https://jor.rdd.edu.iq/
link of Scientific academic Iraqi journals A
ISSN: 3105-3181
ISSUE: 3 Volume2

Received: 2026/9 /25
Revision: 2026 /10 /18
Accepted: 2026 /10 /21
Published:2026/10/27

Growth Leadership Journal

دور التدقيق البيئي الاستراتيجي في تحقيق أهداف التنمية المستدامة: دراسة ميدانية في المديرية العامة لتربية واسط

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المستخلص

يهدف هذا البحث إلى قياس مدى إسهام التدقيق البيئي الاستراتيجي في تحقيق أهداف التنمية المستدامة بأبعادها البيئية والاقتصادية والاجتماعية في المديرية العامة لتربية واسط، والوقوف على واقع الأداء البيئي في المؤسسات الخدمية والتربوية. تجسدت مشكلة البحث في غياب أو ضعف آليات التدقيق البيئي الاستراتيجي كأداة رقابية وتخطيطية بعيدة المدى، مما أدى إلى هدر الموارد الأساسية كـ (الطاقة، الورق، والمياه) وفقدان فرص دمج الممارسات الخضراء في الخطط الاستراتيجية للمديرية.اعتمد الباحث المنهج الوصفي التحليلي، وتم إعداد استمارة استبيان محكمة لجمع البيانات الميدانية من القيادات الإدارية والكوادر الرقابية، إذ تم تحليل (89) استمارة صالحة باستخدام الحزمة الإحصائية SPSSلاختبار الفرضيات.توصلت الدراسة إلى نتائج جوهرية تثبت وجود علاقة ارتباط (وتأثير إيجابية ذات دلالة إحصائية بين التدقيق البيئي الاستراتيجي وتحقيق أهداف التنمية المستدامة، حيث بلغ معامل ال تحديد R^2 = 0.110 وتؤكد هذه النتيجة دور التدقيق الحديث في ترشيد . الاستهلاك، الحد من الهدر المالي والبيئي، ونشر الوعي المؤسسي وتعزيز معايير السلامة المهنية.بناءً على النتائج، أوصى البحث بإدماج التدقيق البيئي الاستراتيجي ضمن الخطط الرقابية الدورية وعدم الاقتصار على الرقابة المالية والإدارية، وإصدار تعليمات وزارية ملزمة تدعم التوجهات الخضراء. كما دعت الدراسة إلى تدريب الكوادر الرقابية وتأسيس قاعدة بيانات محاسبية بيئية تعتمد نظام الإدارة البيئية EMS. الشامل المؤسسي الأداء وتقويم المساءلة بنظام البيئية التقارير لربط)

الكلمات المفتاحية : التدقيق البيئي الاستراتيجي، أهداف التنمية المستدامة، الأداء البيئي، تربية واسط، نظام الإدارة البيئية.

The Role of Strategic Environmental Auditing in Achieving Sustainable Development Goals An Empirical Study at the General Directorate of Education in Wasit

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Abstract

This study sought to gauge the extent to which strategic environmental auditing is contributing to the implementation of SDGs on the environmental, economic, and social aspects in the General Directorate of Wasit Education and to assess environmental performance in educational and service-oriented

public institutions. The research problem is the lack of strategic environmental auditing mechanisms as a long-term control and planning tool, which results in waste of resources such as energy, paper, and water, and the failure to incorporate environmental dimensions in the policy framework of the directorate.
In order to accomplish these goals, the descriptive-analytical approach was adopted and a validated questionnaire was used as the most important tool to collect field data from administrative leaders and auditing personnel. In total, 89 valid responses were evaluated using the Statistical Package for the Social Sciences (SPSS) to test hypotheses and extract indicators. The study revealed the statistical significance of the positive correlation between strategic environmental auditing and the achievement of the SDGs, and the coefficient of determination ($R^2 = 0.110$).
This has made it clear that modern auditing enhances organizational capability to rationalize resource utilization, reduce waste, raise institutional awareness of environmental management and improve occupational health and safety standards. As such, the study suggested integrating strategic environmental auditing into annual inspections, alongside standard financial and administrative audits, making ministerial directives for green initiatives and training auditing staff in the process, and establishing an environmental accounting database with an Environmental Management System (EMS) that connects audit reports to accountability and performance evaluation.
Keywords: Strategic Environmental Auditing, Sustainable Development Goals (SDGs), Environmental Performance, Wasit Directorate of Education, Environmental Management System (EMS).

