away previous collections, allegedly practicing greenwashing (Hardcastle, 2022). These highlight that greenwashing happens when companies claim to be sustainable, while neglecting labor rights or selecting suppliers that pollute the environment (Pizzetti et al., 2021).

Despite its controversial nature (de Freitas Netto et al., 2020), there is a lack of studies linking greenwashing with SCM. As such, through a systematic literature review (SLR), this article seeks to address this gap and aims to answer the following research questions: RQ1: "What are the main thematic groups addressed in the literature when analyzing greenwashing within the supply chain?"; and RQ2: "What are the main challenges to tackling greenwashing to achieve a sustainable supply chain?". For this purpose, this article has two main research objectives: (i) to review the most important themes influencing greenwashing in the supply chain; and (ii) to develop a framework that identifies the main drivers that companies must address to prevent greenwashing throughout the supply chain.

This paper is structured as follows: After this introduction, section 2 includes a theoretical overview of the two main concepts of this study, supply chain and greenwashing. Section 3 outlines the methodology (SLR) used in this study. Section 4 characterizes the sample of articles included in this review. Section 5 presents the results. Section 6 presents the discussion and the development of the proposed framework. Finally, section 7 contains the conclusions and suggestion for future research.

2. Theoretical overview

2.1. The truth behind green claims: greenwashing

As it becomes increasingly important for firms to communicate their sustainable practices as a way to remain competitive in the market, some concerns have emerged regarding the authenticity of their claims. Given the growing stakeholders' interest in sustainability issues (Johnsson et al., 2020; Pizzetti et al., 2021), some companies turn to greenwashing to address those concerns, even though their claims do not align with their actual behavior (de Freitas Netto et al., 2020).

Despite the growing academic interest in greenwashing across different research areas in the last ten years, no clear definition of greenwashing yet exists (de Freitas Netto et al., 2020). For instance, Torelli et al. (2020) divide greenwashing into four main levels, depending on the purpose underlying the deceptive communication: corporate-level; strategic-level; dark-level; and product-level

greenwashing. Other authors define greenwashing as a combination of two concepts: green and brainwashing, meaning that greenwashing practices aim to project a responsible public image, even if it involves presenting a false or misleading image that the organization is green (Mitchell and Ramey, 2011). Hence, greenwashing can be assumed as deliberate deception, as the false/misleading information is conveyed intentionally (Ferrón-Vílchez et al., 2021). In their literature review, de Freitas Netto et al. (2020) evaluate most of the greenwashing definitions and found that no universal definition of greenwashing is accepted as a result of its multidisciplinary nature and multifaceted perspective, involving firm and product level perspectives, as well as process, image, and environmental perspectives. So, based on previous analyses (de Freitas Netto et al., 2020; Ioannou et al., 2023; Torelli et al., 2020), we define greenwashing as "the result of misleading communications used by organizations to disseminate information about green/-environmental practices that are overly inflated *vis-à-vis* with what they actually do."

Overall, greenwashing is just a short-term strategy that works until stakeholders understand the real situation of the *greenwasher*, resulting in reputational damage, thus requiring companies a long time to recover (Ferrón-Vílchez et al., 2021). Moreover, greenwashing can also undermine stakeholders' trust and their intention to invest (Pizzetti et al., 2021) so companies must consider its risks, as it can have collateral effects on the market. It is important for companies to adopt a more authentic communication strategy when making "green" claims, as misleading communications affect stakeholders' actions and reactions, impacting corporate legitimacy and reputation (Torelli et al., 2020).

2.2. Supply chain management and greenwashing

Undoubtedly, supply chains contribute largely to environmental degradation, making it imperative for companies to effectively manage their supply chain operations to achieve sustainability in their organizations and industries (Tseng et al., 2019). The improvement of environmental performance relies on the relationship or collaboration among supply chain partners (Ahi and Searcy, 2013; Moreira et al., 2022; Tseng et al., 2019). If companies mean to be more environmentally friendly, they need to modify their supply chains, ensuring that their partners comply with environmental and sustainable requirements (Tseng et al., 2019). This is crucial as the focal company can be held accountable for its supply chain partners' misbehavior (Blome et al., 2017; Pizzetti et al., 2021).

The incorporation of environmental concerns into SCM is often referred to as green supply chain management (GSCM) or sustainable supply chain management (SSCM) (Ahi and Searcy, 2013; Faramarzi-Oghani et al., 2023; Shekarian et al., 2022). Although they are two independent and well-established concepts in the literature, sometimes certain authors inappropriately use these concepts interchangeably. SSCM encompasses economic, environmental and social concerns, thus being a more inclusive concept that follows a triple-bottom-line approach (Ahi and Searcy, 2013; Faramarzi-Oghani et al., 2023). Currently, being only green (i.e., having incorporated only environmental issues into SCM) is not enough, as stakeholders demand companies to also comply with social and economic concerns at the same time. In fact, even though sustainability initially focused on environmental issues, its scope has been extended to include economic and social concerns (Ahi and Searcy, 2013).

Although some of the articles included in this systematic literature review use 'green' and 'sustainable' supply chains interchangeably, sometimes not including the social dimension (e.g. Carbone and Moatti, 2011), others include economic, environmental and social dimensions in the SCM (e.g. DeFries et al., 2017). Therefore, we have agreed to use the concept of SSCM in order to be more inclusive and to better understand how greenwashing can occur throughout supply chains. Moreover, the SSCM definition includes a relationship-focused, emphasizing the need to design inter-organizational business systems that manage all the flows

(material, information, and capital) to meet stakeholders' requirements, improving the organization's profitability, resilience and competitiveness over time (Ahi and Searcy, 2013).

Indeed, companies' shift towards a more sustainable supply chain needs to be accompanied by concrete actions to incorporate an environmental dimension across the entire supply chain, from design and sourcing to manufacturing and reverse logistics (Carbone and Moatti, 2011). SCM is of paramount importance in preventing greenwashing, as it ensures that partners comply with sustainability standards. This helps to avoid damaging reputation, financial performance, and potential scandals in upstream activities in the supply chain, as well as criticism from stakeholders (Blome et al., 2017). Some well-known and easily remembered examples of negative effects of greenwashing include, for instance, the 2010 B P Deepwater Horizon disaster (Kanso et al., 2019) or the Dieseltgate scandal that erupted in 2015, which had serious repercussions for Volkswagen and other car manufacturers (Boiral et al., 2021).

3. Method

We have adopted an SLR method, thus differing from a traditional narrative review, by being more systematic and explicit about the selection of the studies (Denyer and Tranfield, 2009). In this SLR, we have followed the three stages suggested by Tranfield et al. (2003): (i) planning the review (definition of the review's objective and research question); (ii) conducting the review (identification of the relevant literature, detailing both inclusion and exclusion criteria); and (iii) reporting and disseminating the results.

The first stage of our SLR method has already been stated in the introduction, where our research question was presented. The second stage is presented in sub-section 3.1, where we explain the inclusion and exclusion criteria, in order to ensure the review's transparency and replicability (Denyer and Tranfield, 2009). Then, the reporting of the results is presented in section 4 and the discussion of the main contributions is in section 5.

3.1. Identification and selection of the relevant articles

This second stage involves locating relevant studies to answer our research question. For that purpose, we conducted a search in the Scopus database. The search terms, applied to the title, abstract and keywords, resulted in the following search string: "supply chain*" AND "green-wash*" OR "green wash*" OR "green-wash*" OR "circular wash*". This search was conducted on January 2nd, 2023 and included articles available until the end of 2022. It yielded a total of 38 articles. With such a limited number of studies, we decided not to apply any restrictions to our sample regarding the type of journal, quartile of the journal or subject area of analysis.

