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Research paper



Environmental Costs Versus Sustainable Business Development

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Abstract

The need for companies to value, measure and disclose environmental impacts in the search to make better decisions regarding environmental management in the future is evident, however, many companies decide not to recognize the environmental costs derived from the development of their social object, this is largely due to the lack of knowledge of environmental accounting on the part of company managers since they focus on short-term profitability, which in most cases implies an excessive consumption of resources, and not on long-term sustainability, which aims at a conscious consumption of these resources. Currently, due to the growing environmental deterioration, it is necessary to take measures to ensure that resources are sustainable over time; therefore, it is of vital importance that companies integrate environmental management policies into their operational development plans. Therefore, this article aims to provide a brief overview of the role of environmental costs in the sustainable development of companies.

Keywords: *Environmental Costs; Sustainable Development; Environmental Accounting.*

1. Introduction

The excessive consumption and exploitation of natural resources, most of which are non-renewable, have long been a constant in the way companies have carried out their social purpose, since they have found it more relevant to achieve high profitability (Al Amosh 2025), without considering the long-term effects they could cause on the environment (Lanfranchi et al. 2025). These practices have been present in companies for decades, and it is only now that resources have suffered significant deterioration that the depletion of these resources is very close if rationalization measures are not taken. For this reason, companies must implement strategies aimed at achieving a balance between economic development and environmental protection.

As a result of this arises the concept of sustainable development that provides parameters aimed at better management of resources when producing and consuming, that is, a more conscious way of carrying out the social object of companies (D'Amore et al. 2025), which can be complemented with the identification of environmental costs, to dimension the damage caused to the environment and establish policies to mitigate the detriment of the environment (Drago et al. 2025).

The evaluation of the impacts on the environment is of vital importance to reach sustainable development, but due to the lack of knowledge in the measurement of natural resources, there are still companies that do not recognize the environmental expenses, for this reason, it is necessary to establish a link between the company and the environment, generating management policies and measurement of environmental impact. As well as establishing a relationship of accounting with the environment in the search for measurement strategies, valuation, and disclosure of the effects on the environment where companies are established (Evrikleia et al. 2025). All this is relevant because if companies understand the importance of environmental expenses, they will design policies to mitigate future risks, such as resource scarcity, and become more competitive in the market.

In accordance with the above and in the search for a better understanding of the role of environmental expenses in the sustainable development of companies, this document will be composed of the following parts:

1) Sustainable development in organizations: The importance of developing sustainability strategies is highlighted since they contribute to a company having greater opportunities to adapt to different social and economic changes.

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2) Importance of environmental costs in relation to sustainable management: the importance of environmental expenses in companies is recognized, to understand the effects that their activities have on the environment and what they should do to mitigate risks of environmental damage.
3) Role of environmental accounting in sustainable development: reference is made to environmental accounting and its importance in organizations, since, based on environmental management reports, better decisions can be made to develop policies to mitigate the damage caused to the habitat.

Finally, there will be a section where a brief discussion and conclusions will be given, alluding to the importance of the valuation of environmental expenses and how they affect the sustainability of companies. It is also mentioned that environmental management has become a competitive advantage in today's business world.

2. Sustainable Development in Organizations

The scarcity of resources that is currently evident due to the indiscriminate use of these, has generated questions about how much longer the existing resources will last, companies must acquire a greater relationship with the environment not only focusing on short-term profitability but also on long-term sustainability and as a result of this arises the definition of Sustainable Development (Liu & Xiang 2025), understood as the development that meets "the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987). Sustainable development requires the involvement of companies and the introduction of environmental management, considering not only short-term economic criteria but also their sustainability (Mohy-ud-Din et al. 2025).

Although companies must give greater importance to sustainable development, not all of them do, which is why, in recent years, some organizations have focused their efforts on the search for strategies that serve as a guide for companies to take as a basis.

In this sense, concern about climate change and the excessive consumption of resources led the United Nations to enact the Sustainable Development Goals (SDGs) in 2015, consisting of seventeen goals and one hundred and sixty-nine targets covering different aspects among which environmental management in search of long-term sustainable development stands out, in this sense Mohy-ud-Din et al. (2025) state that the SDGs contemplate companies as agents of development and cover fields where they acquire a leading role such as technologies, consumption, connectivity or energy. To ensure that companies are successfully involved, the Global Compact, WBCSD, and Global Reporting Initiative have developed the SDG Compass guide, which explains how the SDGs affect companies and offers tools and knowledge to introduce sustainability in business.