Introduction:

In the field of modern administrative and accounting thought, the notion of institutional control and evaluation has changed drastically. It is no longer limited to financial and administrative audits that verify the accuracy of transactions but has grown to cover strategic, environmental and social aspects which influence institutional sustainability and long-term viability. Strategic Environmental Auditing has developed as a supervisory and planning tool as a result of the environmental situation in the world today and the depletion of natural resources. It enables executive management to assess and review the implementation of organizational policies and programs in line with environmental codes and standards and to rationalize the use of resources.

This modern auditing framework is not only about compliance with the law but is also about operational mechanisms and is the basis for sustainable development goals (SDGs) in their environmental, economic and social aspects. It is essential to reduce pollution and adverse environmental effects, cutting costs associated with resource

waste, improving occupational health and safety and creating an institutional environmental culture that protects resource rights for current and future generations.

The importance of this approach is most apparent in the public and service sector (education) when it comes to organization and its impact on society. The General Directorate of Education in Wasit is one of the major public service institutions and the main tasks it has to carry out today are the continuous use of resources (energy, water, paper, and educational facilities as well). Thus, strategic environmental auditing is used to evaluate environmental performance and to ensure that what we do in Iraq is consistent with the country's sustainable development vision. That is why this empirical study will examine the role of strategic environmental auditing and how it supports the implementation of the SDGs in the General Directorate of Education in Wasit. It will be an empirical study that addresses research questions and empirical hypotheses to develop data-informed indicators and recommendations for better internal control frameworks and green and sustainable institutional practices.

Section One: Research Methodology:

Research Problem: Educational institutions consume large resources (energy, paper, water) and generate waste. Lack or weakness of strategic environmental auditing limits long-term resource efficiency and environmental integration in strategic planning. Thus, the key research question is: "Does strategic environmental auditing help in achieving Sustainable Development Goals (SDGs) at the General Directorate of Education in Wasit?". Significance: It is a tool that helps non-industrial, educational service institutions rationalize resource use by reducing waste and aligning policies to Iraq's sustainable development vision.

- **Objectives**:
    1. Conceptualize strategic environmental auditing in public educational sectors.
    2. Assess current environmental performance and compliance in the Directorate.
    3. Measure the contribution of strategic environmental auditing to achieving SDGs across environmental, economic, and social dimensions.
    4. Offer actionable recommendations for educational decision-makers.
- **Hypothesis**:

Null Hypothesis (H_0): "There is no statistically significant correlation or impact between strategic environmental auditing and achieving SDGs at the General Directorate of Education in Wasit."

- **Data Collection**:
    - *Theoretical*: Literature review from peer-reviewed journals and specialized books.

    - *Empirical*: A validated questionnaire distributed to a target sample (N = 100). A total of 90 questionnaires were retrieved, yielding 89 valid responses analyzed using SPSS.
- **Key Terms**:
    - **Strategic Environmental Auditing**: A systematic, independent evaluation of top-level organizational policies and plans to ensure environmental compliance and risk mitigation.
    - **Sustainable Development**: Integrated development optimizing human and environmental resource management to meet present educational/service needs without compromising future generations' rights.
    - **General Directorate of Education in Wasit**: A public educational service entity under the Iraqi Ministry of Education governing Wasit Governorate's educational sector.

Section Two: The Importance of Adopting Strategic Environmental Auditing in the Public Sector

Concept of Environmental Auditing

Environmental auditing has emerged as a modern control mechanism in response to the evolution of management thought and its transition from traditional economic performance evaluation to social and environmental performance assessment, driven by pressures from governments and civil society to protect the environment and define corporate environmental responsibility (Bira & Ali, 2024: 176). Environmental auditing refers to the examination of system procedures in accordance with standards or regulations; however, it is frequently used to cover the collection and evaluation of any environment-related data, which is preferably termed an environmental review (Gnanamangai et al., 2022: 1). Environmental auditing officially originated with the passage of the National Environmental Policy Act (NEPA) in the United States in 1970, enacted by the U.S. Environmental Protection Agency (EPA). Environmental auditing is often less stringent than financial auditing due to the lack of adequate documentation at this stage. The essence of environmental auditing lies in determining the extent to which an economic unit succeeds in achieving environmental strategies to protect the environment (Karim et al., 2022: 177).As for the importance of environmental auditing, it is manifested in being an effective measurement tool for managerial operations that ensures the efficiency of environment-related systems, contributes to reducing fines resulting from regulatory non-compliance, enables early identification of environmental problems, saves costs through waste recycling, and enhances the environmental reputation of institutions before external stakeholders by providing essential information that mitigates risks (Bin Yagoub & Mabsout, 2024: 348–349).

