IMPACT OF INADEQUATE SUPPLY CHAIN MANAGEMENT ON SUSTAINABILITY

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ABSTRACT

Understand and bring references on the results of inadequate or inefficient supply chain management in sustainability, highlighting the challenges and associated barriers such as lack of commitment from top management or support from governments, explore ineffective sustainability approaches throughout the supply chain cycle, from the raw material extraction phase, production and use, until the disposal of the product, evidencing the resulting negative impacts, and discussing the practice of greenwashing, a strategy that seeks to mask the true actions and intentions of an organization in relation to the sustainability of its supply chain is the objective of this article. Through a bibliographic research, the perspectives of several authors on the performance, consequences and impacts of inappropriate supply chain management are presented from the point of view of sustainability, not only for the organizations themselves, but also at a global level, whether environmental or socioeconomic, such as depletion of non-renewable resources, aggression to nature, incorrect waste disposal and even threats to people's lives and safety.

Keywords: Supply Chain. Inadequate Management. Environmental impact. Social and environmental responsibility. Sustainability.

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INTRODUCTION

From the 90s onwards, the topic of sustainability in the[2] context of the supply chain began to gain prominence, due to the growing awareness of the impacts of business operations, the pressure from stakeholders for environmental and social responsibility, and the search for operational efficiency and cost reduction. These factors have led companies to consider sustainability as an essential element in the management of their supply chains.

In the wake of the concern with sustainability, *Green Supply Chain Management* emerges , referring to the integration of ecological practices and principles throughout the supply chain cycle. It involves considering the environmental impact of each stage of the supply chain, from product design and raw material sourcing to manufacturing, transportation, distribution, and end-of-life disposal or recycling.

Businesses in general are under increasing pressure to present themselves and act environmentally correct in front of society. These requests arise from concerns of organized society as a whole, governments, consumers and non-profit organizations, aware of environmental problems and the role that companies play, or should play, in sustainability issues.

But what if these sustainability actions, in practice, do not occur, either due to the challenges inherent to the processes, poor management, a minimalist view of obligations, or as a consequence of false or misleading statements about the organization's sustainability practices, whether private or public?

The objective of this article is, based on bibliographic research carried out in articles, books and journals, as well as in reports from entities such as the United Nations – UN, on inadequate management and sustainability challenges in the supply chain, to bring elements that allow us to understand the results and consequences.

The continuation of this article follows the following structure:

- Part 2: Development of the theme, where it is presented
  - The role and importance of a sustainable supply chain, its challenges and barriers.
  - Inadequate approaches to sustainability during the supply chain cycle and its impacts.
  - The practice of greenwashing, a strategy that aims to camouflage the true actions and intentions of an organization in the sustainability of its supply chain.
- Part 3: It is presenting final considerations on the topic and findings of the research.

[2] Sustainability: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Our Common Future, 1987, pg. 41)

SUSTAINABILITY MANAGEMENT IN THE SUPPLY CHAIN: PATHS, CHALLENGES AND CONSEQUENCES

The growing awareness of the impacts of business operations on the environment has driven the search for sustainable practices in supply chain management. In this scenario, the understanding of the paths to be followed by organizations to integrate sustainability into their operations, as well as the knowledge of the challenges and barriers that arise throughout this process, has made it both a necessity and a competitive advantage. Additionally, the understanding of the consequences of inadequate management, from the perspective of sustainability, as well as the practice of *greenwashing*, which seeks to mask the true actions of organizations, is examined, in order to provide a comprehensive view of the importance of environmental awareness and the commitment of senior management to a more sustainable supply chain.

