

Sustainable supply chain management and the UN sustainable development goals: exploring synergies towards sustainable development

Sustainable
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Abstract

Purpose – Despite the growing interest in the field, the literature overlooks how supply chains influence or interact with the United Nations (UN) Sustainable Development Goals (SDGs). To fill this gap, this study aims to assess the influences of Sustainable Supply Chain Management (SSCM) on the implementation of the UN SDGs.

Design/methodology/approach – A systematic literature review of 97 publications was carried out by using the Web of Science database and the support of ATLAS.ti software. In addition, this research also explored how the top 20 Forbes companies are aligned with the SDGs by analysing their sustainability reports.

Findings – The findings suggest that the literature and the analysed companies primarily concentrate on certain SDGs while neglecting others, revealing potential areas of interest for future research. Based on the findings, the study provides valuable insights into the connections between SSCM and the UN SDGs, highlighting the potential benefits of SSCM in reducing environmental, social and economic pressures and

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contributing to sustainable development. It also identifies areas where further research and policy development are needed to maximise the potential benefits of SSCM.

Originality/value – To the best of the authors' knowledge, no other studies have conducted a comprehensive exploration of the literature linking SSCM and the SDGs framework. Moreover, the study differs from others since it combines research data with practical information from company reports, to identify specific issues related to supply chain management.

Keywords Sustainability, Sustainable supply chains, Management, Sustainable development goals, Business

Paper type Research paper

1. Introduction

In recent years, the concept of sustainability has been consolidated as a popular construct amongst scholars due to society's increasing environmental problems (Khan *et al.*, 2020). Sustainability is often understood along the triple bottom line approach, which suggests that a company's performance should be reported on the environmental, economic and social dimensions. This integrative approach is also called the sustainable paradigm (Sharma *et al.*, 2022) and the government plays an important role in this scenario (Khan *et al.*, 2021a, b).

Society's awareness of industrial activities' effects on the environment has forced companies to search for new industrial processes, seeking to make them more sustainable within supply chain management (SCM) (Shekarian *et al.*, 2022a, b). SCM is a core business process and an essential strategic source of sustainable competitive advantage (Seuring and Müller, 2008). SCM implies managing supply chains composed of a "set of three or more entities (organisations or individuals) directly involved in the upstream and downstream flows of products, services, finances and/or information from a source to a customer" (Mentzer *et al.*, 2001, p. 4).

Differently from the traditional SCM, the concept of Sustainable Supply Chain Management (SSCM) considers not only economic but also environmental and social dimensions (Seuring and Müller, 2008), which generally implies the need for firms to operate according to established standards (Beske *et al.*, 2008). The concept of SSCM has been defined in several ways and is becoming vital to companies worldwide (Shekarian *et al.*, 2022a, b). Furthermore, SSCM has received attention from the scientific community and management scholars (Ahi and Searcy, 2013; Shekarian *et al.*, 2022a, b; Hallinger, 2020; Centobelli *et al.*, 2022; Sharma *et al.*, 2022), guiding different lines of research (Carter and Rogers, 2008; Touboulic and Walker, 2015), case studies (Patel and Desai, 2022; Boruchowitch and Fritz, 2022), models (Brandenburg *et al.*, 2014), new approaches, solutions, tools and strategies to improve the sustainability performance across the supply chain (Shekarian *et al.*, 2022a, b).

Scholars have made a substantial effort to identify and assess SSCM drivers and barriers (Khan *et al.*, 2021b); and the literature suggests that SSCM practices have a positive effect on firm performance (e.g. Hong *et al.*, 2018; Zhu *et al.*, 2022). Focussing on green capabilities' impact on green purchasing, Khan *et al.* (2022) verified that manufacturing, design, technological and integration of green capabilities have a positive effect on green purchasing practices. Other popular research lines within the SSCM scope are the analysis of the SSCM practices-firm performance relationship, the analysis of the SSCM-organisational ambidexterity link (e.g. Bui *et al.*, 2021; Li *et al.*, 2022), and the focus on supply chain coordination, namely "managing and aligning the plans and objectives of two or more firms to improve their performances simultaneously" (Kumar *et al.*, 2022, p. 2). In addition, it should be noted that to achieve an appropriate SSCM, it is necessary to consider not only aspects of sustainable development but also technology and aspects of the digital transformation context (Khan *et al.*, 2022). This synergy between SSCM, digital transformation and sustainable development is also evidenced in the study of Khan *et al.* (2022).

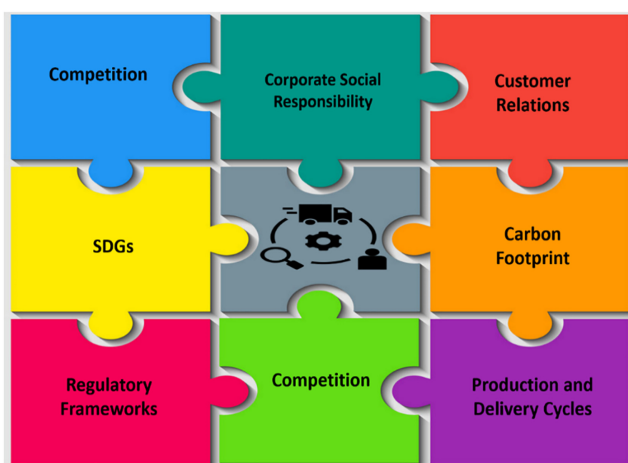
Due to the current global agenda for sustainable development, the research on SSCM has been addressing a set of strategies to contribute to the reduction of waste, pollution, raw materials and other sustainability challenges (Agrawal *et al.*, 2022). Moreover, the pressures imposed by external actors have influenced the supply chain companies' activities, implying the adoption of social and environmental criteria for the company-supplier and company-consumer relationships. Such criteria may collaborate with the firm's economic performance and organisational image, differentiating itself from its competitors (Vasconcelos *et al.*, 2016). In fact, in today's hyper-competitive scenario, achieving strategic alliances with other organisations is a good strategy to enhance performance and ensure firms' survival (Emami *et al.*, 2022). Therefore, environmental (Basiri and Heydari, 2017; Zhang and Yousaf, 2020) and social (Panda, 2014; Panda *et al.*, 2015, 2017) aspects have often been the ground for such coordination, becoming essential elements for the company's sustainability. In this regard, Figure 1 illustrates some of the factors which influence SSCM. The list of factors is by no means comprehensive but entails some of the key components.