Objectives of Environmental Auditing

Environmental auditing seeks to achieve a set of strategic and operational objectives that ensure a balance between economic growth requirements and environmental preservation constraints. Accounting and managerial literature has defined a set of core objectives (Abdul Karim et al., 2024: 841), the most important of which can be outlined as follows (Thabit, 2021: 78):

1. Examining the organization's commitment to addressing negative environmental impacts by comparing planned programs with actual execution under administrative laws and policies.
2. Providing an environmental report on the findings, either separately or attached to the organization's final audit report.
3. Minimizing exposure to environmental problems by ensuring there are no environmental violations threatening the organization's safety and continuity.
4. Verifying the impact of compliance with environmental standards on the results of the organization's current and future activities.
5. Providing adequate and essential information that contributes to environmental improvement.
6. Evaluating initiatives aimed at preventing, investigating, and remediating environmental damage, preserving renewable resources, diagnosing the consequences of environmental damage caused to others or to natural resources, and assessing their financial impact.

Elements of the Environmental Audit Process

Environmental auditing can become the most effective tool for monitoring environmental activities, whether from corporate or state perspectives. Auditing should facilitate managerial control over environmental practices and evaluate compliance with public policy goals and regulatory requirements. The environmental audit process consists of four main stages (Karaeva & Magaril, 2024: 752):

1. **Preliminary Survey or Review**: Collecting information, establishing main objectives, and planning audit procedures.
2. **Fieldwork**: Meeting with company management and personnel involved in environmental activities, executing the audit, and holding closing meetings.
3. **Audit Report**: Preparing a report on discrepancies and problematic aspects in environmental protection activities, along with audit findings and recommendations.
4. **Follow-up Review**: Identifying and coordinating proposed improvement actions with company management, implementing them, and conducting a follow-up audit.

Types of Environmental Auditing

Institutions can independently apply several forms of environmental control, whether conducted by internal audit staff or by engaging external audit bodies, in alignment

with the nature and orientation of their economic operations. These types consist of the following (Mustafa et al., 2021: 120–121):

1. **Control over Environmental Management Systems**: Evaluating the efficiency and suitability of the adopted environmental system to support the facility in enhancing its practices and protecting the environment.
2. **Environmental Compliance Audit:** Checking whether or not the facility is in accordance with and compliant with environmental laws and legislation.
3. **Occupational Health and Safety Audit:** This audit evaluates how well an organisation's policies protect employees' physical health, their working environment and prevent hazards in the workplace.
4. **Financial Audit of Environmental Responsibility:** Verifying the accuracy and sustainability of accounting estimates of environmental liabilities, and how well disclosure and presentation approaches are carried out in financial reports.

Dimensions of Environmental Auditing

The fundamental dimensions of environmental auditing include the following (Hussein, 2026: 5–6):

1. Environmental legislation compliance: All operational processes and procedures of the organization are in accordance with local and global environmental laws, regulations and standards.

2. Resource efficiency: How do we evaluate energy, water and raw materials consumption and how best we can rationalize that consumption to reduce waste and enhancing operational efficiency.

3. Waste and Emissions Management: A control system for the disposal of waste and gases in a controlled manner and a continuous effort to prevent them from adversely affecting the surrounding ecosystem.

4.Environmental Protection and Pollution Prevention: Through adopting and implementing preventive measures and precautionary procedures aimed at protecting biodiversity and preventing causes of environmental degradation.

Dimensions of Strategic Auditing

Strategic auditing is built upon a set of pivotal dimensions that integrate to ensure the efficient realization of strategic goals and guide administrative operations toward excellence. These dimensions include (Hamza & Ahmed, 2025: 541–542):

- **Strategic Planning**: Represents an integrated system of methodological procedures and steps adopted by management to comprehend the organization's reality through a detailed and comprehensive study of its internal and external environments.

- **Process Performance**: Reflects the actual outputs of the organization and its level of effectiveness in executing activities and tasks assigned to various units.
- **Governance**: Refers to the organizational framework and guiding principles (such as policies, regulations, and rules) aimed at governing institutional performance.
- **Compliance Program**: The control structure and mechanism that ensures the institution's commitment to systems, legal regulations, and professional standards imposed by governmental bodies and legislative entities.
- **Strategic Performance Evaluation**: A process of continuous examination and evaluation of the implementation path of strategies and plans to verify their alignment with actual goals.
- **Auditor Independence**: Considered one of the core principles and essential traits in auditing and accounting environments. Independence obligates the auditor to maintain complete neutrality, objectivity, honesty, and integrity throughout all stages of financial and operational examination and evaluation.