The different sustainable development initiatives are aimed at promoting greater production using the least possible resources, which from an economic point of view reduces the costs of collection, transportation, treatment and final disposal of waste, which makes the use of resources more efficient, thus contributing to reduce pollution and the depletion of resources, this being the greatest benefit from an environmental point of view.

For companies, sustainable development becomes a vitally important tool for environmental management, which combined with environmental costs allows assessing the impacts on the environment and "knowing their contribution (in case they are positive) or their severity (if they are negative) in their multiple dimensions (economic, financial, social, technical, aesthetic, cultural or perception, institutional, etc.)" (Mohy-ud-Din et al. 2025).

Companies must adapt to economic and social changes, and for this reason, it is necessary to implement programs aimed at using technologies and raw materials that contribute to reducing the emission of pollutants, which indicates that an assessment of the resources consumed in the production process is necessary, becoming important information for both internal and external decision-making. "Companies would benefit highly in terms of the effective allocation of environmental costs, since they would be allocating the fair and necessary budget to develop the proposed policies to start being a sustainable and environmentally friendly company" (Cheng et al. 2025).

All of the above highlights the importance of recognizing, valuing, measuring and disclosing environmental impacts so that companies can be sustainable over time, but as it is well known, environmental resources, since they do not have a market where they can be traded, have made this task more difficult for companies; With the changes introduced by the new market trends this was changing according to Feng (2025), "the current economic activity has turned the environment into a group of resources, whether they are for production or consumption, with which it was possible to turn nature into another asset to which a price can be imputed".

Stakeholders have played a key role in bringing the environment into business management. Under multiple forms, ranging from non-governmental organizations (NGOs) to sectoral associations, consumers and consumer associations, employees and trade unions, shareholders and institutional investors, or even the media, they all share, as members of society, the general concern about the deterioration of the environment, and have mobilized under different strategies to introduce the prevention of environmental impacts in the company.

Currently, companies have different methods to recognize, value, measure and disclose the impacts caused to the environment, which has contributed to the fact that the basis for the decision-making of different users is not only purely financial, since more than relying on the figures provided by accounting, it is of utmost importance to evaluate the effects of the economic activity of companies on the environment, as well as what strategies are being implemented to mitigate environmental damage and resource conservation (Husain et al. 2025). It is a fact that companies should give greater importance to environmental expenses since these are an indicator to establish policy regarding the management of the effects caused to the environment, i.e., to establish an environmental management plan.

The implementation of an environmental management plan is often accompanied by an environmental management system (EMS), although this depends on the size and complexity of the organization's projects. EMSs make it possible to integrate, in accordance with regulations such as EMAS (Eco-Management and Audit Scheme) or ISO 14001, the prevention of environmental damage throughout the organization and ensure compliance with environmental regulations.

These systems offer other benefits, such as expanding the internal knowledge of the organization; increasing the quality and efficiency of processes; detecting business opportunities and introducing environmental innovations that multiply competitiveness; improving performance by involving employees and strengthening relations with stakeholders; and, if certified by an external entity, enhancing the corporate image and reputation of the organization (Vadera et al. 2025).

Organizations should continuously monitor the environmental management plan to identify whether the established goals are still viable based on the evaluation of results and thus undertake new action programs.

3. Significance of Environmental Costs in Relation to Sustainable Management

Nowadays, organizations must always keep environmental expenses in mind, as they allow them to evaluate the effects on the environment to make decisions regarding environmental management.

"It is necessary for companies to use part of their profits to contribute to repairing the damage generated to the environment, according to the degree of impact that their economic activity has on it. For this reason, it is required to evaluate and consider within the costs of the operation the use of natural resources, to determine at a financial level such an impact" (Mishra et al. 2022).

