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ENVIRONMENTAL, SOCIAL, AND GOVERNANCE FACTORS INFLUENCING SUPPLY CHAIN MANAGEMENT: A SYSTEMATIC LITERATURE REVIEW

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Abstract: *Recent years have seen a growing interest of the impact of environmental, social, and governance (ESG) factors which contribute to shaping sustainable business practices in modern organisations. One business area of attention is that of supply chain management (SCM), where inclusion of ESG factors has come to be seen as a vital aspect for organizations seeking business resilience, as well as success on the long term. The purpose of this paper is to present a systematic literature review that examines ESG factors which have influence over SCM areas. Through the synthesis of existing research, this paper aims to provide a comprehensive understanding of the "as is" knowledge landscape in which ESG and SCM intersect, as well as proposals for further research directions.*
Key words: *supply chain management, environmental social and governance factors, sustainable supply chain, systematic literature review, organizational performance sustainability*

1. INTRODUCTION

Recent years have seen a growing interest on the impact of environmental, social, and governance (ESG) factors which contribute to shaping sustainable business practices [1] [2] [3]. One such business area of attention is that of supply chain management (SCM), which in today's business landscape is constantly in the spotlight for providing organizations with improvements and better ways of meeting and exceeding expectations [4]. As modern organisations are increasing the recognition of ESG practices in their SCM structures, organisations have started taking steps to integrate ESG practices into strategy, reporting, critical success factors, and topics of interest within specialised forums.

The increased visibility of the ESG practices in the SCM structures has become embedded in the recognition that supply chains are not isolated entities, but rather integral components of larger socio-environmental systems. Understanding this interconnectedness has become essential in an era characterized by heightened environmental consciousness, social accountability, and calls for improved organisational governance [26]. The environmental consideration of ESG encourages organisations to address the environmental sustainability impact of their supply chains, such as resources depletion and its associated risks, sustainable lifecycle of its products, or sustainable sourcing practices [27]. The meaning of social responsibility dimension within SCM extends to topics such as fair labour conditions, diversity and inclusion in sourcing practices, or engagement with the local community [28]. Lastly, governance and accountability in SCM should be viewed in the light of the internal mechanism of the organisations which support to ensure accountability for aspects such as ethical leadership, compliance structures, accurate reporting, or decisional transparency [29].

Another major contribution to the SCM landscape is given by VUCA factors (volatility, uncertainty, complexity, and ambiguity). Given its dynamic and rapidly evolving impact, VUCA demands for an ongoing examination and

assessments of topics such as the influence of ESG factors on SCM. The continuous review is compelled by the imperative to picture as accurate as possible an understanding of the modern organisational prospects, especially those oriented towards the growth of sustainable practices and the fulfilment of the organisational strategic opportunities on multiple timeframes. While this can be considered an internal motivation, there is also an external motivation to be considered, such as that driven by continuous organisational regulatory mandates, pressure from investors to deliver on investment, or the looming prospects of reporting ESG initiatives and results as part of the mandatory non-financial regulations [30] [31].

In this context, the inclusion of ESG factors has come to be seen as a vital aspect for organizations seeking business resilience, as well as success on the long term [5] [6].

As such, the purpose of this paper is to present a systematic literature review that examines ESG factors which have influence over SCM areas. Through the synthesis of existing research, this paper aims to provide a comprehensive understanding of the "as is" knowledge landscape in which ESG and SCM intersect, as well as proposals for further research directions.

2. METHODOLOGICAL APPROACH

In order to reach the objectives of this paper, a systematic literature review had been performed, as described below.

In the first step the aim of the paper was defined, which was to examine the ESG factors that influence SCM areas. Secondly, the boundaries of the research were determined, which consisted mainly of the presence of ESG terms together with SCM terms. The terms used to perform the search included keyword relevant to each of the two categories: ESG (sustainability, environment social and governance factors, sustainable performance, green practices, ESG reports, sustainability reports, and other related synonyms) and SCM (sustainable supply chain management, sustainable logistics, sustainable distribution, green supply chain management, green supplier, and other related synonyms).Starting from these two points, searches were performed in academic databases, and subsequently checked against the 8 inclusion and exclusion criteria presented in Table 1.