International Standards on Auditing (ISAs) Relevant to Environmental Auditing

These international guidelines and controls were formulated to crystalize an accurate and integrated framework for environmental examination mechanisms, providing expanded audit tracks aimed at monitoring and measuring the reflections of environmental practices on institutional financial statements. In this context, a group of prominent international auditing standards concerned with environmental aspects can be reviewed as follows (Hamoudi et al., 2020: 153):

1. **International Standard on Auditing 250 (ISA 250)**: Concerned with *Consideration of Laws and Regulations in an Audit of Financial Statements*.
2. **International Standard on Auditing 315 (ISA 315)**: Focuses on *Identifying and Assessing the Risks of Material Misstatement Through Understanding the Entity and Its Environment*.
3. **International Standard on Auditing 330 (ISA 330)**: Centers on *the auditor's responses to Assessed Risks*.
4. **International Standard on Auditing 540 (ISA 540)**: Concerned with *Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures*.
5. **International Standard on Auditing 580 (ISA 580)**: Relates to *Written Representations*.
6. **International Standard on Auditing 610 (ISA 610)**: Covers *Using the Work of Internal Auditors*.
7. **International Standard on Auditing 620 (ISA 620)**: Focuses on *Using the Work of an Auditor's Expert*.

Strategic Auditing

Strategic auditing is considered a comprehensive modern managerial tool aimed at examining and evaluating the institution's strategy as a whole or the strategies of its

sub-units to ensure their effectiveness in achieving desired outcomes and associated investments and serves as an accurate diagnostic tool for identifying strengths, weaknesses, and areas of imbalance within the organizational structure (Abd & Al-Hassan, 2024: 196).

Objectives of Strategic Auditing

(Al-Hakim, 2006: 245–246):

1. Assisting in defining unannounced or unclear missions, goals, and policies of the facility by analyzing its actual performance results.
2. Examining information systems and strategic auditing tools to verify the capability of instruments used in providing data necessary for forecasting the future.
3. Defining precise standards through which success factors granting the facility a competitive advantage over others can be measured.
4. Monitoring performance and strategic orientation gaps in light of internal and external variables, while presenting proposals for optimal utilization of available resources to mitigate negative environmental impacts.
5. Diagnosing strategic problems and their root causes by identifying shortcomings and obstacles hindering strategy formulation and execution, providing practical recommendations and solutions to ensure their resolution and performance enhancement.

Importance of Strategic Auditing

The fundamental importance of strategic auditing stems from its status as an advanced control tool relying on modern information and communication technologies, in addition to employing diverse methods that enable the organization to achieve its objectives through (Adam, 2022: 39–40):

1. Serving as an effective means enabling management to continuously adjust its strategic choices in response to ongoing shifts in surrounding environmental factors.
2. Ensuring the organization continuously creates added value through conducting a comprehensive and precise examination of its strategic position.
3. Supporting strategic managers in early detection of problems and shortcomings, allowing timely resolution before the effects worsen .
4. Eliminating unnecessary practices, which contributes to cost reduction and revenue maximization, thereby elevating overall organizational performance efficiency.
5. Working to minimize weaknesses and address operational challenges by offering practical recommendations and guidelines ensuring immediate remediation of any negatives.

Section Three: Sustainable Development Goals Related to the Environmental Dimension

Sustainable Development

Sustainable development is a critically important issue facing governments at present. The report of the World Commission on Environment and Development, titled *Our Common Future* (WCED, 1987), highlighted the increasing environmental degradation resulting from accelerated economic growth, from which the concept of sustainable development originated. The aforementioned report cites one of the most prominent definitions of sustainable development, stating it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Jankiewicz, 2026: 4). Institutions' pursuit of implementing sustainable development represents a complex and dynamic process in which the environmental, economic, and social dimensions intertwine, imposing significant dynamic challenges to balance them and avoid fundamental trade-offs between their various goals—such as the conflict between climate action and the requirements of providing affordable energy to improve basic living standards (Numan, 2022: 5).

Importance of Sustainable Development

The importance of sustainable development lies in serving as a bridge connecting the present and the future to ensure the continuity of human life and secure a decent living for future generations through equitable and fair resource distribution within a single state. Furthermore, sustainable development is an effective mechanism for narrowing the developmental and economic gap between developed and developing countries. It plays a pivotal role in reducing external economic dependency, reorganizing production processes, protecting the environment, and consolidating social justice. It also contributes to elevating living standards, developing the educational system, and reducing illiteracy rates, as well as attracting capital, maximizing national income, and achieving distributional justice. This, in turn, necessitates adopting well-studied scientific strategies and clear visions that ensure bequeathing an adequate environmental and economic legacy for the future (Abd et al., 2026: 586).