The abstracts, keywords and other citation information of all 38 articles were downloaded and exported to an Excel spreadsheet, allowing all authors to individually identify potential studies to include in this review and to monitor the selection and analysis of the articles. After excluding conference papers, the abstracts were read in parallel by all authors in order to select the manuscripts for further analysis. After compiling the set of selected articles, they were exported to an Excel sheet and individually analyzed by the authors. The initial analysis considered the titles and abstracts of the articles to determine their relevance to the research theme.

After this independent assessment, any discrepancies were discussed until a unanimous decision was reached (Xiao and Watson, 2017). Therefore, abstracts that did not include a direct reference to both greenwashing and supply chain, as well as abstracts that did not establish a connection between supply chain, sustainability and greenwashing were excluded, which left us with 27 articles. To ensure the reliability of the selection process, and following previous studies' recommendations (Xiao and Watson, 2017; Zimmermann et al., 2016), all

three researchers independently evaluated those 27 articles, proceeding to the full-text reading. If there was a unanimous agreement, the article was included for analysis. When consensus was not reached, the three researchers convened to discuss the inclusion and exclusion of the manuscript, with inclusion dependent upon unanimous agreement from all authors. After reading the entire documents, eight papers were found to be unrelated to the scope of our study or that did not establish a link between greenwashing and (sustainable) supply chain. This resulted in a final pool of 19 papers. Fig. 1 provides an overview of this identification and selection process.

The 19 approved documents serve as a foundation for understanding the themes addressed in the literature, which supported the segmentation and grouping of the articles present in the results section. Following an inductive approach, as utilized by Jones et al. (2011), an interpretive perspective was utilized to analyze the content covered in all articles. Consequently, the articles were organized according to the specific context in which greenwashing took place. As such, they were classified based on the following themes.

- Corporate social responsibility and greenwashing: the cost for firms to go green;
- The influence of firms' characteristics and culture in greenwashing along the supply chain;
- The importance of relationships between supply chain partners;
- The urgent need for guidance and certification programs in tackling greenwashing;
- Report and measurement of sustainable practices;
- Greenwashing in supply chain management: Industry case studies.

4. Characterization of the sample

For the third stage of our SLR, reporting and dissemination of results, we start by characterizing the sample. Table 1 provides an overview of the final pool of articles, revealing that all 19 articles were published in 19 different journals by different authors. This information corroborates the wide spectrum and multidisciplinary nature of research on the relationship of greenwashing in the supply chain in academia. Therefore, one can conclude that this is a relatively new research subject in the literature. Moreover, as Fig. 2 shows, that greenwashing in the supply chain is quite recent: although publications began in 2011, 14 of the 19 articles were published from 2019 onwards, as shown in Fig. 2.

Considering the research areas of the journals listed in Table 1, seven papers were published in journals with a particular emphasis on sustainability studies. Indeed, by looking at the top-5 most cited papers (Table 1), one can see that three of them belong to environmental-related journals, which supports the notion that this study is first-of-its-kind research. In addition, a citation analysis allowed us to examine the potential links between the reviewed papers (Fahimnia et al., 2015). In Table 1, the total global citation (TGC) score corresponds to the number of times the paper has been cited in the SCOPUS database, whereas the total local citations (TLCs) correspond to the number of times that a specific article has been cited by another article within our sample of 19 articles (Fahimnia et al., 2015). As shown in Table 1, there is a significant disparity between global citations and local citations. Even though the TGC score is high, the TLC count is almost non-existent, meaning that the authors of the articles selected for this SLR do not cite each other, indicating that this research field is in an embryonic stage. As such, it is possible to anticipate that the selected articles may analyze different topics and reach different conclusions. Once again, this is also proof of this research subject's infancy and emergence.

Taking into account the examination of the 19 papers, the results were organized according to the thematic groups identified and their year of publication (Table 2). Although in the beginning, the articles approached different topics, recently (since 2019), different authors have increasingly focused on three main these related to greenwashing and supply chain-related: certification programs, sustainability

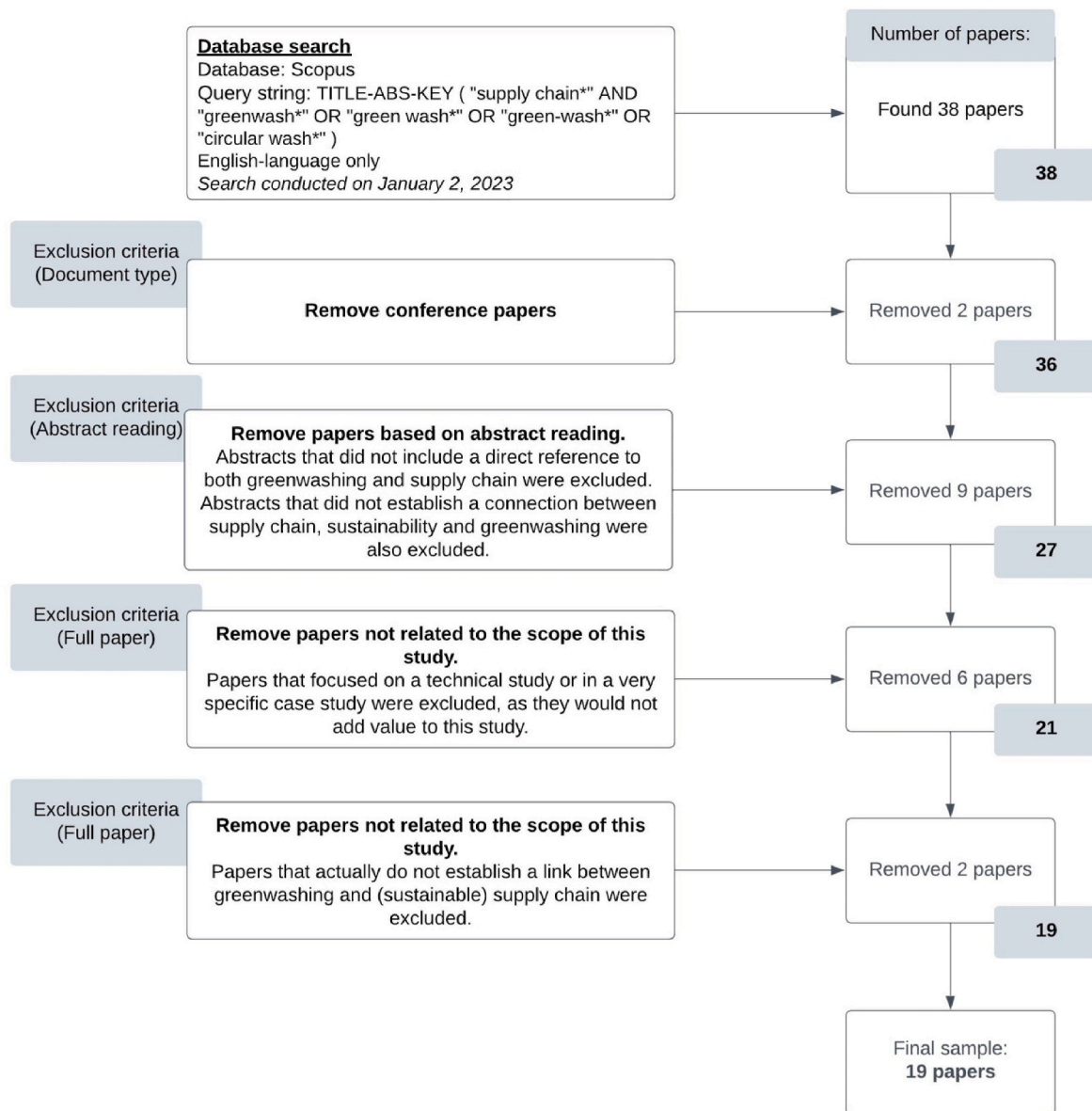


Fig. 1. Schema representing the identification and selection process in this SLR.

assessment and industry case studies.