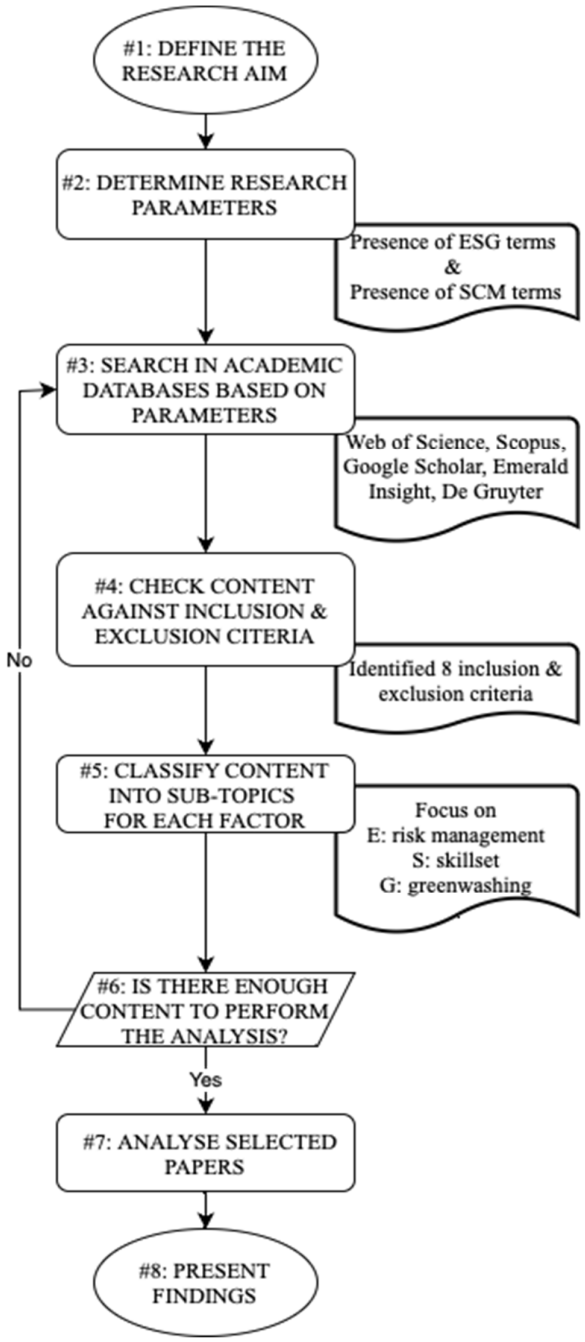

Fig.1. Visual representation of systematic literature review flow. Source: own development

The academic databases searched included: Web of Science, Google Scholar, Scopus, Emerald Insight, De Gruyter.

The documentation that resulted from steps 1 to 4 were analysed and structured into the three key themes, one for each ESG area: risk management for the environmental factors, skillset highlights for the social area, and greenwashing as part of the governance factors.

If following steps 1 to 5, there weren't enough papers identified to allow for an analysis to be made for each sub-topic, the online academic databases were searched again, by widening the timespan, starting from the present and going backwards, until it was considered that sufficient research material was identified to conduct and meet the research aim.

In step 7, the selected papers were critically analysed and the results consolidated in the results and conclusions sections of this paper.

The phases of the methodological approach previously detailed are presented in a visual workflow structure in Fig. 1.

The relevance of the articles in relation to the selected research topic were assessed by using inclusion and exclusion criteria present in similar research endeavours [7]. The 8 sets of criteria have been adopted and adapted to fit this research paper and can be found in Table 1. After going through the detailed steps, the pool of articles considered for lower-level dissemination within this systematic literature review was narrowed to a final selection of 14 publications. The list of publications and their relevant information can be found in Table 2.
While the ESG factors that influence the supply chain management area are vast and diverse, for this purpose of this paper, for each category a specialized sub-topic has been selected to be presented.