THE SUPPLY CHAIN AND SUSTAINABILITY

Supply chain refers to the interconnected network of activities and flows of products and information that support the production and distribution of goods and services, from obtaining raw materials to delivering the product to the consumer, and disposing of it at the end of its useful life, and also covers strategic planning, process optimization, risk management, sustainability and corporate social responsibility throughout the chain. (Balkau & Sonnem, 2011)

An environmental bias of supply chain management is essential to promote sustainability, meet stakeholder expectations, improve operational efficiency, and ensure regulatory compliance, while providing competitive advantages in the marketplace. However, as we see in Sudarshan et al. (2019), its adoption faces several barriers, which cover a number of challenges, including organizational, technical, financial, and environmental factors, which can hinder the successful implementation of *green supply chain management (GSCM)* practices, including:

- Absence of Commitment from senior management;
- Absence of government support;
- Corporate culture not adhering to the adoption of the *GSCM;*
- Weak or non-existent environmental awareness of suppliers.

According to Castilho et al. (2019), non-implementation of GSCM can lead to adverse environmental impacts, such as:

- Waste in the use of resources;
- Depletion of non-renewable resources;
- Aggression to nature, in various forms (pollution, contamination, etc.);
- Incorrect waste disposal;

In addition to regulatory risks, reputational damage, operational inefficiencies and loss of market opportunities.

Regarding the effects on innovation capacity from the way sustainability is managed, research carried out by Ostermann et al. (2021) in more than 1000 companies in 22 industrial sectors in Brazil, identified that the focus of some of them on meeting only what the legislation imposes, in what the authors call 'gray companies', It leads to focus efforts on operational capacity, rather than prioritizing the ability to develop, which can limit the company's ability to make sustainable innovations, increase returns on investment and become a green company.

In addition to the inherent challenges and barriers, there are also points of failure in supply chain management, which according to Jungmichel et al. (2017) compromise sustainability:

- Lack of transparency in the supply chain, resulting in difficulty identifying "hot spots".
- Environmental and sustainability issues along the supply chain are not given the attention they need, leading to unidentified or unmanaged negative impacts.
- Lack of effective influence on direct and indirect suppliers to improve their sustainability performance.
- Failing to take into account environmental effects at all stages of the supply chain, from the extraction of raw materials to processing and disposal.
- Failing to set clear and precise targets and implement measures to enhance supply chain sustainability.

These failures can generate significant environmental impacts along the supply chain, compromising the reputation and continuity of the company itself.

While environmental impacts can be the result of inefficiency or difficulty in overcoming barriers and overcoming challenges, even if the company does not want this result, there is another type of action, according to Redaud (2022), which deliberately applies a strategy of creating a positive image in relation to the environment, without a real commitment to sustainable actions, greenwashing.

Regardless of the generating reasons, issues related to sustainability can arise at various stages of the supply chain cycle, according to Jungmichel et al. (2017), ranging from the extraction of raw materials, production, supply, own processes and facilities, distribution logistics, to the use and disposal at the end of the product's life, highlighting the importance of attention to sustainability management and its consequences throughout the supply chain.

SUPPLY CHAIN CYCLE: SUSTAINABILITY HOTSPOTS

According to Balkau and Sonnem (2011), inefficient management, regardless of its cause, has environmental consequences in all phases of the supply chain, and includes, for example,

Table 1 - Supply Chain Cycle Phase x Environmental Risk

Phase	Environmental Risk
Extraction of raw materials	• Environmental degradation due to the extraction of natural resources. • Exhaustion of resources. • Social conflicts. • Human rights violations. • Greenhouse gas emissions and air pollutants associated with processes.
Transportation and Logistics	• Greenhouse gas emissions and air pollutants from transport vehicles. • Risks of leaks and spills of hazardous substances during transport.
Manufacturing and Processing	• Generation of solid, liquid and gaseous waste from industrial processes. • Consumption of natural resources, such as water and energy, for manufacturing operations.
Distribution and Storage	• Waste of resources due to inefficient product storage and handling practices. • Emissions associated with distribution operations, including transportation and cold storage.
Product Usage	• Consumption of energy and natural resources during the use of products by consumers. • Waste generation and improper disposal of products at the end of their useful life.
Product End of Life and Final Disposal	• Improper disposal of products and packaging, resulting in soil, water, and air pollution, affecting natural ecosystems and biodiversity. • Difficulties in recycling and recovering materials due to unsustainable product designs. • Risks to public health.