Against this background, the present study departs from the following research questions:

RQ1. What are the links between SSCM and the UN SDGs?

RQ2. How can synergies in relation to sustainable development be achieved?

This study seeks to address a significant gap in the existing literature on SSCM by broadening the current focus beyond the classical Triple Bottom Line approach, towards encompassing the diversity of the SDGs. While most research in the field traditionally focusses on a single SDG (see Kang *et al.*, 2019; Costantini *et al.*, 2017, Dahlmann and Roehrich, 2019), this study proposes a more comprehensive, systemic view, examining the interconnections between SSCM and a variety of SDGs, rather than treating them in isolation. Thus, the study fills a vital gap by investigating the broader question of the relationship between SSCM and the UN SDGs, as well as exploring potential synergies to be gained in sustainable development.



Source(s): Prepared by the authors

Figure 1.
Some influencing
factors in sustainable
supply chain
management

Moreover, in respect of the methods used to address this research gap, an expert-driven systematic literature review was conducted to assess the connections between SSCM literature and the SDGs' implementation. More specifically, the study focusses on SDGs 7 (Affordable and Clean Energy), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequality), 12 (Responsible Consumption and Production) and 13 (Climate Action), since they are directly connected to the field. In addition, the study analyses other relevant - but not commonly discussed SDGs in the SSCM - SDG 1 (No Poverty), SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality). Finally, to complement this analysis, this study relied on the investigation of the sustainability reports of the Forbes 20 enterprises through the lens of the SDGs framework. Therefore, the study uses a unique methodology that combines research data with an analysis of sustainability reports from leading global enterprises, yielding practical, applicable insights into SSCM. This method allows the study to explore less commonly discussed SDGs in the context of SSCM, marking another significant contribution to the field. In this regard, to the best of the authors' knowledge, no other studies have conducted a comprehensive exploration of the literature linking SSCM and the SDGs framework.

The subsequent parts of this paper are as follows: [section 2](#) provides an overview of the definitions and interconnections between SSCM and the UN SDGs. [Section 3](#) describes the methods used, whereas [section 4](#) presents and discusses the results obtained. [Section 5](#) draws some conclusions from the study and lists some measures which may be deployed, in order to cater for a closer integration of both topics.

2. Sustainable supply chain management (SSCM) and the UN sustainable development goals (SDGs): definitions and interconnections

When looking for a “systemic” definition of sustainability, one must rely on the institutional works of international organisations since sustainable development and sustainability are regarded as essentially contested concepts in academia ([Connelly, 2007](#)). It gets less hard if we look at the institutional literature coming from International Organisations: The United Nations (UN), the European Union (EU) and the Organisation for Economic Co-operation and Development (OECD). The definitional milestone came back in 1987 when the Norwegian Prime Minister Brundtland – to whom the Report is entitled – defined sustainable development as an economic model endorsing the needs of the planet and future generations at its core ([UN, 1987](#)). A flourishing array of literature has come out since then, with other institutions taking part in affirming a systemic approach to sustainability. A further key document addressing thoroughly what a sustainable multinational company should be is the *OECD Guidelines for Multinational Enterprises*. Other works from the OECD have addressed such concepts further by extending the scope of a sustainable company regardless of enterprise dimensions and industries and with a focus on state ownership and corporate governance ([OECD, 2015a, b](#)).

Another player in providing the definitions of sustainability is the European Commission, whose Green Paper on Corporate Social Responsibility ([European Commission, 2021](#)) has further addressed the need for clearer definitions. However, at the start of the 2000s, there was a concrete step forward in separating the so-called “microeconomic approaches”, such as *Corporate Ethics* and *Corporate Social Responsibility*, whereby companies defined the strategies for the sake of future generations from the systemic approach overseeing sustainability as a “Copernican System”, with the planet and future generations at the core ([Standard Ethics, 2021a](#)). Companies are increasingly making an effort to approach sustainability in a systemic way. A practical example of this can be found in the corporate policies disclosure: from supply chain to human rights policies with a good mention of companies' codes of ethics, we are seeing more and more companies pursuing a systemic

approach to sustainability. The most practical proof is that the aforementioned policies, most of the time, contain a formal reference to the international guidelines on sustainability provided by the UN, the EU and the OECD.