For the development of this document, environmental costs are understood as the monetary or non-monetary valuation of the negative effects caused by companies on the environment, which are not commonly valued in organizations, however, nowadays most of them are converging to the measurement, valuation and disclosure of environmental expenses since the depletion of resources is approaching and it is everyone's task to contribute to the improvement of our habitat.

In view of the above, it is important to take a closer look at what has been defined as environmental costs, since it has become an important variable for managing sustainability within organizations.

Organizations should take into account such concepts in the search for strategies to make their operations environmentally friendly and sustainable over time, in line with Hueske and Dijkstra-Silva Notley (2025) who considers sustainability as a creative process of change that leads to sustainable companies to change the application of traditional eco-efficiency and environmental management practices (mainly focused on risk reduction to continue operating in the market) by exploring new production and consumption patterns that can open new market opportunities.

In the quest to be sustainable over time, companies must choose to develop a strategy for valuation, measurement, recognition, and disclosure of the impacts caused on the environment, being able to recognize the cost-opportunity when relating operating strategies to the environment. "Companies that manage sustainability seek new business models with the capacity to support innovation and change on a systemic scale". By doing this, they break the traditional value chain in which a company usually provides its own product, to understand that it is necessary to start operating in a collaborative work structure with other companies to create sustainable solutions (system offerings) (Hueske & Dijkstra-Silva, 2025).

Sustainable companies are always in search of new markets, since by knowing their environmental expenses, they can establish commercial expansion programs, and this should be a watchword in all organizations, since their survival and success will often depend on it. "All the actions carried out within the organization in pursuit of environmental cost management ultimately lead to the sustainability of the environment and the organization" (Erfan et al. 2022).

4. The Role of Environmental Accounting in Sustainable Development

According to Husain et al. (2025), environmental accounting is the generation, analysis, and use of financial and non-financial information aimed at integrating economic and environmental policies for the benefit of sustainability.

On the other hand, D'Amore et al. (2025) state that "environmental accounting provides information on the impact of production and consumption processes on the protection of natural resources and the environment, which essentially refer to land, water, and the atmosphere".

Based on these appreciations about environmental accounting, it is valid to say that it provides the opportunity to value and record the different operations that companies carry out aimed at the reduction of pollutants, rationalization of resources, and restoration of the environment, among other activities.

According to Khatoon et al. (2023), it is important to clarify that sustainable development accounting or environmental accounting is not independent from traditional financial accounting, on the contrary, it is part of it, as it represents the response of accounting to the growing needs for information on the impact of company activities on the environment and the impact of companies derived from regulations and laws that restrict many activities when they are harmful to the environment.

In recent years, several businesses have prioritized decarbonization as a key issue in their environmental strategy. Material Flow Cost Accounting (MFCA) is an environmental accounting method that assigns costs to material and energy flows through a process, allowing for a simultaneous reduction in environmental impacts and an increase in business and financial efficiency. Material flow cost accounting (MFCA) is one of the most widely acknowledged methodologies in environmental, social, and economic research for tracing and quantifying material flows and stock in physical and economic entities.

Material Flow Cost Accounting (MFCA) is a cost calculation and analysis method that focuses on resource and energy losses in the manufacturing process, and comprehensively evaluates costs by treating the material costs, processing costs, and equipment depreciation costs used to account for those losses as "negative product costs." Cost reduction issues analyzed and considered using MFCA also lead to resource and energy conservation.

MFCA is an environmental accounting method that aims to achieve both resource efficiency and economic efficiency. It can also be considered a cost accounting and analysis method in the sense that it clarifies the costs incurred in waste disposal and recycling materials in the manufacturing process, and is used to consider cost reductions.

MFCA has the following three characteristics as a cost accounting and analysis method:

1) Separate and calculate the positive and negative product costs

Positive product costs: Costs invested in items are passed on to the next process. Negative product costs: Costs invested in waste and recycled items.

2) Calculate costs throughout the entire process

Positive product costs are included in the input costs of the next process (as costs of the previous process).

3) Comprehensive cost calculations include

Material costs, energy costs (electricity, fuel), system costs (labor, equipment depreciation, indirect labor, etc.), and disposal and recycling costs.

Examples from the real world show how businesses use environmental accounting to assess and control their environmental effects, which frequently leads to higher productivity, lower expenses, and a better reputation. The case studies that follow demonstrate how companies have used environmental accounting concepts across several industries.