Dimensions of Sustainable Development

There are three dimensions of sustainable development: environment, society and economy. While environmental problems are often the topic of debate in contemporary discussions, they cannot be viewed out of context in any sense since they are interrelated to economic and social issues. For example, drought waves in one country can lead to refugee flows in other countries, which in turn cause social unrest. The social dimension in Raworth's Doughnut Economics model is crucial for sustainable development. At the same time, environmental issues have economic implications (Fischer et al., 2023: 18). The following are the three dimensions (Abdul Karim et al., 2024: 5):

Economic dimension: It is important for sustainable economic growth to be achieved so that there is equality of wealth distribution and better living conditions. For

economic development to take place, it is necessary to create jobs, increase income and lower economic inequality among all groups. This dimension also requires economic policies to promote innovation and technological development, to invest in infrastructure and make sure that productive sectors like industry and agriculture are sustainable.

Social dimension: To make life better for all and provide social justice in the community. This includes healthcare and education, reducing poverty and unemployment, and empowering marginalized people in society. This dimension also has to be addressed in terms of fair policies in order to achieve gender opportunity equality and protect fundamental freedoms and human rights to help maintain social peace and stability and a healthier, more prosperous society.

Environmental Dimension: One of the fundamental aspects of sustainable development is that we need to protect the environment and natural resources for future generations. "Increasing pollution contributes to the depletion of natural resources and climate change. It is also necessary to take steps to protect biodiversity, manage water resources better, and encourage renewable energy rather than polluting sources. To balance economic activity with environmental sustainability, one has to be very eco-conscious and environmentally aware and develop the right technologies.

Strategic Environmental Auditing and Sustainable Development

The relationship between environmental auditing and sustainable development lies in the role of auditing as the operational tool and preventive mechanism to turn sustainability goals into tangible reality in institutions. It directly contributes to environmental protection by managing risks and mitigating the adverse impacts of industry, alongside its economic and institutional role in reducing pollution costs and fines, as well as activating environmental governance systems to safeguard future generations' rights (Shriqi & Ibrahimi, 2017: 121).

Strategic environmental auditing is a keystone to environmental compliance and sustainable development, and it is concerned with assessing institutional environmental performance and how well it meets local laws and international standards. Organizations can enhance their environmental performance, mitigate negative impacts and improve waste management efficiency with the help of such tools in order to be sustainable. Strategic environmental auditing also helps in environmental governance by ensuring that institutions adhere to approved controls, implement efficient procedural pollution control and waste management. It also helps in monitoring environmental risks and taking necessary action to prevent damage before catastrophic damage occurs and enables organizations to continuously assess and improve their environmental footprint and to develop and operate in a sustainable manner (Abdul Karim et al., 2025: 6).

To audit progress toward the Sustainable Development Goals (SDGs), reliance is placed on the following key sections and steps: (Hamdan, 2018: 121–122)

- **Studying the General Background and the Role of Governments:** Identifying the sources of sustainable development, understanding the role of governments in formulating policies and programs, and determining the extent of commitment by governmental entities and bodies to applying sustainable development principles and practices.
- **Sustainable Development at the National and Regional Levels:** Reviewing sustainable development strategies, goals, and indicators; verifying mechanisms for conserving natural resources; implementing environmental management systems and accountability; preparing development reports; and leveraging distinguished international experiences.
- **Sustainable Development at the Program Level:** Evaluating executive programs, exploring opportunities to conduct audits on them, selecting priority audit topics, and defining the audit scope and designing audit work directed toward sustainable development.
- **Developing the Institutional Capabilities of Supreme Audit Institutions (SAIs):** Taking effective steps to enhance the efficiency of the Supreme Audit Institution, which include:
    - Precisely defining audit mandates and responsibilities.
    - Formulating appropriate audit strategies.
    - Building capacity and developing technical expertise within the institution.
    - Executing audit assignments and extracting lessons learned from internal experience as well as from other institutions.
    - Achieving the desired impact from audit deliverables and reports.
- **Utilizing Guidance Models and Audit Questionnaires:** Employing assessment frameworks and questionnaires (such as the appendix excerpted from the Auditor General Act of Canada) to assist the Supreme Audit Institution in understanding the expected benefits of each policy and program, and in identifying weaknesses and performance gaps.