In 2015, as a continuation of the Millennium Development Goals (MDGs), the UN formulated the 2030 Agenda for sustainable development (SD), signed by the 193 signatory members, which included 17 SDGs and 169 sustainable specific targets, indicators and metrics (UN, 2015). The 2030 Agenda emphasises the need for a collective effort and cooperation of multiple actors for the achievement of the SDGs, including businesses and non-governmental organisations (Delabre *et al.*, 2020). Therefore, companies are especially affected by such changes towards new and sustainable ways of running the business (Cammarano *et al.*, 2022). Alexander and Delabre (2019) state that a crucial change from the MDGs to the SDGs is the inclusion of businesses as major stakeholders in the contribution to SD. Thus, the private sector should be in line with the expectations of the UN and policymakers (Cammarano *et al.*, 2022).

Sustainable supply chain management (SSCM), a concept deriving from the main concept of SD (Gupta and Palsule-Desai, 2011), refers to the integration of environmentally and socially responsible practices into the entire supply chain process, from the sourcing of raw materials to the distribution of finished products (Shekarian *et al.*, 2022a, b). It aims to minimise the negative impacts of supply chain activities on the environment, society and the economy while maximising long-term value creation. SSCM is guided by various principles. Some of them are:

- (1) Reducing the ecological footprint of the supply chain by minimising energy consumption, waste generation and greenhouse gas emissions. It includes practices such as using renewable energy, implementing recycling and waste management programs and adopting eco-friendly transportation options.
- (2) Emphasising fair labour practices, human rights and social welfare, ensuring safe working conditions, fair wages and ethical treatment of workers throughout the supply chain.
- (3) An economic viability for all stakeholders involved, including the total cost of ownership, optimising resource allocation and improving operational efficiency to achieve cost savings and profitability.

To achieve these, greater collaboration amongst supply chain partners is needed. In particular, transparency and information sharing may enable better decision-making, risk management and identification of improvement opportunities across the supply chain. It also involves working closely with suppliers, customers and other stakeholders to drive sustainability initiatives.

In this context, given the environmental damage associated with industrial and agricultural commodity production, the need for SSCM in the successful implementation of SDGs is evident (Campagnolo *et al.*, 2018). Therefore, companies must be ready to change, reengineer and implement processes and activities from a sustainable perspective (Cammarano *et al.*, 2022). It means that businesses need to lessen the negative impact on the environment and improve life for upcoming generations (Khan *et al.*, 2021a), which implies pursuing not only the economic dimension but also social and environmental objectives (Mageto, 2021). Since the SDGs are deeply interconnected, the high level of commitment towards a single goal can lead companies to engage in positive spillover and enable them to attain more goals (Khan *et al.*, 2021a). Similarly, implementing SSCM practices is complex given the number of players, interests and the factors involved, requiring transparency, risk management, strategy and cultural change (Carter and Rogers, 2008).

Therefore, the integration of the SDGs into supply chain activities requires a holistic view of the process and the development of models that can support managers in decision-making (Zimon *et al.*, 2020).

Another point must be made, there are two kinds of supply chains and their impact varies amongst companies. A “long” supply chain concerns the widest array of processes from product manufacturing up to retail selling. Conversely, a “short supply chain” involves a limited and circumscribed process. The former requires sophisticated quality control and ESG risk management structure. The topic of SSCM must therefore be situated in a precise context, and there should be a key difference – from an ESG research standpoint - between the different industries. To give some examples, the selling of a garment or food very often requires a “long” supply chain, whereas the delivery of a financial service will be characterised by a “short” supply chain. The striking difference between the two concepts rests on the complexity of processes leading to the delivery of the output. The retail selling of garments and food involves a set of quality controls, human rights audits, and materials sourcing that opening a bank account would not require. When it comes to “Sustainable Supply Chain Management”, this concept is key since, for some industries, those aspects are “critically material”, whereas, for some other industries, such aspects are not so (Standard Ethics, 2022, pp. 41–46).

3. Methods

As far as the research design is concerned, the authors opted for an approach where two different and mutually complementary methods are used. The first method was an assessment of the literature, based on the need to identify previous and current trends. The second method used as part of the research design is an assessment of the extent to which some top companies are engaged with sustainability reports. These were analysed and some features were identified. The particular elements of the methods are now described in detail in this section.

This study developed a systematic review of the literature, whose rationale is to provide an assessment of the influences of SSCM on the implementation of the UN SDGs. Specifically, it focussed on the direct relevance of SSCM for the following SDGs: 7 (Affordable and Clean Energy), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequality), 12 (Responsible Consumption and Production) and 13 (Climate Action). Furthermore, the SDGs of indirect relevance analysed were: 1 (No Poverty), 3 (Good Health and Well-being) and 5 (Gender Equality).

In the research methodology, we employed a systematised procedural approach to ensure rigour and reliability to the study, incorporating the efforts of five researchers in the distinct phases of the analysis. To summarise the state of the literature, we carried out a systematic literature review (Petticrew and Roberts, 2006), which was supported by the guidelines laid down by Tranfield *et al.* (2003) - planning, conducting, reporting and dissemination - following previous studies (Yun *et al.*, 2019; Bertossi and Marangon, 2021; Sharma *et al.*, 2021) and by Modgil *et al.* (2022) - Preparing for the review, steering and presenting and interpreting the review.

The first stage consisted of defining the review question and a research protocol, including the inclusion and exclusion criteria and the establishment of databases. Subsequently, the conduction stage was carried out, with the identification of keywords and search terms in the selected databases, refinement of the data through the inclusion and exclusion criteria, screening of references, critical evaluation of the data, discussion and synthesis of studies. The research started with the identification of search terms in the Web of Science (WoS) database in September 2022 using the combination of terms related to Sustainable Supply Chain Management and the UN Sustainable Development Goals and the Boolean operators

“AND” and “OR”. The final search was held with the following search strings presented in Table 1.