Table 1

Research inclusion & exclusion criteria

#	Inclusion / Exclusion Criteria	Possible answers
1	Are the research queries well formulated?	Yes / No
2	Are the identified cases relevant?	Yes / No
3	Are the criteria appropriate for this research?	Yes / No / Not Applicable
4	Is the participation rate relevant?	Yes / No / Not Applicable
5	Does the data collection method match the requirements?	Yes / No
6	Are the considered variables relevant?	Yes / No / Not Applicable
7	Is the paper scope measurable and well defined?	Yes / No
8	Is the statistical inquiry relevant?	Yes / No / Not Applicable

Adapted from [6]

The selected works have been organized into three sections, each corresponding to a factor:

- risk management for environmental factors
- skillset acquisition and development for social factors
- and greenwashing for governance factors

All the selected papers address different industries related to manufacturing. The papers have been published in academic databases between 2015-2022 and provide an in-depth view on the "as is" view of ESG factors adoption in the context of developing and / or improving sustainable organizational performance and stakeholder relationship management practices.

Table 2

Detailed view of reviewed publications

#	Title & Reference	Authors	Journal	Publication Year	Factors mapped: E / S / G	*No of citations
1	Analysis of environmental sustainability practices across upstream supply chain management [10]	Pimenta H. C. D. et al.	Procedia CIRP	2015	E	59
2	Environmental risk management in supply chains: A taxonomy, a framework and future research avenues [11]	de Oliveira, F. N. et al.	Journal of Cleaner Production	2019	E	50

#	Title & Reference	Authors	Journal	Publication Year	Factors mapped: E / S / G	*No of citations
3	Choosing the right approach to green your supply chains [12]	Zhu Q et al.	Modern Supply Chain Research and Applications	2019	E	43
4	Era of Industry 4.0 Technologies and Environmental Performance of Thailand's Garment Industry: Role of Lean Manufacturing and Green Supply Chain Management Practices [13]	Jermsittiparsert K et al..	Agile Business Leadership Methods for Industry	2020	E	11
5	Sustainable supply chain management in the fast fashion Industry: A comparative study of current efforts and best practices to address the climate crisis [14]	Wren B.	Cleaner Logistics and Supply Chain	2022	E	40
6	Developing a Risk Reduction Support System for Health System in Iran: A Case Study in Blood Supply Chain Management [34]	Sibevei A. et al.	Int. J. Environ. Res. Public Health	2022	E	21
7	Capitalizing on SME Green Innovation Capabilities: Lessons from Irish-Welsh Collaborative Innovation Learning Network [15]	Harrington D. et al.	University Partnerships for International Development	2016	S	16
8	Environmental-sustainability aspect in the outsourcing of business-logistics services [16]	Jakšič, M. et al.	Challenges on the Path Toward Sustainability in Europe	2020	S	2
9	Moving toward a circular economy in manufacturing organizations: the role of circular stakeholder engagement practices [17]	Fobbe L. et al.	The International Journal of Logistics Management	2022	S	4
10	A Systematic Review: How Does Organisational Learning Enable ESG Performance (from 2001 to 2021)? [18]	Xia J.	MDPI Sustainability	2022	S	3
11	Analysis of social barriers to sustainable innovation and digitisation in supply chain [32]	Singh P. K. et al.	Environment, Development and Sustainability	2023	S	4
12	Sustainability Practices and Greenwashing Risk in the Italian Poultry Sector: A Grounded Theory Study [24]	Toscano A. et al.	MDPI Sustainability	2022	G	2
13	Twalk Your Talk: On the (Non)-Formative Influence of Corporate Social Responsibility Communication on Supply Chain Sustainability Measures [25]	Blaha S. et al.	MDPI Sustainability	2021	G	-
14	Corporate social responsibility governance, outcomes, and financial performance [33]	Wang Z et al.	Journal of Cleaner Production	2017	G	512

Note: Number of citations source is input available on Google Scholar as of 11-Sept-2023

3. RESULTS

3.1 Environmental Factors

Within the ESG model, environmental factors consist of climate changes, environmental compliance management systems, environmental management systems, as well as considerations of green energy for resources such as energy, waste, and water [8].