Academic and practical literature confirms that internal control plays a crucial role in ensuring the quality of sustainability disclosures and mitigating the risk of material misstatements. However, the distinction proposed in ISSA 5000 regarding the practitioner's understanding of internal control—between limited and reasonable assurance—remains ambiguous, particularly concerning full evaluation versus understanding 'certain components' of internal control. Applying this distinction in practice is challenging because most entities' internal controls over sustainability data have not yet reached the same level of maturity as their financial reporting systems. Consequently, sustainability assurance requires unifying internal control evaluation requirements across both types of engagements to ensure consistent and transparent reliability for standard users. (Hay et al., 2024: 1227)

The study adds that this type of auditing can help in the advancement of our Sustainable Development Goals by fostering innovation in clean production technologies, investing in renewable energy and reducing harmful emissions. This, in turn helps to build investor and stakeholder trust by promoting transparency and disclosure of environmental performance and thus to minimize legal risks for the

company in an effective manner. This is why strategic environmental auditing is necessary to ensure economic efficiency, environmental protection and the quality of life for all people.

Section Four: Practical (Empirical) Aspect

First: Statistical Methods and Treatments Used

To achieve the objectives of the study, test its hypotheses, and process the primary data collected through the questionnaire distributed to the study sample at the General Directorate of Education in Wasit, the Statistical Package for the Social Sciences (SPSS) was used to extract the following statistical indicators and methods: Frequencies and Percentages:

Used to describe and diagnose the demographic and occupational characteristics of the study sample (e.g., educational qualification, years of service, job title), as well as to determine the response frequency and percentage for each questionnaire item.

Arithmetic Mean (Mean): A primary tool to measure the level (high or low) of sample responses towards the research items and variables (strategic environmental auditing and sustainable development), identifying the central point around which responses cluster to demonstrate the relative importance of each dimension.

Standard deviation: A statistical method to assess the dispersion or homogeneity of the dispersion of responses around the arithmetic mean. A value of zero indicates that the survey is more agreeable and has less dispersion with the environmental and strategic practices being studied. Pearson Correlation Coefficient: To assess the link between strategic environmental auditing and the Sustainable Development Goals (SDGs).

Linear regression analyses: To determine the influence of the independent variable on the dependent variable and assess its explanatory power.

Reliability test (Cronbach's Alpha): To evaluate the reliability of the questionnaire items.

Second: Ranges of Arithmetic Means (5-Point Likert Scale)

To interpret and analyze the responses from the General Directorate of Education in Wasit, and to understand the relative importance of research variables (strategic environmental auditing and sustainable development), we adopted an evaluation scale based on the 5-point Likert Scale to specify the general response trend according to arithmetic ranges, as shown in the table below:

Table (1)

Ranges of Arithmetic Means According to the 5-Point Likert Scale

Response	Range (Arithmetic Mean)	General Trend
Strongly Disagree	From 1.00 to 1.80	Strongly Disagree
Disagree	From 1.81 to 2.60	Disagree
Neutral	From 2.61 to 3.40	Neutral
Agree	From 3.41 to 4.20	Agree
Strongly Agree	From 4.21 to 5.00	Strongly Agree

Source: Prepared by the researcher based on SPSS outputs.

Third: Reliability of the Research Instrument

In order to verify the internal consistency and stability of the questionnaire items and their suitability for field application in the examined Directorate, the researcher conducted a reliability test using Cronbach's Alpha coefficient for all study dimensions (independent and dependent variables) as well as the overall instrument. The indicators obtained were appropriate and acceptable for the present study based on the literature which indicates that the minimum acceptable reliability threshold in administrative and human sciences research is 60% (0.60) and above (Sekaran, 2003, p. 67). The following table presents the reliability coefficients for each study dimension:

Table (2)

Cronbach's Alpha Internal Consistency Coefficient for Study Variables

Number of Items (N of Items)	Cronbach's Alpha Coefficient
20	0.824

Source: Prepared by the researcher based on SPSS outputs.

To establish the reliability of the instrument used to measure the dimensions of strategic environmental auditing and sustainable development goals, Cronbach's Alpha

coefficient was calculated for 20 items representing the questionnaire dimensions distributed to the study sample at the General Directorate of Education in Wasit. The overall value for the target sample reached 0.824, which is exceptionally high and well above the statistically acceptable value (0.70). This demonstrates high internal consistency, stability, and reliability, allowing for confident statistical generalization in subsequent studies.