The WoS database was chosen due to its broad scope, excellent citation tracking, quality of sources, access to full-text articles, support for the exportation of search results, and search precision (Adams *et al.*, 2016; Meho and Yang, 2007; Falagas *et al.*, 2008). The described process resulted in 128 publications. After a screening analysis, 22 publications were excluded because they were not related to the SDGs, and nine publications do not refer to SSCM. Thus, in total, 97 publications were analysed. The process followed in selecting the sample conforms to the flowchart in Figure 2, according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher *et al.*, 2009).

For data analysis, we chose the content analysis method because it supports the exchange from qualitative to quantitative information and back to the qualitative interpretation of findings (Cheng *et al.*, 2018). Five independent researchers were involved in the content analysis in order to improve intercoder reliability. The qualitative content analysis process followed the recommendation of Elo and Kyngäs (2008), consisting of a deductive analysis process, with a matrix composed of the mentioned SDGs to classify the units of analysis regarding their focus. In this study, the units of analysis were the publications selected from the literature. And the classification was made based on the content and relationship between one or more SDG and SSCM. The final stage of the systematic review, reporting, was conducted simultaneously with data analysis because the process of writing the paper and organising the results are helpful to the iterative process of analysing the data.

In the process, the ATLAS.ti software (version 8.4.26) and the reference manager, Zotero (version 6.0.4.), were used to support the analysis. ATLAS.ti software supports rigorous analysis and visual representation of data by allowing researchers to code, analyse and interpret complex qualitative data (Paulus and Lester, 2016). Moreover, it supports collaborative work, allowing multiple researchers to work on the same project at once, which is crucial for large-scale research projects or studies that require multiple perspectives (Woods *et al.*, 2016).

The review of the literature was complemented by an analysis of the emphasis on SDGs by the top 20 companies listed by Forbes in 2022. The latest available reports (2020–2021) were analysed, and the most prominent SDGs listed, referred to or implicitly considered as part of the companies' operations were identified and summarised in a table.

4. Results and discussion

Defining SSCM is not a straightforward task since the concept has lately received substantial attention from scholars and practitioners. Supply chains should be designed considering not only economic and social needs but also environmental ones, which lays the foundations for a new growing body of literature (Ahi and Searcy, 2015). Within this context, SDGs provide a solid framework to analyse the various SSCM-related aspects. In this section, some SSCM practices will be described focussing on how the SDGs are met in supply chain activities. Just

Database	Search string	Number of documents
Web of Science	(“sustainable supply chain” OR (“supply chain” AND “sustainab*”)) AND (“SDG*” OR “sustainable development goal*”)	128

Source(s): Prepared by the authors

Table 1.
Search criteria and
number of publications
on the Web of Science
database

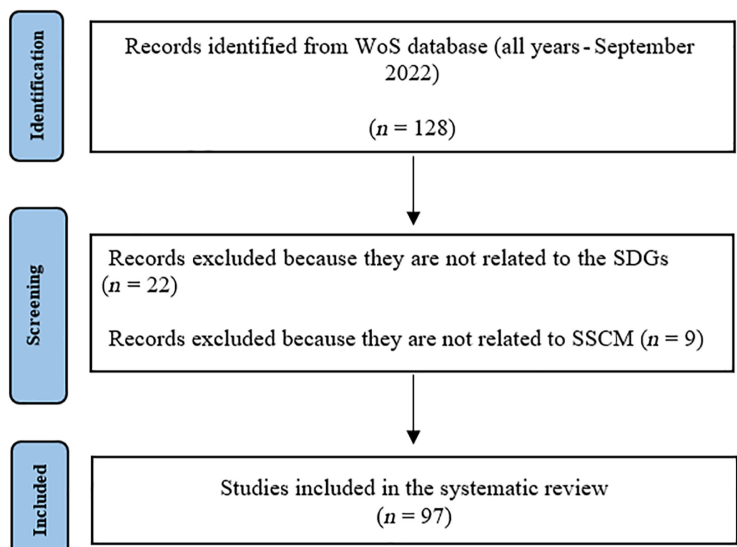


Figure 2. Process of the publications' selection for systematic review, based on PRISMA

Source(s): Prepared by the authors

to name a few, the achievement of SDG 12 can be enhanced by involving all stakeholders in the food supply chain and waste management. Similarly, SDG 8 can be fostered by ensuring decent working conditions in global supply chains, while investing in improving the efficiency of electricity and alternative energy sources could lead to SDG 7 (Affordable and Clean Energy) achievement.

The achievement of the SDGs requires that all nations combine strategies at various scales. In this regard, it is essential to understand the impacts generated by supply chains through data-driven conversations to obtain insights into governance approaches and policy responses in different sectors (Malik *et al.*, 2021).

As a first step in the study, a set of publications focussing on sustainable supply chains and the UN SDGs was analysed. The results are presented in Figure 3. The frequency of occurrence of each SDG shows that SDG 12 (Responsible Consumption and Production) is

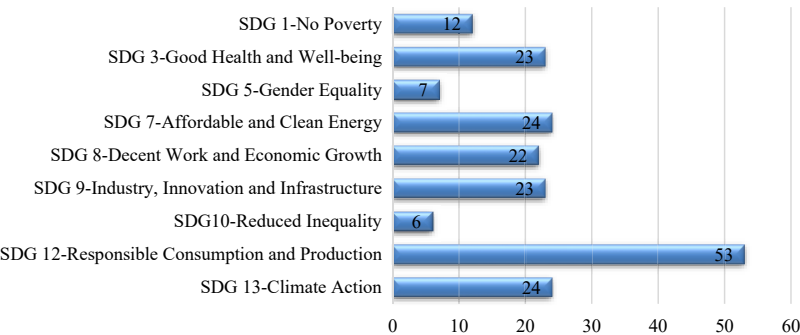


Figure 3. Sustainable supply chain management publications related to the United Nations sustainable development goals

Source(s): Prepared by the authors

highlighted in the literature as being the most discussed. It is followed by SDG 7 (Affordable and Clean Energy) and 13 (Climate Action).