5. Results

In this section, we will present the results of this review according to the thematic groups that were identified. As previously stated in the method section, the articles were organized and classified into different thematic groups based on the content they covered. The authors have identified six major groups, which are presented in the next subsections.

5.1. Corporate social responsibility and greenwashing: the cost for firms to go green

Although Corporate Social Responsibility (CSR) enables firms to differentiate themselves from competitors, the cost of implementing CSR or sustainable practices can be high. Moreover, not all companies can afford to implement green strategies, and some of them engage in greenwashing to remain competitive, as green marketing communication attracts consumers and stakeholders. To study greenwashing

companies' market behavior, Lee et al. (2018) found, based on the greenwashing practices of two companies, that when greenwashing is not regulated, both companies are reluctant to go "green", especially in price-based competition (Lee et al., 2018). If the cost of implementing environmental practices is too high, companies are not willing to improve their internal practices (Lee et al., 2018). Moreover, customers play a very important role in regulating greenwashing. Contrary to the general conviction held by some greenwashing critics, such as Dahl (2010), that greenwashing deceives consumers and discourages firms that are going genuinely green, informed consumers can actually be the main driver for firms to be genuinely green (Lee et al., 2018). As such, companies need to educate customers, raising their awareness and information level. However, this alone is not sufficient, because sometimes firms do not go green simply because of the high cost of implementing CSR (Lee et al., 2018).

If the cost of implementing a sustainable practice was not dependent on the costs only, what other drivers would be influencing greenwashing? Using a novel influential analysis technique (Grey Influence Analysis), Rajesh (2023) evaluates some key main drivers of greenwashing that must be addressed to inhibit firms from practicing it,

Table 1
Final pool of publications included in this SLR.

Authors	Journal	Quartile*	TGCs	TLCs
DeFries et al. (2017)	<i>Environmental Research Letters</i>	Q1: Environmental Science	102	1
Blome et al. (2017)	<i>Journal of Cleaner Production</i>	Q1: Environmental Science	54	2
Lee et al. (2018)	<i>Decision Sciences</i>	Q1: Business, Management and Accounting	42	0
Carbone and Moatti (2011)	<i>International Journal of Logistics Research and Applications</i>	Q1: Business and International Management	41	1
Jonhsson et al. (2020)	<i>Renewable and Sustainable Energy Reviews</i>	Q1: Renewable Energy, Sustainability and the Environment	39	0
Pizzetti et al. (2021)	<i>Journal of Business Ethics</i>	Q1: Arts and Humanities	27	0
Kapitan et al. (2019)	<i>Industrial Marketing Management</i>	Q1: Marketing	25	0
Partzsch et al. (2019)	<i>Global Environmental Change</i>	Q1: Ecology	20	1
Bager and Lambin (2020)	<i>Business Strategy and The Environment</i>	Q1: Business and International Management	18	0
Dos Santos et al. (2021)	<i>Sensors</i>	Q1: Analytical Chemistry	9	0
Gonçalves and Silva (2021)	<i>Energies</i>	Q1: Engineering	9	0
Saber and Weber (2019)	<i>Business and Society Review</i>	Q2: Business and International Management	4	0
Datta (2020)	<i>Transportation Journal</i>	Q3: Transportation	2	0
Rajesh (2023) (x)	<i>Expert Systems with Applications</i>	Q1: Artificial Intelligence	1	0
Björklund and Forslund (2014)	<i>Transport and Sustainability</i>	Q3: Management, Monitoring, Policy and Law/Transportation	1	0
Dobos and Éltető (2023) (x)	<i>Sustainability Accounting, Management and Policy Journal</i>	Q1: Business, Management and Accounting	0	0
Ye et al. (2022)	<i>IEEE Transactions on Engineering Management</i>	Q1: Electrical and Electronic Engineering	0	0
Aouinait et al. (2022)	<i>International Journal of Food Studies</i>	Q3: Food Science	0	0
Blaha et al. (2021)	<i>Sustainability</i>	Q1: Geography, Planning and Development	0	0

Note: * This information was obtained from the SCOPUS database. At the time of the research all articles were fully available (two of them as 'early cite'/article in press) in 2022; however, two of the articles (x) were published in 2023. TGC: Total Global Citation (actual overall Scopus citation); TLCs: Total Local Citations (within the 19 papers).

namely: firms' characteristics, such as firm size, type, and industry sector; uncertain regulatory environment (i.e. regulations are unclear, making it difficult to prove greenwash); optimistic bias; and ethical climate change, because if firms are used to unethical behavior, they will continue with a harmful environment behavior (Rajesh, 2023). For instance, regarding firm's characteristics, Rajesh (2023) highlights that smaller firms are more likely to engage in greenwashing, as they perceive that the risk of being caught is not that high compared to the potential market share they can gain. On the other hand, large companies perceive a significantly higher risk of being caught greenwashing, as it could heavily impact their reputation, prompting them to avoid such practices (Rajesh, 2023). Unclear or weak regulations can act as a driver for firms to overstate their products' environmental-friendly characteristics, as the risk of being caught is less significant (Rajesh, 2023). Another influential driver for firms to engage in greenwashing is

when firms have an optimistic bias, believing that they will not be caught and that this practice ultimately brings many positive benefits, such as attracting green customers and gaining increased market share (Rajesh, 2023). So, it reflects the lack of long-term strategy. Besides, firms that historically have been practicing unethical behavior are also more likely to continue such misconduct (Rajesh, 2023).

5.2. The influence of firms' characteristics and culture in greenwashing along the supply chain

One of the key drivers of greenwashing throughout the supply chain is firm characteristics (Rajesh, 2023), namely their firm size, organizational culture, leadership styles, governance mechanisms, and institutional contexts, as detailed in the next paragraphs.

First of all, institutional contexts significantly impact the translation of strategic intent into operationalized green supply chain practices, influencing the design of those practices (Carbone and Moatti, 2011). In highly regulated environments, sustainable supply chain actions are typically designed based on optimization and cost reduction (i.e., exploitation), whereas in less regulated environments, actions are designed to deliver innovation and differentiation (i.e. exploration) (Carbone and Moatti, 2011). Indeed, sustainability plays an important role in market differentiation, enabling sustainable companies to differentiate themselves from unsustainable ones (Bager and Lambin, 2020).

Some specific leadership styles are also key drivers of either adopting sustainable/green supply chains or resorting to greenwashing (Blome et al., 2017; Carbone and Moatti, 2011). Blome et al. (2017) analyze the impact of two opposing leadership styles, namely ethical leadership and obedience to authority, on both green supplier championing and greenwashing. While obedience to authority, a type of transactional leadership, is positively related to greenwashing, with ethical incentives moderating this relationship, ethical leadership can help prevent greenwashing by facilitating the implementation of sustainability practices throughout the supply chain, such as the development of green supplier criteria (Blome et al., 2017). Therefore, with strong support from corporate/executive leadership, greenwashing can evolve over time into concrete actions that will consequently be implemented throughout the entire supply chain (Carbone and Moatti, 2011). On the other hand, when companies are led by transactional leaders who prioritize profitability goals and control employees, sustainability issues are often neglected, as employees' ethical values are often suppressed, favoring greenwashing (Blome et al., 2017).