Within the supply chain management area, environment factors are proved to have an important role in the evaluation and selection process of the supplier. Ignoring or diminishing the environmental factors' role on the customer side has shown to result in a negative perception and motivation by the supplier [34]. This in turn can be cascaded into a lower adoption of sustainable best practices in the flow of the supply chain activities. To mitigate these risks, the authors of the study advise that compliance best practices be integrated early in the relationship design activities, so that both customer and supplier can learn how to improve their performance [10].

Yet, more recent studies have shown that there is a higher need for effective risk management of the supply chain environmental factors in the context of sustainable development. One such study comes from Oliveira et al., who have developed and proposed an "Environmental Supply Chain Risk Management Taxonomy" [11]; this model acts as a guiding reference for strategies to manage environmental risks [11]. It should be noted that this model, while robustly defined in terms of response reactions for each event, relies heavily on the existence and maintenance of a solid data management system. This creates the need for an in-depth understanding of a supply chain model and highly trainer human resources, therefore making it difficult to implement in an environment where specialized and experience hands-on resources are missing. Another model for managing green supply chain management (GSCM) is proposed by Zhu Q at al., who present a 3-steps model based on the life cycle of the products and their location within the supply chain aimed at reducing associated risks. [12]. Compared to Oliveira's approach, the framework proposal from Zhu has only 3 steps, defined at a high-level view. The main advantage of the second framework is that it can be easier to adopt and adapt at a conceptual level. In this way, supply chain departments have more space for incorporating their organization's specific environmental components. The same aspect can also be seen as a disadvantage in the adoption of the framework, as too much space for interpretation can leave the door open for rebranding of existing green risk management practices.

Efforts to mitigate environmental risks in the supply chain management area are also highlighted through studies performed in the clothing industry through different methods. Through a survey conducted in Thailand's garment industry, Jermsittiparsert K et al. showed that how 4.0 technologies, used together with lean and green best practices, can support businesses in their environmental performance initiative [13]. A further study was carried out in the supply chain management environment of a fast fashion industry. To address the need of reducing their footprint, Wren B, proposes the development of sustainable supply chain management (SSCM), with the purpose of integrating sustainable best practices in the operational side of the supply chain management area [14]. The author goes on to show that by implementing a SSCM model, the industry will benefit from agility with risk identification, as well as risk remediation initiatives [14].

As the selected studies on environmental factors show, academic literature provides a variety of frameworks from which entities, both public and private, can select from in order to adopt and adapt a working framework within their supply chain organization. The selected studies also revealed that there is a tendency to define sustainability risk frameworks without considering a common basis across a given industry (e.g., manufacturing, food processing, telecommunication, etc.), a factor which also contributes to confusion when looking into defining a common ground for the evaluation of environmental sustainability efforts.

3.2 Social factors

The social in ESG is considered to include factors relating to health and safety in the

workplace, the management of human capital, skills for the future such as stakeholder management, the so-called "license to operate" of corporate entities, as well as ways in which consumer engagement and services with the providing organisations take place [8].

In their study, Harrington D et al. go on to advocate for the capitalization of capabilities developed within small and medium enterprises (SME) from green innovation area, with supply chain management being among them [15].

Another form of human capital management is that of outsourced resources. Although traditionally neglected in favour of commercial factors such as cost, quality, time efficiency, the human resource was proved in Jakšič M et al.'s study to be linked to a higher rate of best practices adoption when it comes to developing and adopting an environmentally sustainable mindset in the service provider's supply chain process flow. Through the survey conducted in large multinational enterprises, the authors were able to prove that there is a positive correlation between the importance of green logistic processes and the rate of their adoption within the SCM area, and that there is a further gap which can be addressed at the managerial level of the SCM areas [16].