SDG 12 seeks responsible consumption and production. The main topic addressed by the publications related to this SDG refers to the food supply chain. For instance, [Wakiyama et al. \(2019\)](#) explored the food loss of vegetable production in Japan by identifying the amount of food loss and where it occurs. The results show that a significant number of vegetables are harvested but not delivered to markets due to overproduction, lowering demand, or nonstandard shapes of vegetables. Some solutions proposed by the authors involve enhancing communication and transparency amongst producers, industries and consumers. [Lemaire and Limbourg \(2019\)](#), through a literature review, investigated the connection between food loss and waste (FLW) and SDG 12 by identifying the causes, solutions and research gaps on the topic. [Djekic et al. \(2021\)](#) explored the role of food supply chain stakeholders in achieving the SDGs. [Herzberg et al. \(2022\)](#) explored the factors throughout the supply chain that drive food loss of vegetables and fresh fruit in Germany. The study identified the main causes of food loss and recommended actions to reduce the problem. Along the same line, [Celli et al. \(2022\)](#) developed a tool to create business models that minimise food waste generation. [Corrado and Sala \(2018\)](#) reviewed studies on food waste generation by describing and comparing the approaches adopted, as well as analysing their potential in supporting food waste-related European interventions and policies. [Jacob-John et al. \(2021\)](#) also conducted a systematic review to evidence the interrelationships between the food supply chain and SDG 12. [Thakur et al. \(2021\)](#) investigated a project to reduce food losses through improvements in the management of cold chains and in the efficiency of using the rest raw materials.

Regarding other sectors, [Akter et al. \(2022\)](#) identified and categorised the materials waste generated in the production stages of the textile-apparel manufacturing industry, determining the economic loss and tracing the informal trading of waste materials. This study provides insights into SSCM, especially regarding strategies to reduce environmental impact. [Qazi and Appolloni \(2022\)](#) presented an analysis related to circularity in procurement operations and provided insights for future research by arguing that the circular economy approach is essential to achieve SDG 12. In this regard, [Appolloni et al. \(2014\)](#) argue that green procurement potentially holds greater influence as a catalyst for transformation than any other business function. Moreover, [Cheng et al. \(2018\)](#) state that green procurement can serve as a significant driver for innovation, particularly in relation to eco-friendly and environmentally sustainable technologies, products and services. Along the same line, [Herrero-Luna et al. \(2022\)](#) claim the importance of leaving behind the current linear economic model and committing to new business models and supply chains in agreement with the circularity perspective. [Delabre et al. \(2020\)](#) examined how the “sustainable supply chains” and “tropical forest protection” (SDG 15) agendas are framed at different levels and by different actors. The study investigated two contrasting non-state actors: (1) Instituto Centro de Vida (ICV), a Non-Governmental Organisation (NGO) in Brazil which addresses deforestation and supports farmers to produce commodities, and (2) Unilever, a global consumer goods manufacturer and major buyer of such commodities. [Nayal et al. \(2022\)](#) analysed the link between artificial intelligence (AI), the internet of Things (IoT), flexibility and the performance of companies in a supply chain in the context of a circular economy and resource orchestration theory. They found that flexibility presents the greatest impact on the adoption of AI-IoT, and this relation is affected by the circular economy.

SDG 8 refers to decent work and economic growth. Social sustainability in supply chains is linked to human welfare throughout the supply chain ([Nakamba et al., 2017](#)). In the study of [Chanani et al. \(2022\)](#), a worker voice tool used in formal sector social compliance audit procedures was adapted to collect worker feedback in high-risk informal factory clusters in Bangladesh. Some important implications of this study were to provide guidance for live

phone operators on what constitutes forced labour, to elaborate indicators to identify workers as at risk of forced labour, and to connect at-risk workers, including children, directly to local organisations for support services. [Peake and Kenner \(2020\)](#) critically reflected on the concepts of modern slavery and decent work in the Bangladeshi context. This study argued whether garment workers in Bangladesh can be considered modern slaves and made policy recommendations to strengthen strategies to eliminate modern slavery in supply chains and promote decent work through Europe Union (EU) external action. [Hasle and Vang \(2021\)](#) presented factors that make interventions in working conditions in global supply chains to be satisfactory or not and showed how to conciliate productivity increase and improvement in working conditions. [Lotfi et al. \(2021\)](#) reflected critically on the workers' rights in supply chains through the connection between the Doughnut Theory Lens and the UN SDGs. The authors developed the sustainable supply chain doughnut model and provided examples of workers' rights violations. Considering the textile supply chain, for instance, [Malik et al. \(2021\)](#) analysed the occupational health and safety negative impacts on workers in the countries of the EU. The authors listed the countries responsible for most occupational accidents.