As part of its "People & Planet Positive" policy, IKEA employs environmental accounting to reduce its environmental impact.

Methodology: To measure the environmental effects and dependencies of its activities and goods, IKEA adopts an Environmental Profit and Loss (P&L) account.

Implementation: The business has made large investments in sustainable energy, such as installing solar panels on its stores and wind farms. Additionally, it has pledged to reduce waste and obtain all its cotton and wood from more sustainable sources.

Results: The company's eco-efficiency initiatives saved €190 million in 2024. Additionally, its dedication has increased consumer trust and reduced deforestation associated with the source of its raw materials.

Unilever has reduced waste and carbon emissions while increasing operational efficiency using environmental management accounting.
Methodology: Unilever's eco-efficiency initiatives monitor how much water and packaging are used in each of its operations.
Implementation: The business has put energy and waste reduction initiatives into action. It also establishes challenging targets, such as using only recyclable, compostable, or reusable plastic packaging.
Results: Unilever reportedly saved $470 million through eco-efficiency initiatives. Its carbon emissions significantly decreased by 2024, and 75% of its factories had zero non-hazardous waste going to landfills.
To lower its fuel expenses and carbon impact, UPS used technology to build an environmental accounting system.
Methodology: Real-time traffic, fuel, and emission data are used by the company's On-Road Integrated Optimization and Navigation (ORION) system.
Implementation: To reduce mileage and fuel consumption, the ORION system evaluates and optimizes delivery routes.
Results: By 2024, the system was reducing UPS's carbon impact by 100,000 metric tons, or 10 million gallons of fuel annually.
To produce lighter, more fuel-efficient aircraft, Airbus incorporates environmental accounting into its manufacturing process.
Methodology: To create lighter airplane parts, the company uses additive manufacturing, also known as 3D printing. The costs and advantages of this process, such as material consumption and fuel savings, are measured by environmental accounting.
Implementation: To create lighter parts, Airbus teamed up with a technology business that specializes in additive manufacturing.
Results: There is a definite economic and environmental benefit to additive manufacturing, since it can cut the annual greenhouse gas emissions of an A320 jet by an estimated 465,000 metric tons.
Environmental accounting is used by Swire Properties, a Chinese construction company, to monitor its sustainability objectives.
Methodology: To maximize building energy efficiency, the organization makes use of smart technology and 3D modeling.
Implementation: The company used low-carbon, recycled building materials, biodiesel produced from food waste oil, and smart lighting with sensors when constructing One Taikoo Place in Hong Kong.
Results: The program assisted in reducing the greenhouse gas emissions intensity of the company's entire portfolio by over 20%.
By putting solar plants on vacant rooftops, an Indian energy provider uses environmental accounting.
Methodology: The clean energy produced by the solar panels, expressed in watts, is tracked by environmental accounting and contrasted with energy from conventional sources.
Implementation: Tata Power converts unused space into a renewable energy source by installing solar panels on rooftops.
Results: By producing 431 million watts of electricity in 90 Indian cities in 2024, the program decreased dependency on conventional power sources.
Tata Steel, a member of the highly polluting steel sector, tracks and controls its environmental performance using environmental accounting.
Methodology: Tata Steel establishes precise standards for waste and water use and tracks emissions using a greenhouse gas management system.
Implementation: At its Jamshedpur factory, the company uses technology and procedures to meet its environmental goals, which include 100% solid waste utilization and zero effluent discharge.
Results: By attaining high rates of solid waste utilization and drastically lowering its CO2 emissions intensity, the company has set an example for the Indian steel sector.
In developing countries like India, environmental challenges are frequently urgent and local, focusing on issues such as clean water and deforestation, whereas Western countries prefer to focus on long-term, systemic issues such as climate change. This disparity has an impact on environmental accounting, which is more sophisticated and institutionalized in Western contexts but is frequently voluntary and underprioritized in developing countries.
While Western contexts, despite their struggles with climate change, have more robust regulatory frameworks and established sustainable accounting practices, albeit primarily focused on large corporations, environmental challenges in developing countries are often the result of prioritizing short-term economic growth over long-term sustainability, which leads to problems like indoor air pollution and deforestation. Accounting procedures vary greatly; in contrast to established economies, developing countries have difficulty incorporating environmental costs because they lack standardized frameworks, have fewer resources, and pay less attention to environmental sustainability reporting.
Environmental accounting should be used by companies in their search to be sustainable in the long term, by means of which it is possible to detect different effects caused by the organization on the environment and the valuation of resources, as well as to recognize how far the company has advanced in the sustainability process.