In the context of stakeholder management, a study conducted by Fobbe L. et al. has showed that the way in which stakeholders are engaged also needs to be reconsidered in the context of circular economy challenges. The proposal is that not only systems need to improve, but also stakeholder engagement, from what is now perceived as a linear approach to a circular approach. The main challenge highlighted was the difficulty perceived by stakeholders to establish circularity. While all the companies involved in this study agreed that they are promoting internally the stakeholder structure related to their supply chain management activities, the way in which this was performed differed from one company to another. The implementation varied from: setting up an internal network of ambassadors which hosted knowledge-sharing session on best practices, to defining and organizing a department to promote sustainability topics and raise awareness within the company, to having taken proactive actions to familiarize employees on the topic without having any kind of formal or informal group advocating for sustainability themes implementation at the time [17].

When it comes to formal training on the topic of sustainability, two of the companies from Fobbe's study were looking into developing training to address circular economy aspects, while the third company preferred to use a frequent communication model as a way of cascading know-how on the topic [17].

While in Fobbe's case study, all three companies showed increase demand from customers to drive sustainability topics, and thus started setting up training & communication programs, this demand also opened up new opportunities to approach customers on product improvements to meet sustainability demands. In some cases, where the specialized know-how was not part of the employee skillset, the companies reached out to consultants, academia, and governmental institutions to better understand the requirements. This kind of actions led to creation of new stakeholder channels in the companies' setups both on the short & long-term [17].

Fobbe's findings on the importance of ESG training within the supply chain management area are also backed-up by Xia J.'s research on the impact of organizational learning on ESG performance in the supply chain management field. The author's study goes on to show that through the use of single-loop and double-loop learning processes, organizations enable ESG learning acquisition [18]. The case for hiring and training employees in sustainable and digital technologies for retaining organisational talent in the supply chain management area is also made by Singh P et al., who consider this to be a social barrier towards sustainable innovation. Their study shows that by working on developing and encouraging sustainable behaviours in organisational development setups, the effects will be cascaded through the entire supply chain structure [32].

A common trait which all selected studies identified was the willingness of supply chain governing bodies to address social factors through training and knowledge sharing, stemming either from internally (from formal or informal in-house structures) or externally (from consulting companies) delivered groups. For

entities based in the European Union, this challenge of gaining future-ready skillsets such as deepening sustainability knowledge, is also expected to take place through the European Commission's initiative entitle "European Year of Skills 2023" [19]. As in the case of environmental factors, the papers selected indicate the lack of a common foundation, based on which a common training and knowledge sharing platform can be relied on by diverse industries.

3.3 Governance factors

Thirdly, governance factors in the ESG model are considered to refer to the structural corporate governance and thus, include: the board management structures, business ethics of the enterprise, tax and accounting policies, regularity practices, and cybersecurity aspects [8, 9]. As anticipated, the recent events in society have led to an increase focus on the way in which ESG is perceived and are expected to be a point of interest long after the immediate events have ended [20, 21, 22, 33]. For investors, this aspect is something that should be considered in their long-term strategy for investment, as ESG impact is not so easy to monitor, as the above has shown [20].

In this context, efforts to reduce greenwashing should come as no surprise. Greenwashing is considered to be an action which results in misleading consumers about the environmental practices of an entity which promote environmental benefits of the acquired goods and/or services. By undergoing greenwashing, an entity is expected to reap benefits which helps them outperform their competition or gives them an advantage [23].

Toscano A. et al highlight that due to missing legislative regulation, the manufacturing industry is at a high risk when it comes to greenwashing. This is mainly attributed to the lack of a properly regulated reporting structure and corresponding methodology to act as a standard for companies to assess their ESG efforts against. The group of authors go on to advice for rating agencies involved in regulatory defining activities to consider in their definitions the dynamics of the supply chain management factors related to the cultural and environmental aspects. This should be performed considering the governance transformation capabilities of the companies. Besides these internal-facing factors, regulators should also consider external-facing customers, such as demands coming from the markets, the missing ESG policies which regulate compliance monitoring, etc. [24].