SDG 7 (Affordable and Clean Energy) seeks the transformation of energy systems into energy structures based on renewable resources ([Pehlken et al., 2020](#)). In this context, [Rivera-Cadavid et al. \(2019\)](#) discussed the supply chain optimisation for energy cogeneration by using sugarcane crop residues. The authors proposed a Mixed-Integer Programming model to decide which plots to harvest on a given day. This activity has key implications for the SSCM as the sugarcane crop residue releases less equivalent CO₂ than coal when burned for electricity generation. [Bhutto et al. \(2019\)](#) presented an assessment of biomass resources' potential in Pakistan as renewable energy resources and reviewed the potential to adopt efficient use of biomass for cooking, heating and other activities. [Al-Nory \(2019\)](#) developed an optimisation model based on computing methods for the electricity supply chain, which through operations planning, supports the reduction of energy sources.

SDG 3 refers to good health and well-being. [Oruma et al. \(2021\)](#) addressed Nigeria's food insecurity challenges by adopting Agriculture 4.0 and commercial farming through a systematic literature review. The results showed Nigeria's current agricultural state, threats to food security and modern digital agriculture technologies. The authors argued that the implementation of Agriculture 4.0 would contribute significantly to SDG 2 (zero hunger), SDG 3 (good health and well-being) and SDG 8 (decent work and economic growth). [London et al. \(2022\)](#) focussed on the construction industry, presenting a model to improve the mental health of workers in this sector. [Ahern et al. \(2021\)](#) investigated the inclusion of nutritious fish and fish products in school feeding programs, highlighting the need to replicate and scale good practices to ensure sustainable solutions for reducing poverty and malnutrition in adolescence.

SDG 9 is about industry, innovation and infrastructure. [Amani and Sarkodie \(2022\)](#) proposed the deployment of artificial intelligence in the meat supply chain to automatise the controlling and separation process of wholesome meats from spoilt ones. This system can be utilised in transportation, storage and retail sections, helping to mitigate human errors. It can also lead to enhanced meat shelf life while decreasing losses and increasing productivity, contributing then to SDGs 9 and 12. [Mina et al. \(2021\)](#) developed a novel approach by integrating multi-criteria decision-making methods and a fuzzy inference system to evaluate and rank the suppliers towards the transition in the circular supply chain. [Walker et al. \(2021\)](#) argued that large companies should take a look at the same methods developed in collaboration with businesses because they can facilitate the management of supply chain risk and innovation along the supply chain.

Regarding SDG 13, climate action, [Leal Filho et al. \(2022\)](#) discussed the connection between food production and climate change by reflecting on how the food production

process influences climate change and vice versa. The study shows that there is an important association between the topic and SDGs 1, 2, 3, 6, 7, 12, 13 and 15. For instance, the temperature influences heat stress and animal welfare, affecting poor farmers, the use of land resources affects the life on land and the food transportation from farmers to consumers increases greenhouse emissions. In addition, mitigation strategies for combating climate change in the food supply chain are presented. [Johnsson *et al.* \(2020\)](#) developed a framework for the SDGs business assessment, pointing out the example of the construction industry. The authors discussed key challenges related to SDG 13 and the key measures required to reach near-zero emissions. [Gonçalves and Silva \(2021\)](#) stated that in the fashion industry, SDG13 aims to reduce all activities' CO₂ emissions and global warming potential, which relates to all phases of the fashion product supply chain, including buildings' energy efficiency.

SDG 1 calls for an end to poverty. Applying a broader definition of 'fairness', [Hall \(2021\)](#) investigated practices to verify social life cycle assessment regarding fair salaries on a global supply chain scale. They found that measuring the living wage gap is a limited way of assessing people's social conditions and analysing poverty, as it focusses on basic needs. [Gonçalves and Silva \(2021\)](#) mention philanthropy, volunteer initiatives and charity work in local communities as priorities of the brands in the apparel industry as a way to fulfil, and report on, their corporate social responsibilities. Focussing on the resource efficiency of the surimi supply chains in India, [Thakur *et al.* \(2021\)](#) mention the possibility of job creation due to supply chain improvements, thus contributing to poverty alleviation. [Ben Hassen and El Bilali \(2022\)](#) address the Ukraine–Russian conflict and its impact on global food security. The further implementation of SDG 1 is mentioned as being under pressure due to the war.

Reference to SDG 10 (reducing inequalities) and SDG 5 (gender equality) is rather scarce within the sample's publications. These SDGs are mostly mentioned related to the role of women or minorities in supply chains. [De Andrade *et al.* \(2021\)](#) explicitly focus on women as the 'hidden workforce' in seafood supply chains, whose work is underreported, undervalued and underpaid. Within the context of the textile industry, [Herrera Almanza and Corona \(2020\)](#) point to the negative performance of SDG 5 due to the low ratio of women in management positions in manufacturing sites in Bangladesh and China. [Foroudi *et al.* \(2022\)](#) refer to SDG 5 as one of the drivers or objectives for reshoring decisions of multinational enterprises. Within the framework of the living wage gap as a measure of poverty (SDG 1) in global supply chains, [Hall \(2021\)](#) also calls for further research focussing on gender differences in the living wage gap. [Decouttere *et al.* \(2021\)](#) provide a different perspective on SDG 5 and SDG 10, referring to universal access to vaccination services as a way to reduce inequalities.