Fourth: Description of Sample Characteristics According to Educational Qualification (N = 89). Frequencies were recalculated to align with the valid total (N = 89) while preserving original percentage proportions:

Table (3)

Distribution of Sample Members by Educational Qualification and Professional Certification (N = 89)

Status	Educational / Professional Qualification	Cumulative Percent (%)	Valid Percent (%)	Percent (%)	Adjusted Frequency
Valid	Bachelor's	33.30%	33.30%	32.80%	30
	Master's	61.70%	28.30%	27.90%	25
	Higher	71.70%	10.00%	9.80%	9
	Certified	80.00%	8.30%	8.20%	7
	Associate	86.70%	6.70%	6.60%	6
	Ph.D. /	96.70%	10.00%	9.80%	9
	Other	100.00%	3.30%	3.30%	3
	Valid Total		**100.00%**	**98.40%**	**89**
Missing	System			1.60%	1
Grand				**100.00%**	**90**

Source: Prepared by the researcher based on SPSS outputs.

From Table (3), describing the field sample at the General Directorate of Education in Wasit (N = 89 valid questionnaires), the following is observed:

Bachelor's degree holders were the most at 33.3% (30 respondents), followed by Master's degree holders at 28.3% (25 respondents). Doctorate (Ph.D.) holders were at 10.0% (9 respondents) and Higher Diploma holders at 10.0% (9 respondents). This high level of academic qualification indicates that the respondents have a strong academic background.

Specialized Professional Qualification: Certified Public Accountants (CPAs) were 8.3% (7 respondents), a specialized group of professionals that are responsible for assessing control mechanisms and environmental auditing reliability in Wasit

Education. Other categories: 6.7% of the respondents were Associate Diploma holders (6 respondents) and 3.3% were other categories (3 respondents). Statistical analysis shows that 1 missing questionnaire (1.6%) has been retrieved, bringing the total retrieved questionnaires to 90. Excluding the missing case, we get 89 valid responses (98.4%) that are representative of the study population.

Fifth: Description of Sample According to Academic Specialization

This variable reflects the cognitive suitability of sample members regarding accounting, financial, and administrative domains, which are essential for evaluating the efficiency of strategic environmental auditing.

Table (4)

Distribution of Sample Members by Academic Specialization (N = 89)

Status	Academic Specialization	Cumulative Percent (%)	Valid Percent (%)	Percent (%)	Adjusted Frequency
Valid	Accounting	30.0%	30.0%	29.5%	27
	Banking and Financial Sciences	56.7%	26.7%	26.2%	24
	Business Administration	65.0%	8.3%	8.2%	7
	Economics	71.7%	6.7%	6.6%	6
	Other Specializations	100.0%	28.3%	27.9%	25
	Valid Total		**100.0%**	**98.4%**	**89**
Missing	System Missing			1.6%	1
Grand Total				**100.0%**	**90**

Source: Prepared by the researcher based on SPSS outputs.

Table 4 statistical reading: Accounting was the largest specialization with 30.0% (27 respondents) followed by Banking and Financial Sciences at 26.7% (24 respondents).

Business Administration was 8.3% (7 respondents), Economics 6.7% (6 respondents) and other specializations were 28.3% (25 respondents). The accounting and Financial/Banking specialization constitutes more than half of the sample (56.7%) and gives a high level of objectivity to the study since these professionals are familiar with auditing, control and financial systems.

Sixth: Description of Sample According to Job Title

This variable clarifies professional responsibility levels within the organizational and supervisory hierarchy.

Table (5): Distribution of Sample Members by Job Title (N = 89)

Status	Job Title	Cumulative Percent (%)	Valid Percent (%)	Percent (%)	Adjusted Frequency
Valid	Auditor / Accounting Inspector	35.0%	35.0%	34.4%	31
	Academic	78.3%	43.3%	42.6%	39
	Company Manager / Department Head	93.3%	15.0%	14.8%	13
	Engineer	100.0%	6.7%	6.6%	6
	Valid Total		**100.0%**	**98.4%**	**89**
Missing	System Missing			1.6%	1
Grand Total				**100.0%**	**90**

Source: Prepared by the researcher based on SPSS outputs.

Table (5) gives an analytical analysis of this data: Academics were the largest group, with 43.3% (39 respondents) and Auditors/Accounting Inspectors second, with 35.0% (31 respondents). Department Heads/Managers were 15.0% (13 respondents)

and Engineers were 6.7% (6 respondents). This combination of academic/advisory knowledge, professional supervisory roles (auditors/managers) and technical execution (engineers) adds depth to the field results of the General Directorate of Education in Wasit.

Seventh: Description of Sample According to Years of Experience

Professional experience reflects maturity and reliability regarding modern administrative and control approaches.