Moreover, although senior leadership plays a crucial role in supporting CSR (Blaha et al., 2021), leaders need to ensure effective communication of these CSR initiatives within the organization to avoid a disconnect between top management at the corporate and business unit levels and the operational perspective (Blaha et al., 2021). In fact, this gap is an obstacle to promoting SSCM practices and, therefore, demands more specific CSR key performance indicators (Blaha et al., 2021). The role of leaders is paramount in promoting the adoption of green practices at the supply chain level, leading companies towards a more environmentally friendlier path, as they are responsible for developing the company's strategic intent (Carbone and Moatti, 2011).

The adoption of sustainable practices can be influenced by company size as it often involves significant costs. Indeed, only a small number of companies, usually large market-leading companies with financial and human resources, design their supply chains incorporating sustainable practices (Bager and Lambin, 2020). Therefore, they can more easily promote the implementation of sustainable practices across the entire supply chain, practicing hands-on governance (Bager and Lambin, 2020). Opposite results were found among SMEs due to their limited resources (Moreira et al., 2022).

The literature, however, is controversial. On one hand, Rajesh (2023) supports that large, well-established companies are less likely to greenwash as they worry about brand damage and risking their

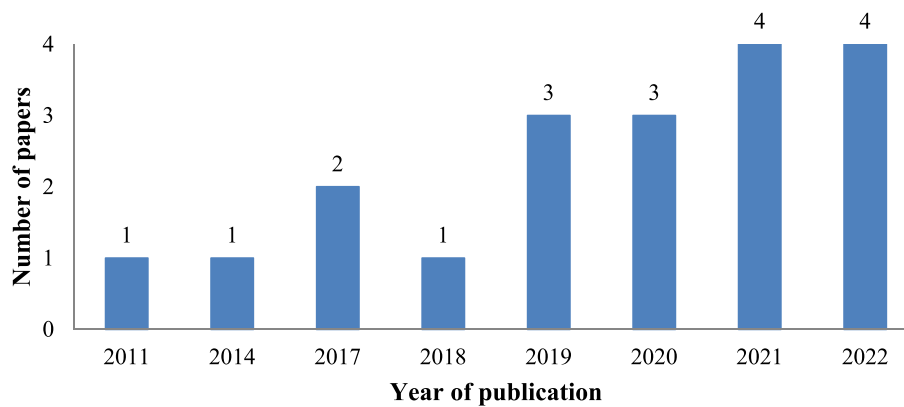


Fig. 2. Number of articles per year of publication

Note: At the time of the research all articles were fully available (two of them as ‘early cite’/article in press) in 2022; however, two articles were published in 2023.

Table 2
Thematic groups and year of publication.

Year of publication		2011	2014	2017	2018	2019	2020	2021	2022	2023
Thematic groups	Corporate Social Responsibility and Greenwashing: the cost for firms to go green				Lee et al. (2018)					Rajesh (2023)
	The influence of firms’ characteristics and culture in greenwashing along the supply chain	Carbone and Moatti (2011)					Bager and Lambin (2020)	Blaha et al. (2021)		Rajesh (2023)
	The importance of relationships between SC partners: from greenwashing to a sustainable SCM		Björklund and Forslund (2014)	Blome et al. (2017)		Kapitan et al. (2019)		Pizzetti et al. (2021)		
	The urgent need for guidance and certification programs in tackling greenwashing across the supply chain			DeFries et al. (2017)		Partzsch et al. (2019)		Dos Santos et al. (2021); Gonçalves and Silva (2021)		
	Report and measurement of sustainable practices: a key challenge					Saber and Weber (2019)	Datta (2020)	Blaha et al. (2021)		
	Greenwashing in Supply Chain Management: Industry Case-studies		Björklund and Forslund (2014)				Bager and Lambin (2020)		Aouinait et al. (2022); Ye et al. (2022)	Dobos and Éltető (2023)

reputation, whereas small firms may be less concerned about the risk of greenwashing. On the other hand, Bager and Lambin (2020) found that due to the hands-on governance, it can be more difficult to assess the impact of sustainable practices adopted, making these companies more liable to greenwashing, as they rely less on external standards. Previous research (e.g. Samper and Quiñones-Ruiz, 2017; Thorlakson et al., 2018) highlighted that in-house practices are more visible to downstream stakeholders, and sustainability issues may not be addressed at their origin (e.g. child labor). On the contrary, small firms, which are usually risk-averse with fewer resources, tend to adopt hands-off governance, relying mostly on external certification practices instead of developing their own sustainable practices (Bager and Lambin, 2020).

Additionally, the maturity of companies regarding the incorporation of green practices also impacts supply chain actions. Companies that have been incorporating environmental concerns at their strategic level for a longer time are more likely to implement green strategies in the supply chains (Carbone and Moatti, 2011). However, this does not necessarily imply that all supply chain partners are moving towards greener actions (Carbone and Moatti, 2011). Yet, it is expected that the sustainable practices incorporated by well-known and large companies throughout their supply chain will eventually influence smaller actors,

being those practices progressively adopted throughout the supply chain and by the whole sector (Bager and Lambin, 2020; Carbone and Moatti, 2011).

5.3. The importance of relationships between supply chain partners: from greenwashing to a sustainable supply chain management

Supply chain partners can determine the adoption and the success of sustainability practices across the supply chain, thus helping to avoid greenwashing. Indeed, as the supply chain involves multiple partners and interactions, it is crucial to develop long-term trusting relationships among partners (Kapitan et al., 2019). Establishing these direct relationships ensures that sustainability efforts are enforced throughout the supply chain and promotes intra-firm communication on sustainability practices (Rajesh, 2023). Hence, relationships, especially with suppliers, are crucial to prevent greenwashing across the supply chain, as they reduce information deficits that can lead to discrepancies between claimed and actual sustainable actions amongst all partners involved in the supply chain (Blome et al., 2017; Pizzetti et al., 2021).

Indeed, it is difficult to clearly pinpoint and control greenwashing in the supply chain (Kapitan et al., 2019), especially in global supply

chains with geographically dispersed partners (Blome et al., 2017; Ye et al., 2022). Greenwashing is a major problem in global supply chains, wherein the misbehavior of supply chain partners can negatively affect the focal firm's reputation and performance (Blome et al., 2017; Reuter et al., 2010). Greenwashing can thus occur due to a company's internal or external factors, or both (Pizzetti et al., 2021). While some companies deliberately engage in greenwashing, others may lack control over their supply chains due to their complexity (e.g. too many suppliers spread across the globe) making it difficult to monitor the suppliers' compliance with sustainable requirements, not realizing they are actually committing greenwashing (Pizzetti et al., 2021; Ye et al., 2022).

Depending on the locus of greenwashing, individuals evaluate the greenwashing differently, normally attributing more or less blame to the focal company, also affecting investment decisions (Pizzetti et al., 2021). Greenwashing impacts those decisions, as investors perceive that sustainable companies can offer more profitability in the long term due to their reputation (Pizzetti et al., 2021). The locus of discrepancy between claims and actions across the supply chain depends on whether greenwashing occurs at company-level (i.e., direct greenwashing), if it is external to the company (i.e., indirect greenwashing), or if it is a result of both internal and external actions (i.e. vicarious greenwashing) (Pizzetti et al., 2021).