In summary, the various publications analysed in this study address different aspects of SDGs. Specifically, the main SDGs approached were SDG 12, responsible consumption and production; SDG 8, decent work and economic growth; and SDG 7, affordable and clean energy. The publications discussed in the text provide insights into the challenges faced by these SDGs and present solutions to overcome them. Specifically, based on this research, some suggestions are pointed out on how supply chains can address the UN SDGs:

- (1) Responsible consumption and production (SDG 12) in the food supply chain can be addressed by enhancing communication and transparency amongst producers, industries and consumers, reducing food loss and waste (FLW) and developing business models that minimise food waste generation.
- (2) Decent work and economic growth (SDG 8) in the supply chain can be improved by addressing modern slavery and promoting worker welfare throughout the supply chain, conciliating productivity increase with improvement in working conditions, and developing worker voice tools to collect worker feedback in high-risk informal factory clusters.

- (3) Affordable and clean energy (SDG 7) can be promoted by optimising supply chains for energy cogeneration using renewable resources like sugarcane crop residues.
- (4) The circular economy approach is essential to achieve SDG 12, and businesses can move towards circularity by adopting circular procurement operations, committing to new business models and supply chains, and supporting tropical forest protection (SDG 15).
- (5) The role of supply chain stakeholders in achieving the SDGs can be explored, and research can be conducted to identify the causes of waste and the solutions to reduce the problem.

Furthermore, the literature analysed presents other several practices to ensure the SDGs in supply chain activities, such as green purchasing and raw material procurement, green packaging, sustainable transportation, material recycling, eco-design, green manufacturing and remanufacturing, emission reduction, training and education to the employees, leadership opportunities for women, research and innovation, cooperation with local food suppliers, water consumption reduction, monitoring of unethical behaviour in supply chains and investment in new technologies and renewable energy generation (Zimon *et al.*, 2020; Sudusinghe *et al.*, 2018). However, it should be noted that each company has its specific drivers, challenges and barriers and needs to find its own path and strategies to establish the SDGs in its supply chain practices (Zimon *et al.*, 2020, p. 228). Figure 4 summarises the connection between the SSCM facilitators and actors and the UN SDGs.

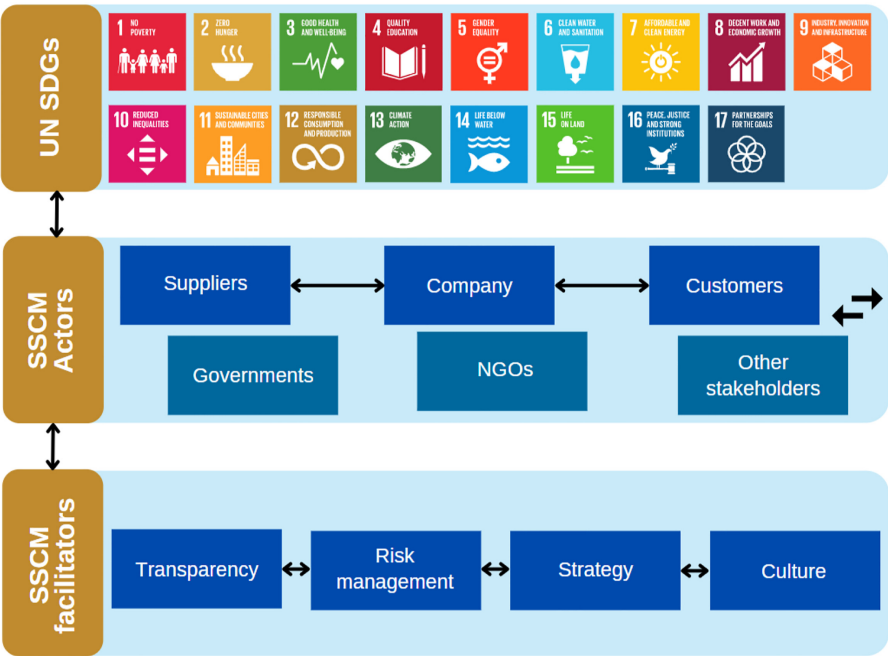


Figure 4.
The connection
between sustainable
supply chain
management and the
UN sustainable
development goals

Source(s): Prepared by the authors

In respect of the cases based on the Forbes 20 list, [Table 1](#) showcases some of the key SDGs these companies prioritise at the moment. The process of prioritising entails two main components:

- (1) The level of emphasis provided to the SDGs and the amount of time and effort invested in trying to implement them.
- (2) An assessment of the specific challenges, needs and opportunities in the organisation.

This facilitates a greater understanding of the advantages of using SSCM to optimise their operations as part of their efforts to implement the UN SDGs. Analysing [Table 2](#), it is possible to verify that Microsoft is the company with the highest number of SDGs prioritised, with ten of them being considered. Alphabet and Samsung occupy the second position, with nine SDGs. Regarding the SDGs most addressed by the companies, SDGs 9 and 12 are evidenced being prioritised by all the twenty companies. It is seen that in many cases, emphasis is given to SDGs directly related to industrial operations and less to more socially oriented SDGs.

[Table 2](#) also shows that the companies have established criteria to evaluate the SDGs based on factors such as urgency, impact, feasibility and potential for transformative change. It can be assumed that they also consider the interlinkages between the goals and prioritise those that have significant leverage and co-benefits.

5. Conclusions










































This paper provides an overview of the extent to which SSCM may contribute to the implementation of the UN SDGs. It departed from two research questions. The first one was about the links between sustainable supply chain management and the UN Sustainable Development Goals. The paper has answered it by showcasing the existing links. In respect of the second research question, namely how can synergies in relation to sustainable development be achieved, the comprehensive review of the literature describes the contributions that SSCM may provide towards optimising processes and, by doing so, reducing the carbon footprint and social and environmental pressures of a wide range of industrial activities. Here, a special emphasis has been given to the theoretical components, as advocated in the current literature, which includes the concept, its evolution and its status.