Note: Prepared by the author, based on Balkau and Sonnem (2011)

Examining some of these steps, examples and consequences of inefficiency in supply chain management are noted:

Extraction of raw materials: Extractive activities bring significant challenges due to the potential adverse impacts they have on the environment, local communities, and workers. The extraction process often results in environmental degradation, including habitat destruction, deforestation, soil erosion and water pollution, contributes to greenhouse gas emissions and air pollution, can lead to negative social impacts on local communities, such as displacement, loss of livelihoods and human rights violations. In addition, workers in the extractive industry often face challenging working conditions, safety risks, and issues related to forced labor and exploitation. (Ashcroft, 2023).

In a look at the extractive industry, the United Nations Environment Programme (2017) brings:

- Climate change: 50% of the world's carbon emissions are due to the extractive sector;
- Biodiversity loss: A fifth of oil and gas contracts coincide with protected biodiversity areas in Africa.
- Social issues: Waste dam disasters have posed threats to people's lives and safety. Mining, as the third sector with the highest incidence of murders, recorded more than half of these attacks in three specific countries (Colombia, Mexico, and the Philippines). In addition, numerous human rights abuses are associated with Small-Scale Mining, with more than 40,000 children working in cobalt mines in the Democratic Republic of Congo.

Manufacturing and Processing: According to the United Nations Environment Programme (2021), 177 nations in the world depend to some degree on water desalination, with certain countries, such as the Bahamas, Maldives, and Malta, fully dependent on this method. In most desalination processes, approximately 1.5 liters of liquid polluted with chlorine and copper are generated for each liter of drinking water produced. If not properly diluted and dispersed at disposal, this can result in the degradation of coastal and marine ecosystems. Increased salinity and temperature can cause a reduction in dissolved oxygen content, contributing to the formation of "dead zones" where few marine animals can survive.

Final disposal and disposal: The process of industrialization and the increase in income levels in a growing urbanized population have contributed to an increase in the consumption of Electrical and Electronic Equipment (EEE), which in turn, have increasingly shorter life cycles due to technological advances. The combination of these factors results in an increase in the generation of Waste Electrical and Electronic Equipment (WEEE).

In 2019, the disposal of Waste Electrical and Electronic Equipment (WEEE), called e-waste, at a global level, reached a new level, totaling 53.6 tons, with only 17.4% of this amount being disposed of properly, according to United Nations data, that is, about 82.6%, equivalent to 44.3 million tons of WEEE, were not disposed of properly, exerting a negative impact on both the environment and human health, and yet, in recent years, the growth rate of Waste Electrical and Electronic Equipment (WEEE) has been three times higher than the expansion of the world population and has exceeded the increase in Gross Domestic Product (GDP) by 13%, and WEEE recycling rates are not advancing at the same pace, making the situation worse every year. (Franz & Silva, 2022)

Avelar (2022), presents how much Latin America, which in a UN survey appears that only 3% of the disposal of electronics is carried out correctly, and this irregular disposal that, among others, has environmental consequences, grew 49% between 2010 and 2019 in some countries in the region, and places Brazil as the fifth largest producer of electronic waste in the world.

GREENWASHING

Greenwashing is a practice that some organizations use of misleading communications about their environmental actions, projecting an image of environmental responsibility that does not reflect the truth. False or exaggerated claims are made about its commitment to sustainability, whether in relation to products, production practices, or corporate policies. The goal is to create a public image of environmental responsibility, regardless of the reality of its actions. (Inês; Diniz & Moreira, 2023)

When analyzing the theme, Elving (2014) highlights that this is not a practice restricted to a certain type of organization and is disseminated by companies in various sectors, such as energy, food, fashion, technology, and automotive, a point corroborated by Redaud (2022), who informs that it is more common in companies that operate in sectors with high environmental impact, such as the fossil fuel industry, the food industry and the fashion industry.