As shown in the study performed by Blaha S. et al., greenwashing can occur also due to the lack of specialized knowledge within a supply chain entity. While the simple responses of participants may indicate a positive attitude and set of actions taken for managing a green supply chain status quo, detailed responses revealed confusions as to the ESG measures relevant to a supply chain structure [25]. A negatively perceived opinion has also seen to result from the use of tools aimed at aiding greenwashing, which in turn cascade both into a legitimacy gap of the organisation's ESG efforts and diminished monetary investments [33].

Unlike the previous two sections, for the governance factors that address greenwashing in the manufacturing industry, only two papers have been identified against the given criteria and selected for review. While each paper's research is performed at different levels of supply chain entities, they both highlight the lack of a clear solid background which can serve to mitigate the risks coming from greenwashing activities.

4. CONCLUSIONS

Despite the increased attention on ESG factors which influence the supply chain management area, the output of the studies continue to indicate a lack of alignment towards a common platform which can be used to provide objective measurements for sustainable goals. The analysed papers indicate however that there is a growing awareness exercise taking place within supply chain management structures, which has contributed to the development of positive structures such as risk management frameworks and training opportunities. The present study has a series of limitations which could be considered for future studies. In the first place, the study was prepared only based on English-written materials. In

future studies this can be resolved by widening the search net to articles published in other widely published journals. This would help get a better grasp on the state of the SCM industry across more cultures. Secondly, this study as based only on a part of the ESG factors for which principal research could be found. The recommendation in this case is to continue the impact study of ESG factors on SCM by taking into consideration minor factors or taping into factors which are isolated only to specific geographical or cultural area.

At the same time, the analysed studies have shown that misused or misinterpreted ESG know-how can lead to negative outcome perceptions.

Summarised, environmental factors have and are expected to continue playing an essential role in SCM activities such as the evaluation and section of suppliers, and as such, these factors should not be dismissed, as they can lead in a lower adoption of sustainable practices across the supply chain lifecycle. Recent studies have also showed the need to develop more effective risk management frameworks which can address environmental factors in the context of sustainable organisational development. While being perceived as robust, frameworks in this area can require additional guidance and development of skilled resources for their implementation, which can be a point of interest for future research endeavours. From a social perspective, the analysed studies have shown that the continuous development of human capital management in VUCA contexts should remain a key priority of SCM structures within organisations. This can be achieved through a variety of training programs, more attention to stakeholder engagement models, and even development of policies intended to retain skilled employees in key areas of SCM structures. Finally, the visibility of governance factors is on the rise, in the context of societal events, mainly as a result of greenwashing practices which can be of concern when it comes to measuring the perception of such activities across supply chain structures. While not intentional, greenwashing can also be the result of poor training or available specialised know-how within SCM organisational structures and future studies could look at ways of mitigating this risk, without the risk of negative organisational perceptions.

For the above reasons, future research is warranted to continue pursuing a common framework, supported by best practices for remediation actions, aimed at developing and monitoring ESG within supply chain structures. By having a common point of reference, organizations can create a more collaborative environment within their structures to both tackle the right demand and better respond to the challenges posed by increasing VUCA (volatile, uncertain, complex, ambiguous) market conditions.

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Factori de mediu, sustenabilitate și guvernanță care influențează managementul lanțului de aprovizionare: o revizuire sistematică a literaturii de specialitate

În ultimii ani, s-a observat un interes tot mai mare pentru impactul factorilor de mediu, sociali și guvernamentali (ESG) care contribuie la modelarea practicilor de afaceri durabile în organizații moderne. Un domeniu de interes este managementul lanțului de aprovizionare (SCM), unde includerea factorilor ESG a devenit un aspect esențial pentru organizațiile care urmăresc reziliență în afaceri, precum și succes pe termen lung. Scopul acestui articol este de a prezenta o revizuire sistematică a literaturii care examinează factorii ESG care influențează domeniile SCM. Prin sintetizarea cercetărilor existente, acest articol își propune să ofere o înțelegere comprehensivă a peisajului "as is" în care se intersectează ESG, SCM, precum și propuneri pentru direcții viitoare de cercetare.

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