While direct greenwashing occurs when a company's environmentally friendly claims do not match its internal actions, indirect greenwashing is often related to suppliers' misbehavior. Finally, vicarious greenwashing happens when a company, that claims to be sustainable, deliberately sets out relationships with non-environmentally-friendly suppliers, being fully aware of their behavior (Pizzetti et al., 2021). Investors are more likely to invest in companies if their greenwashing practices are external to the company, as it is understandable that when the cause of the problem is exogenous, the company can more easily address the problem, for instance, by breaking the relationship with the unethical supplier (Pizzetti et al., 2021). Moreover, individuals are more likely to understand when the locus of greenwashing lies outside the internal scope of the company, as they attribute a lower level of blame attribution (Pizzetti et al., 2021).

Clearly, direct greenwashing is the most important one as it causes the most damage since it reduces investor willingness and increases blame attribution (Pizzetti et al., 2021). Consumers and other stakeholders attribute more blame when greenwashing is a result of a company's internal actions (Pizzetti et al., 2021). This happens because, in line with Thorlakson et al. (2018) and Bager and Lambin (2020), the efforts of focal companies to control their suppliers or other partners in the supply chain are less visible to customers than when they are applied in-house. However, especially in agri-food companies, namely those operating in the coffee sector, the most important socio-economic and environmental impact occurs in upstream activities in the supply chain, namely child labor, climate change or deforestation challenges, that remain underprioritized (Bager and Lambin, 2020; Thorlakson et al., 2018).

Customers' awareness must be stimulated to improve their knowledge about supply chain interactions (Lee et al., 2018). Indeed, as public opinion usually fails to understand the complexity of supply chain interactions, consumers normally refuse to believe that a company did not know that its suppliers were unethical. That explains the blame for greenwashing spillover effects from suppliers to the supplied company, falsely accusing the latter of greenwashing due to unethical actions of suppliers (Pizzetti et al., 2021). Therefore, as greenwashing can happen due to suppliers' actions, the management of the upstream supply chain is of paramount importance, as scandals related to suppliers' misbehavior impact negatively the focal company, damaging its reputation and credibility, in line with Reuter et al. (2010), Blome et al. (2017) and Pizzetti et al. (2021). Notwithstanding, even greenwashing can be an opportunity for companies to move towards a more sustainable SCM, allowing them to restructure the supply chain by adopting sourcing strategies and other sustainable practices (Pizzetti et al., 2021).

Criteria to assess sustainable suppliers in the supply chain are needed, which can be done through the adoption and implementation of substantive practices, such as green supplier championing, as proposed by Blome et al. (2017). This practice is a way of proactively managing the upstream supply chain, ensuring that a supplier meets the advocated and required sustainable criteria, thus avoiding greenwashing problems that can comprise the focal company (Blome et al., 2017). Ethical leaders play a key role in the adoption of this practice, as they have a positive impact on green supplier championing (Blome et al., 2017). Indeed, sourcing strategies alone are not enough, and sharing transparent information among stakeholders is necessary to improve the supply chain's traceability and communication among supply chain partners (Pizzetti et al., 2021). In line with Simula et al. (2009) and as stressed by Kapitan et al. (2019), usually focal firms rely on their partners' sustainability perceptions as there is a lack of clear information between a focal firm and other supply chain partners. However, those perceptions need to be aligned with real practices to avoid greenwashing (Kapitan et al., 2019). For this purpose, and taking into account the work of Simula et al. (2009), Kapitan et al. (2019) developed a B2B sustainability positioning scale to help focal firms/business buyers position their manufacturers and suppliers, to understand if they are (i) greenwashers; (ii) organizations with a missed opportunity, having a high sustainable credibility, but perceived as low; (iii) honest, non-sustainable entities; or (iv) genuinely sustainable superior organizations.

Companies also need to develop measurement tools to evaluate the level of sustainability of logistics and logistic service providers (Björklund and Forslund, 2014). For example, regulatory measures are important to help firms comply with regulations, but also to avoid penalties for misleading statements. Those metrics could also establish industry-wide standards for environmental reporting and performance evaluation, which supports customers, investors and other players in the supply chain to reduce the risk associated with greenwashing. Finally, those metrics could underpin true transparency and accountability for all stakeholders. Logistics are another key partner in SSCM, as they are responsible for some undesirable environmental consequences and social effects that focal firms need to prevent (Blaha et al., 2021; Björklund and Forslund, 2014). So, focal firms need to ensure green logistics practices and green logistic service providers, which implies a joint collaboration, for instance, to schedule the transport flows and transport resources in order to lower CO₂ emissions (Björklund and Forslund, 2014).

5.4. The urgent need for guidance and certification programs in tackling greenwashing across the supply chain

To mitigate greenwashing as a deceptive and misleading communication strategy, establishing well-defined guidelines is essential. However, when such guidelines are lacking, certification programs and their entities play a crucial role in preventing greenwashing. Voluntary certification (DeFries et al., 2017), third-party certification (TPC) (dos Santos et al., 2021), and certification promoted by Non-Governmental Organizations (NGOs) (Partzsch et al., 2019), are some of the different certification programs available to companies. These certifications enable companies to demonstrate their genuine commitment to sustainability and avoid misleading their stakeholders.

Moreover, the impact of voluntary certification is important for all the stakeholders across the supply chain, such as consumers (retail or buyers), as it ensures that producers really comply with the advocated sustainability criteria (DeFries et al., 2017; Saber and Weber, 2019). Certification should also cover all three pillars of sustainability – economic, social and environmental – and provide detailed guidelines and checklists of practices that producers must comply with to undergo an audit (DeFries et al., 2017). These guidelines include workers' health and working conditions, compliance, transparency, partnerships, projects related to social, economic and environmental development

(DeFries et al., 2017). However, these certification programs may lead to oversupply and have a high implementation cost, so producers sometimes sell production as non-compliant although it is compliant with the certification standards (DeFries et al., 2017). Although it is rare, certification can also have negative impacts when farmers produce certified products but cannot recover the compliance costs through the expected benefits (DeFries et al., 2017).

Labeling schemes can also be implemented to improve transparency and reassure consumers of sustainability practices in the fashion industry, where there are so many labels and a lack of harmonization in communicating sustainability (Gonçalves and Silva, 2021). Therefore, it is imperative to improve transparency within the buyer's community by adopting a methodology that encompasses all aspects of sustainability and can be applied throughout the supply chain (Gonçalves and Silva, 2021). Developing a global methodology could boost consumers' confidence and establish key performance indicators (KPIs) to assess environmental, social and transparency issues, providing sustainability benchmarks and simple classification (Gonçalves and Silva, 2021). It is thus important to find new ways to prevent environmental harm throughout the supply chain (Gonçalves and Silva, 2021). Companies may rely on voluntary sustainability standards (VSSs), CSR programs (Bager and Lambin, 2020), or governmental regulations to address sustainability challenges. However, Kapitan et al. (2019) found that compliance with governmental regulations and standards is only one signal of sustainability perceptions. Regarding NGOs, it should be highlighted that the role they play in the emergence of environmental sustainability certification is controversial (Partzsch et al., 2019). First, some NGOs' programs are less ambitious compared to public standards and regulations and, second, some of them are committed to multi-stakeholder initiatives, being driven by the interests of public donors, which can lead to greenwashing (Partzsch et al., 2019).