These businesses can use *greenwashing* as a way to improve their public image and attract environmentally-conscious consumers. The practice, however, is not limited to the sectors already presented, Redaud (2022) brings that some non-profit organizations and even governments use it to promote their environmental actions, even if these initiatives are not as effective as communicated.

Greenwashing also makes it difficult to identify truly sustainable products, services or policies, in addition to undermining public confidence in genuine sustainability initiatives.

In her article, Inês; Diniz and Moreira (2023) present some greenwashing practices:

Table 2 Types of *Greenwashing*

Kind	Share
Strategic	It refers to misleading claims about specific products or isolated initiatives, in which the company attempts to portray a positive environmental impact, even if other areas of its operations are not sustainable.
Obscure	It involves marketing practices that are designed to obscure or minimize the company's unsustainable environmental practices by making them less visible to the public.
Product Level	This occurs when companies make misleading claims about the sustainability of specific products, exaggerating their positive environmental impact, or hiding negative information.
Enterprise-level	The company promotes an image of environmental responsibility throughout the organization, but its actual practices do not reflect this commitment.

Note: Prepared by the author, based on Inês; Diniz and Moreira (2023)

When analyzing the topic from the point of view of business communication, Elving (2014) highlights that there are strategies designed to lead customers and other stakeholders to perceive the organization as sustainable, even though this is not the reality, thus masking inefficient management from the point of view of sustainability of its supply chain.

Table 3 Communication strategies in greenwashing

Strategy	Share
Use of vague and imprecise terms	Using terms such as "eco-friendly," "sustainable," or "environmentally friendly" without providing specific information about the company's environmental practices.
Use of suggestive images	Images such as forests, animals, or natural landscapes, to create a positive image of the company, even if its practices are not really sustainable.
False or misleading claims about the company's environmental practices	Statements such as stating that a product is "100% recyclable" when only a small part of it is recyclable.
Making misleading comparisons with other companies or products	Claiming that a product is more environmentally friendly than others without providing clear evidence to support that claim.
Donations	Donating to environmental or social causes to create a positive image of the company, even if its business practices are not truly sustainable.

Note: Prepared by the author, based on Elving (2014)

These practices, which can be used individually or in combination, can be used individually or in combination to deceive consumers and society as a whole about a company's real commitment to environmental sustainability.

FINAL CONSIDERATIONS

The transition to sustainable supply chain management is not limited to a matter of regulatory compliance or corporate image. It presents itself as a strategic opportunity for organizations to innovate in their processes, products, and business models, generating long-term value for all stakeholders. The adoption of sustainable practices drives operational efficiency, reduces costs, mitigates risks, and strengthens the company's image, while contributing to the preservation of the environment and social well-being.

The successful implementation of sustainable supply chain management requires an integrated and holistic approach that involves all links in the chain, from raw material

suppliers to end consumers. Clear and measurable sustainability goals, implementation of performance monitoring and evaluation systems, and promotion of transparency and collaboration throughout the chain are elements of this process.

The adoption of business models based on a circular economy with reuse, remanufacturing and recycling of products, through investment in innovative technologies and practices that reduce the consumption of natural resources, minimize the generation of waste and emissions, contribute to reducing the environmental impact of the supply chain.

In short, sustainable supply chain management is a continuous and dynamic process, which requires adaptation, improvement, and attention to new trends and challenges. In addition, collaboration with other companies, governments, non-governmental organizations, and research institutions drives innovation and promotes the dissemination of good practices.

In summary, this study offered a broad analysis of the consequences arising from inadequate supply chain management from the perspective of sustainability. Given the inherent extent and complexity of the topic, this article aims to be a starting point for future investigations, as well as additional research that explores, in greater depth, topics such as: sustainable management models, comparative analysis of practices, impact of emerging technologies, communication and sustainable engagement. By directing efforts to these areas of research, it will be possible to advance the knowledge and practice of sustainable supply chain management, contributing to a more prosperous and equitable future.

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