In addition, the paper addresses the SSCM concept by exploring its influences on a set of relevant UN SDGs. Precisely, a systematic literature review was developed to assess the influence of SSCM on the implementation of some SDGs, namely SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), SDG 10 (Reduced Inequality), SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). Furthermore, the SDGs of indirect relevance analysed were SDG 1 (No Poverty), SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality).

The findings show that SDG 12 (Responsible Consumption and Production) is the most highlighted by the literature. More specifically, most of the publications that address this SDG analyse the food supply chain, but some others focus on other industries, such as the textile-apparel manufacturing sector. Other highly mentioned SDGs in the literature are SDG 7, SDG 13, SDG 3, SDG 9 and SDG 8. As far as the case studies table is concerned, the current emphasis on industry-related SDGs suggests that the companies should consider ways to widen their emphasis since the focus on some SDGs may lead to a neglect of others.

The study highlights the potential of SSCM to contribute to the achievement of the UN SDGs by optimising processes, reducing environmental pressures and operational costs and promoting responsible consumption and production. The findings -and main lesson from it-is that there is a need to widen the focus on SDGs beyond industry-related goals, to ensure that

Table 2.
Some of the UN SDGs
prioritised by the top
20 Forbes companies

Company	Country	Number of employees	Turn-over (in billion US\$)	SDGs prioritised
Berkshire Hathaway	United States	372,000	\$ 276.09	     
Industrial and Commercial Bank of China	China	434,089	\$ 208.13	      
Saudi Arabian Oil Company	Saudi Arabia	68,493	\$ 400.38	   
Morgan Chase	United States	271,025	\$ 124.54	       
China Construction Bank	China	349,671	\$ 202.07	      
Amazon	United States	1,608,000	\$ 469.82	  
Apple	United States	154,000	\$ 378.7	     

(continued)

Agricultural Bank of China	China	455,174	\$ 181.42	      
				       
Bank of America	United States	208,000	\$ 96.83	
Toyota Motor	Japan	366,283	\$ 281.75	    
Alphabet	United States	156,500	\$ 257.49	       
Microsoft	United States	221,000	\$ 184.9	         
Bank of China	China	306,322	\$ 152.43	      

(continued)

Sustainable supply chain management

Table 2.

Table 2.

Samsung Group	South Korea	113,485	\$ 244.16	          
ExxonMobil	United States	63,000	\$ 280.51	          
Shell	UK	82,000	\$ 261.76	          
Ping An Insurance Group	China	355,982	\$ 181.37	          
Wells Fargo	United States	247,848	\$ 84.12	          
Verizon Communications	United States	118,400	\$ 134.35	          
AT&T	United States	203,000	\$ 163.03	          
Source(s): Prepared by the authors				

all SDGs are being addressed. Moreover, it outlines the many variables which characterise SSCM and how these are connected with the SDGs. Also, the study provides examples that illustrate the links of SSCM to specific SDGs. The case studies table illustrates some of the current initiatives in the field.

5.1 Study implications

The implications of the study are two-fold. In theoretical terms, it provides some useful background information on how SSM can contribute to a set of UN SDGs. In addition, the paper shows some measures which may be deployed, in order to cater for better integration of the SDGs, in the context of SSCM measures. Researchers and practitioners may use the study in the implementation of SDG12 and some actions which may be helpful in improving operational efficiency to achieve cost savings and profitability.

The practical implications of this study are significant for businesses, policymakers and society as a whole. For businesses, the study highlights the importance of adopting SSCM principles to improve sustainability performance and contribute to the achievement of the UN SDGs. By implementing SSCM practices, companies can reduce their environmental impact, optimise their processes and reduce costs. The study also emphasises the need for companies to broaden their focus beyond industry-related SDGs to ensure that all SDGs are being addressed. For policymakers, the study suggests that adequate policies need to be put in place to support the industry in taking advantage of SSCM and its potential contribution to the UN SDGs. There is also a need for policies that address existing inequalities in access to resources and infrastructure, which may hinder the deployment of SSCM principles in some developing countries. For society as a whole, the study emphasises the importance of promoting responsible consumption and production to achieve the SDGs. By adopting SSCM principles, businesses can contribute to this goal, thereby promoting a more sustainable and equitable society.

5.2 Study limitations

This study has some limitations. The first is the fact that the systematic review was not large enough to cover all applications of SSCM and focussed on those associated with UN SDGs. While the studies mentioned in the text provide valuable insights, they are not exhaustive and may not capture the full extent of the challenges and solutions related to the SDGs. Therefore, there is a need for further research to explore the challenges and opportunities related to the SDGs and to assess the effectiveness of the proposed solutions in practice. Finally, the paper does not use detailed case studies which describe the impacts of using specific SSCM tools used in the various geographical regions. Despite these constraints, the paper provides a welcome addition to the literature since it sheds some light on some of the issues which permeate the use of SSCM and addresses the need to cater for more information on its potential in support of the implementation of the UN SDGs. This may be an element that may catalyse action towards increased use of SSCM, also as a response to deteriorating environmental and climate conditions.

5.3 Future research directions

With respect to future trends, it is very important that adequate policies are put into place in order to assist the industry to better take advantage of the use of SSCM, especially linked with the UN SDGs. Also, further studies which investigate how different methods could be deployed to harness sustainable production and consumption are needed, to identify appropriate measures to replicate their use across developing countries, which may significantly benefit from greater use of SSCM.

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