To prevent greenwashing, certification programs, such as TPC, must be publicly communicated to all supply chain actors and stakeholders, increasing supply chain transparency and consumer trust (dos Santos et al., 2021). TPC also fosters traceability and sustainable consumer behavior, for example with the implementation of TPC broadcasting through token smart (dos Santos et al., 2021). This solution helps avoid greenwashing attempts and empowers consumers, preventing them from being misled by unverified label information, particularly in the food supply chain, as consumers can scan a specific food item and access reliable information regarding the TPC of the raw material (dos Santos et al., 2021). The tokens provide food supply chain stakeholders with an easily accessible certification and allow certification to be available across the supply chain all the way to consumers (dos Santos et al., 2021).

5.5. Report and measurement of sustainable practices: a key challenge

In 2015, in the Paris Agreement, the United Nations developed 17 SDGs with the aim of being fully implemented by the Year 2030 (United Nations, 2022). SDGs allow companies to reflect on sustainable development activities/practices that are critical for them, in order to reduce the investment in new businesses that are not carbon emission-free (Johnsson et al., 2020). An adequate SDG assessment allows to minimize future business risks, but due to SDGs' complexity and interconnection, sometimes an overall analysis forgets important aspects, thus leading to SDG-washing (Johnsson et al., 2020). Moreover, in their reports, companies tend to cherry-pick SDGs in areas in which they are already performing well (Johnsson et al., 2020). So, as highlighted by Johnsson et al. (2020) and in line with the work developed by van der Waal and Thijssens (2020), SDGs seem to assume a symbolic nature rather than a substantive action. To avoid SDG-washing, Johnsson et al. (2020) suggest that companies have to adopt an SDG assessment tool for all companies across the supply chain, making sure that they comply with similar SDG framing. Therefore, five SDG assessment tools are reviewed and analyzed, concluding that this tool must be applied using a

value chain perspective, thus helping to check if common goals have been established and whether they are considered by the whole supply chain (Johnsson et al., 2020).

Despite the existence of a standard reporting – the Global Reporting Initiative (GRI) – for objective and balanced reporting, most companies follow their own standards or do not comply with objective reporting (Saber and Weber, 2019), as is the case in the food and retail industry (dos Santos et al., 2021). When analyzing the current GRI of retail companies, managers reduce their own direct responsibility in the supply chain, claiming to be minor players in a larger system (Saber and Weber, 2019). For instance, retailers believe that they are not responsible for their supply chain, playing passive roles and lacking interest in their SCM (Saber and Weber, 2019).

Although companies embrace CSR practices, their reporting and measurement still face several challenges that managers need to overcome, especially the absence of specific KPIs (Blaha et al., 2021). First of all, it was found that supply chain managers have little knowledge regarding CSR reports, giving only inputs to the distribution function and management aspects, instead of measurement ones (Blaha et al., 2021). Therefore, there seems to be a disconnect between performance management and reporting and also between aspired CSR communications and reality (Blaha et al., 2021). We understand the need to create a model that allows the measurement of sustainable supply chains, allowing companies to “twalk their talks” (Blaha et al., 2021). As communicating CSR reports alone is not sufficient to avoid greenwashing, managers need to develop tools to measure GSCM performance, including criteria to assess the downstream financial performance of environmental impacts (Datta, 2020). The study of Datta (2020) develops a Green Supply Chain Index, wherein it identifies five green practices based on 4Rs that need to be implemented across the supply chain (from sourcing to operations and both forward and reverse logistics), specifically: reengineering; resource management; reduction; and recovery and recycle (Datta, 2020). Therefore, implementing a green supply chain index will help companies to define the real meaning of “going green” in their SCM, creating a benchmark of green environmentally sustainable supply chains and auditing practices to analyze each activity across the supply chain (Datta, 2020). The aim is to increase transparency, allowing companies to underpin green practices across the supply chain (Datta, 2020). In conclusion, to increase reliability and to allow comparison of sustainability reports, more concrete guidelines on what and how to report should be established. External verification of these reports should be mandatory.

5.6. Greenwashing in supply chain management: industry case-studies

Some companies deliberately greenwash and engage in clear misconduct, while others have numerous suppliers, spread across the globe (Ye et al., 2022), and are unable to practice sustainable supplier selection criteria and effective supplier management (Blome et al., 2017; Pizzetti et al., 2021). For example, the fashion industry relies on sub-contractors around the world, with deep supply chain activities in different continents (Dobos and Éltető, 2023). A more complex production chain, with a large number of suppliers, reduces supply chain transparency and control, hindering sustainability. According to Dobos and Éltető (2023), sustainable global supply chains are an oxymoron, and they question if a “completely sustainable global supply chain can be achieved in the fashion industry”. In fact, these companies usually invest their profit in opening more stores, increasing their carbon footprint, instead of developing a sustainable supply chain (Dobos and Éltető, 2023). Choosing to remain a smaller company can often lead to greater sustainability compared to having a global supply chain (Dobos and Éltető, 2023). This is because larger companies face the challenge of managing numerous suppliers and production units, which makes it increasingly complex to maintain transparency across the globe and the supply chain. As the scale of operations expands, the probability of greenwashing within their complex supply chains also rises (Dobos and

Éltető, 2023). By choosing a smaller scale, companies can better exercise control, ensure transparency and prevent greenwashing.

In the retail industry, there are national and international rules and certifications, but their effectiveness in addressing greenwashing is questionable (Björklund and Forslund, 2014). A study conducted on Sweden’s retail market focused on logistics transportation, revealing that the contracts with logistics service providers (LSP) consider CSR strategies and strive to maintain a green image; however, there is a lack of measurement tools in evaluating the “green” level of these logistics practices (Björklund and Forslund, 2014).

Examining the agri-food industry, sustainability issues in the coffee sector remain underprioritized by the majority of companies (Bager and Lambin, 2020). While some strategies aim to reduce the impact of coffee processing and consumption, generating cost-savings (recycling, waste management and energy reduction programs) (Bager and Lambin, 2020), smaller supply chains, such as Short Food Supply Chains are gaining consideration due to their positive environmental and socio-economic impacts (Aouinait et al., 2022). These smaller supply chains enable direct interactions between producers and consumers, facilitating feedback, and ensuring both transparency and trust (Aouinait et al., 2022), ultimately preventing greenwashing. Greenwashing can thus be prevented mainly by using fewer suppliers on the supply chain, which allows better sustainable practices and promotes close producer-consumer relationships, and to a positive social impact on local communities and society (Aouinait et al., 2022). However, some producers stress that consumers must be educated to recognize that price and convenience usually favor long chains and to acknowledge some of the environmental issues of agricultural production (Aouinait et al., 2022).

In the manufacturing industry, the relationship between original

equipment manufacturers (OEMs) and their contract manufacturers (CMs) raises questions about regulated greenwashing (Ye et al., 2022). In a cooperative scenario, if a contract manufacturer sets up a green product line, they may send OEMs green samples in an effort to build trust. Subsequently, these OEMs choose to convey green product information to consumers (Ye et al., 2022). In such instances, the OEMs assert the eco-friendliness of their products when the risk of greenwashing being detected is minimal (Ye et al., 2022). In competitive scenarios, when the market potential is high and greenwash is easily detectable, OEMs may strategically use greenwashing as leverage to obtain favorable manufacturing contracts from the CMs (Ye et al., 2022). In conclusion, OEMs can use greenwashing as a strategy to pressure suppliers to reduce the price of non-environmentally friendly products (Ye et al., 2022).