5. Discussion and Conclusion

Although some companies have decided to value, recognize and disclose the effects they have on the environment many still do not do so, but every time the natural resources are smaller which requires measures as soon as possible since in the not too distant future production can be greatly affected by the indiscriminate consumption of these resources, in addition, it is required that the organization, accounting and the environment acquire greater relationship to develop an environmental management plan that must constantly be evaluated to make decisions that benefit the environment (Ahmad & Khan 2023).
According to Ali et al. (2022), the function of accounting for sustainability is to carry out a rigorous evaluation and monitoring of the control that organizations exercise over the wealth under their orbit, which includes environmental, social, and economic wealth.
Accounting thus becomes the guardian of wealth, the protector of resources, systemic relationships, and environmental, social, and economic services of this wealth. This new accounting proposes an integral sustainability, which is different from classical sustainable development (Alakkas et al. 2023). Integral development presents a hierarchical structure of wealth, so it formulates the integral pyramid of development, which places environmental wealth in the first place, followed by social wealth, and, in the last place, the environmental dimension. While sustainable development establishes that there must be harmony between the economic, social, and environmental dimensions that form the triple bottom line, integral sustainability argues that the economic dimension must be subordinated to the social and environmental dimensions. The social dimension is subordinated to the environmental dimension, with environmental sustainability being the goal of society.
For the idea of sustainable development to be a fact, it is necessary that in each country there are public policies to mitigate the damage caused by economic activity, as in Finland, Iceland, Switzerland, and Norway, countries that have been considered as the most

environmentally friendly according to the environmental efficiency index, it does not imply that the countries are the most ecological or cleanest in the world, but that they are countries that carry out great efforts to take care of the environment.

In the case of Switzerland, water protection has been enshrined in the Swiss Constitution since 1970 as a permanent task for the State, the government established in 1876 the first federal law for the protection of forests controlling the maintenance and exploitation of wooded areas, in 2020 the parliament approved the framework of the CO_2 law and foresaw a 10% reduction in carbon dioxide emissions by 2030 compared to 2010.

All these laws notoriously limit the actions of companies regarding the use of natural resources and have been in place for many years while in other countries companies have been given complete freedom to use resources without measuring the possible consequences, so this is the time to raise awareness from the governance of the countries so that the proper use of resources becomes a duty and becomes mandatory.

If the companies of the 21st century wish to be successful and above all remain on time, they must take the baton and educate themselves about environmental care and improve their management and processes, because, in addition to the enormous social responsibility that they have, they can take advantage of this trend to make their business more profitable, since as the days go by, people are becoming increasingly aware of the importance of the environment and this is a potential market that can help to increase the profits of companies that decide to be more socially responsible with the environment.

If a company does not pay special attention to environmental care, it can damage its corporate image with all stakeholders, and therefore its reputation, and this can seriously affect its profitability since stakeholders often take certain organizations as models to follow in certain practices.

For future issues, examine how real-time, reliable environmental data may be obtained using technologies like blockchain, IoT, and AI, and how this data can be used to improve external environmental reporting and environmental accounting.

Investigate how environmental accounting is used in the circular economy. Examine how industries moving toward circular models might utilize environmental accounting to monitor and control waste reduction, resource efficiency, and the creation of more sustainable products.

Examine how sustainability affects business financing. Analyze how a company's financial risk, performance, and access to sustainable financing choices are impacted by environmental accounting information disclosure, including for environmental, social, and governance (ESG) aspects.

Investigate how environmental accounting can help achieve conservation and agricultural goals, such as assessing the impact of sustainable agriculture practices and landscape planning on environmental health.

Compare environmental accounting methods, regulatory frameworks, and their impact on environmental protection in industrialized and developing countries.

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