6. Discussion and framework development

If the main themes were addressed in the results section, answering RQ1, to address RQ2 we decided to put forward a framework to help firms prevent greenwashing throughout their supply chains, increasing their transparency, as shown in Fig. 3. In this framework four dimensions are proposed to support companies to mitigate greenwashing across the supply chain: (i) consumers/customers; (ii) supplier-client relationships; (iii) certification programs and reporting assessment; and (iv) corporate leadership. These four dimensions represent the main internal and external drivers in their quest to regain control over their supply chain. Consumers play a vital role as they have significant power in the market, especially when they favor genuinely eco-friendly products. Moreover, with increasing consumer awareness and active participation in demanding genuine sustainability practices (Lee et al., 2018),

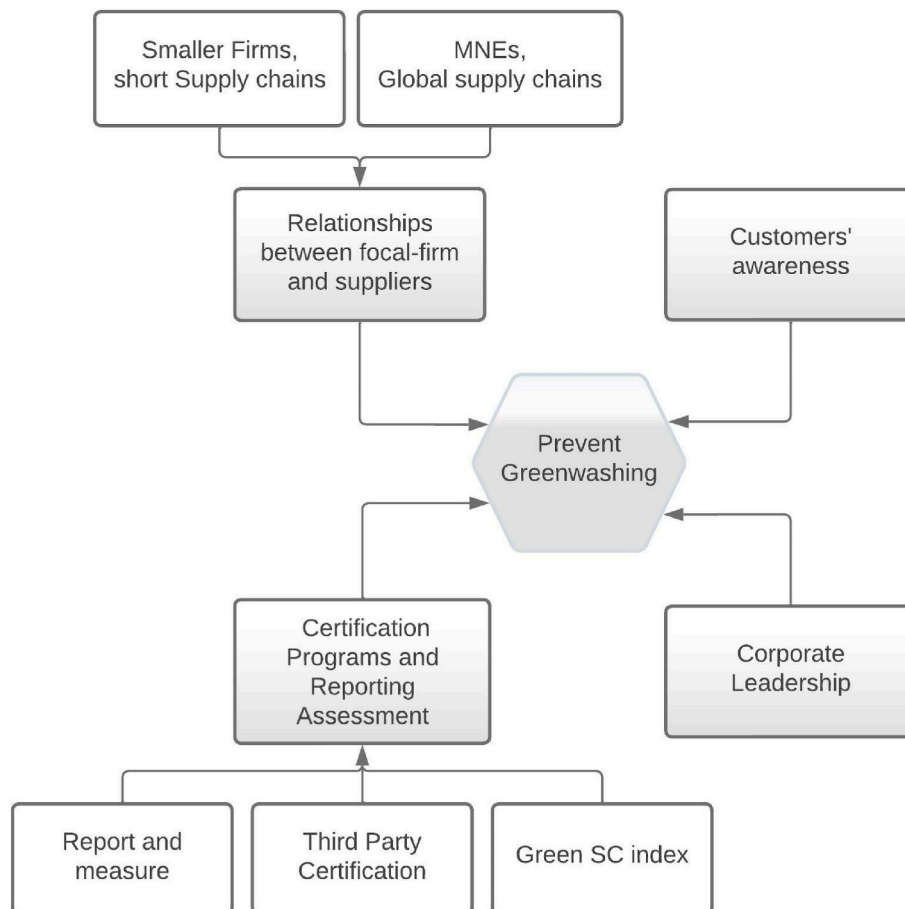


Fig. 3. Framework to help firms prevent greenwashing along the supply chain.

they may drive industry standards and push governments to exert more stringent regulations to achieve long-term sustainability. If consumers exert an inward perspective, from the firms' perspective, establishing close relationships with their partners along the supply chain follows an outward perspective. As focal firms need to set the pace and the standards for sustainable practices, they need to influence the whole supply chain by promoting transparency and accountability. As such it is important to address how they encourage supplier compliance, collaborative improvement and supply chain visibility if they want to satisfy the consumers and achieve market leadership.

Another important aspect deals with what companies can do to provide a credible assessment of sustainability practices, enhance transparency and incentivize sustainable practices. This dimension, also outwardly oriented, is linked to the previous one as it is likely to influence supplier evaluation, supply chain resilience and continuous improvement across the supply chain. Finally, corporate leadership, intrinsic to the firm, is crucial as it influences long-term vision, drives culture and value, stakeholder trust and sets clear lines for the company to genuinely implement sustainable and ethical practices.

6.1. Consumers/customers dimension

As consumers are the main drivers for firms to genuinely implement green practices, companies must educate their consumers, and enhance their awareness regarding sustainable practices, which has implications for SSCM activities (Aouinait et al., 2022; Lee et al., 2018). This proactive approach can help to mitigate greenwashing across the supply chain, being more effective than regulating or prohibiting greenwashing (Lee et al., 2018). Instead of relying solely on regulatory measures, it is the consciousness of consumers that are more influential force in regulating greenwashing and compelling firms to embrace sustainable practices across their supply chains. In fact, as conscious consumers tend to gravitate and prefer to purchase from environmentally responsible firms (Lee et al., 2018), they are often willing to pay a premium to support environmental practices (DeFries et al., 2017), leading to enhanced profitability for the companies involved. Consequently, the proactive stance taken by informed consumers can act as a powerful driving force, compelling other companies to adopt green practices and integrate sustainability into their supply chains (Lee et al., 2018), especially if consumers are aware and trust certifying entities (DeFries et al., 2017). Moreover, the importance of well-informed consumers is also in fostering green supply chain practices is supported by Datta (2020) as they can stimulate firms to go green. As consumers' awareness and trust in certifying entities grow, this virtuous cycle further reinforces the adoption of sustainable practices throughout the business landscape. Therefore, companies must invest in educating their consumers to drive the transformative shift towards a genuinely green and sustainable supply chain.

6.2. Supplier-client relationships

Firm's characteristics such as size and industry type play a major role in greenwashing in the SSCM (Rajesh, 2023). The implementing of CSR or other environmental initiatives can be financially demanding, making it feasible mainly for a limited number of companies, usually large companies, to invest in sustainable innovations and practices (Bager and Lambin, 2020; Lee et al., 2018; Moreira et al., 2022). Therefore, implementing CSR practices requires financial support and clear public policies (Lee et al., 2018). However, even though large and well-established companies are less likely to greenwash as they worry about losing credibility and damaging their brands (Rajesh, 2023), the reality is that sometimes they may face challenges in exerting full control over their extensive and complex supply chains, with suppliers spread across the globe (Pizzetti et al., 2021; Ye et al., 2022). So, effectively assessing the implementation of sustainable practices across the supply chain can be a challenging task. One way to ensure this is, for

instance, by establishing closer relationships with suppliers and adopting green sourcing practices (Bager and Lambin, 2020; Blome et al., 2017; Pizzetti et al., 2021). By doing so, transparency and control can be enhanced, leading to improved communication between supply chain partners, and ensuring that sustainability efforts are imposed throughout the supply chain (Bager and Lambin, 2020; Kapitan et al., 2019; Rajesh, 2023).

Regarding small firms, their size can serve as an impediment or a driver of greenwashing, depending on the strategies adopted. Given their limited resources and risk-averse nature, they can struggle to adopt sustainable practices across the supply chain, often relying on external certification practices (Bager and Lambin, 2020). However, recognizing that sustainable practices can help them to reduce costs may motivate these companies to implement SSCM practices. Smaller firms can benefit from a close relationship with suppliers, fostering transparency and control across the supply chain (Dobos and Éltető, 2023). Additionally, as smaller supply chains have fewer suppliers, it is easier to promote direct relationships between focal firms and their suppliers (Aouinait et al., 2022), thus aiding in preventing greenwashing.

The relationships between focal firms and their suppliers are important in mitigating greenwashing. As the focal company needs to ensure that its suppliers adhere to sustainable criteria, suppliers need to be carefully selected, screened, monitored and controlled (Blome et al., 2017; Pizzetti et al., 2021). This can effectively mitigate the spillover effects of greenwashing from suppliers to the focal company (Pizzetti et al., 2021). Therefore, selecting the most suitable partners becomes a key challenge for firms trying to embrace environmentally conscious practices, underscoring the necessity to develop decision-support tools for identifying and selecting suppliers that genuinely comply with environmental criteria (Tseng et al., 2019). For instance, in a recent study, Cole and Aitken (2019) highlight that the use of a socially responsible purchasing approach is crucial to ensure the selection of the appropriate suppliers. Suppliers must show their commitment to social sustainability practices in the pre-selection stage, even before any transaction takes place, demonstrating trust, transparency, engagement and knowledge development capability (Cole and Aitken, 2019).

6.3. Certification programs and reporting assessment

Certification programs and reporting assessment tools, such as GRI evaluation, play a key role in advancing SDGs and preventing greenwashing, while also assessing the real sustainability performance of supply chains. First of all, it is important to find a way to reduce the implementation costs of CSR, as companies will feel encouraged to improve their internal practices (Lee et al., 2018). Moreover, CSR initiatives need to be well communicated and provided to supply chain managers, as sometimes there is a gap between performance management and reporting, and between CSR communications and the actual implementation by the companies (Blaha et al., 2021). Despite the existence of the GRI framework, many companies follow their own methods and standards for reporting (Saber and Weber, 2019). Therefore, in order to prevent greenwashing across the supply chain, it is mandatory to develop standardized measurement tools to enable comprehensive and consistent reporting. Additionally, detailed guidelines for certifying eco-labels should be developed, incorporating social, economic and environmental concerns, which will facilitate better compliance among producers and enable them to undergo audits (DeFries et al., 2017). Sustainable supply chains can only be achieved if all supply chain partners gain responsibility and play their roles, which will be facilitated by detailed guidelines for certification and regulation to all partners involved. Hence, certification and regulation processes in the supply chain can serve as important drivers for promoting sustainability across the supply chain (Gonçalves and Silva, 2021).

In order to ensure consistency and relevance across industries and supply chain actors, common sustainability indicators need to be developed, aligned with SDGs (Bager and Lambin, 2020). The

evaluation criteria and procedures need to be shared across the entire supply chain. For instance, companies can implement/adopt a green supply chain index, which will help them to define the real meaning of “going green” in their SSCM practices. This index serves as a benchmark for environmentally sustainable supply chains and facilitates auditing practices to analyze each activity (Datta, 2020). The aim is to increase transparency, allowing companies to underpin green practices across the entire supply chain (Datta, 2020).

6.4. Corporate leadership

Corporate leadership also plays a critical role in supporting the adoption and diffusion of green practices across the supply chain, as it transforms strategic intent into operationalized sustainable supply chain practices (Blome et al., 2017; Carbone and Moatti, 2011). In fact, ethical leaders can help prevent greenwashing activities by establishing green supplier criteria, also known as green supplier championing (Blome et al., 2017). To effectively combat greenwashing in supply chains, corporate leadership should move away from transactional leadership, which relies on incentives or rewards, and instead embrace more ethical or transformational leadership styles that inspire the transition toward a more sustainable supply chain (Blome et al., 2017).

7. Conclusions and future research agenda

This SLR has shed some light on the main thematic groups addressed in the literature related to greenwashing and the supply chain. It has identified the challenges and the main drivers that companies must address to prevent greenwashing across the supply chain. Based on the themes identified, we were able to map the main drivers. Based on the identified drivers, we were able to propose a framework. The framework highlights that there are internal drivers, namely corporate leadership; as well as external drivers, such as consumer demands, certification programs, and supplier-client relationships.

Greenwashing and sustainable supply chains are interconnected aspects of sustainability as firms committed to implementing sustainability practices across the supply chain seek to use resources responsibly, minimize waste, reduce environmental impact, and ensure social and economic equity. However, inflating their results when communicating their achievements is a deceiving practice conveying misleading information about a company’s environmental efforts or products to make them appear more environmentally friendly than they actually are. It is clear that the state of knowledge is still in its early stages as a result of the limited number of studies found, as well as low TLC scores. The transition toward concrete sustainable actions within the supply chain, diminishing greenwashing, is seen as a fundamental step towards achieving genuine SSCM. However, for this transition to happen and to prevent greenwashing several key actions must take place, such as: informing consumers about greenwashing and sustainable companies and practices; fostering close relationships between focal firms and their suppliers; developing effective certification and other assessment tools to better assess the real sustainability of supply chains, which facilitates sustainability claims and practices and promotes transparency in the supply chain; and the implementation of green sourcing practices through corporate leadership, which may facilitate supplier evaluation, supply chain resilience, continuous improvement and compliance with regulations.

This SLR has also identified future research avenues to narrow the gap regarding greenwashing in (sustainable) supply chain management. First of all, it is mandatory to establish an objective metric for measuring sustainability performance across a company’s supply chain to discern what type of practices are indeed genuinely sustainable. Moreover, the influence of various leadership styles and their impact on promoting sustainable supply chain practices in different cultural contexts and industries should be thoroughly analyzed as they may influence differently customer trust and customer choice with consequences for companies’

reputation.

As the majority of the papers included in this SLR did not address a specific country or industry, further studies should analyze country and industry-specific situations – e.g. including strongly regulated vs. pollution heaven contexts, and e.g. the plastics, the fast-fashion, the slow-fashion, and the food supply chains, as well as long and short supply chains – in order to identify possible differences, providing a more comprehensive view of the phenomenon. Indeed, regional differences entail different degrees of sustainability issues and regulatory frameworks (e.g. differences between Asian and European countries). As there is a high risk of greenwashing when relying on self-reported data, future research should explore alternative data sources and methodologies to enhance the accuracy of findings.

Taking into account the key importance of relationships between focal firms and their suppliers, it would be valuable to see how sustainable supply chains can be implemented in industries where there are few suppliers that insist on unsustainable practices. In addition, as we have stated in our theoretical overview, there is not a commonly accepted definition of greenwashing. Hence, future studies need to address how differently greenwashing is defined and how the various definitions may hinder its common understanding. As a complement, further studies should implement a multi-dimensional scale to measure greenwashing across the supply chain. In fact, there is an urgent need to develop suitable variables to measure greenwashing in supply chains. This will have a theoretical, but also a practical implication, contributing to a better assessment of genuine sustainable performance across the supply chain.

It would also be interesting to analyze the spread of sustainability practices across the supply chain partners, to assess if they exert any influence on each other’s sustainability efforts in upstream and/or downstream activities.

Finally, this SLR has laid the groundwork for future research to delve deeper into the complexities of greenwashing and its impact on sustainable supply chain management. By addressing the suggested research avenues, scholars and practitioners can further advance the understanding and application of sustainable practices across the supply chain. Moreover, it helps companies to be honest and transparent about their environmental efforts and consumers to have informed choices and contribute to a more sustainable and healthier future.

Declaration of competing interest

Ana Inês, Andreia Diniz, and António C. Moreira declare that they do not have any conflict of interest regarding the content or submission of this paper.

Data availability

No data was used for the research described in the article.

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