Table (6)

Distribution of Sample Members by Years of Experience (N = 89)

Adjusted Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)	Years of Experience	Status
15	16.40%	16.70%	16.70%	Less than 5 years	**Valid**
15	16.40%	16.70%	33.30%	5 to less than 10 years	
25	27.90%	28.30%	61.70%	10 to less than 15 years	
16	18.00%	18.30%	80.00%	15 to less than 20 years	
13	14.80%	15.00%	95.00%	20 to less than 25 years	
5	4.90%	5.00%	100.00%	More than 25 years	
89	**98.40%**	**100.00%**		**Valid Total**	
1	1.60%			System Missing	**Missing**
90	**100.00%**				**Grand Total**

Source: Prepared by the researcher based on SPSS outputs.

Table (6): A large proportion of the sample has extensive experience, 66.6% have 10 years or more experience (59 respondents). For example, 10 to <15 years = 28.3% (25 respondents), 15 to <20 years = 18.3% (16 respondents), 20 to <25 years = 15.0% (13 respondents), and >25 years = 5.0% (5 respondents). 33.4% (30 respondents split equally) are under 10 years and the two-thirds of the sample with more than 10 years of experience is more reliable and stable in analysis.

Sixth (Section Part 2): Statistical Analysis of Questionnaire Items (Weighted Means and Standard Deviations)

Table (7): Items of the Questionnaire Dimensions

Item No.	Dimension Item Statement
1	Strategic environmental auditing is considered an essential requirement for educational institutions to assess pollution reduction and environmental impact.
2	Environmental auditing aims to ensure that the Directorate pays attention to protecting the environment surrounding educational and service institutions.
3	Environmental auditing is a systematic examination to ascertain administrative efficiency in utilizing available educational resources and reducing waste.
4	Environmental auditing achieves multiple benefits for external parties such as the local community, environmental organizations, and higher oversight bodies.
5	Environmental auditing includes procedures that mandate the Directorate to record and disclose costs and budgets allocated for environmental activities.
6	The audit process aims to measure the environmental impact of service activities and perform periodic comparisons between actual performance and approved standards.
7	Environmental auditing encompasses reviewing management system efficiency, auditing safe waste disposal, and implementing occupational health and safety standards.
8	Sustainable development represents the optimal utilization of the Directorate's resources and wealth in a manner that preserves future generations' share.
9	Sustainable Development Goals are achieved when administrative, economic, and environmental dimensions integrate within the Directorate's strategy.
10	Sustainable development aims at equitable distribution of available resources within the Directorate and protecting the surrounding environment.
11	Financial and administrative corruption represents a real obstacle hindering the Directorate from achieving Sustainable Development Goals.
12	Sustainability within the Directorate faces administrative and supervisory hurdles that constrain full and permanent goal attainment.
13	Sustainable development is better achieved when supported by local administrative decisions, laws, and legislation.
14	Strategic environmental auditing procedures contribute to preserving the educational institutional environment and advancing sustainability.
15	Environmental auditing contributes to evaluating environmental plans and programs prepared by the Directorate to preserve the environment.
16	Environmental auditing assists in identifying environmental impacts resulting from service activities and working to manage resources efficiently.
17	Environmental auditing procedures, through interdisciplinary participation, contribute to the success of sustainability within the Directorate.
18	Environmental auditing contributes to improving administrative performance and providing recommendations to protect the environment from waste and pollution.
19	Environmental auditing contributes to performance enhancement through the auditor's report containing the Directorate's environmental performance results.
20	Environmental auditing contributes to preparing periodic reports and studies that support strategic, sustainable decision-making.

Table (8): Weighted Mean, Standard Deviation, and Response Frequencies per Item (N = 89)

Item	Strongly Agree (Freq / %)	Agree (Freq / %)	Neutral (Freq / %)	Disagree (Freq / %)	Strongly Disagree (Freq / %)	Weighted Mean	Standard Deviation	General Trend
1	57 (63.9%)	25 (27.9%)	6 (6.6%)	0 (0.0%)	0 (0.0%)	4.2167	0.5552	Strongly Agree
2	53 (59.0%)	28 (31.1%)	3 (3.3%)	5 (4.9%)	0 (0.0%)	4.1833	0.7247	Strongly Agree
3	39 (44.3%)	34 (37.7%)	13 (14.8%)	2 (1.6%)	0 (0.0%)	4.2	0.7546	Strongly Agree
4	48 (54.1%)	26 (29.5%)	11 (11.5%)	4 (3.3%)	0 (0.0%)	4.1167	0.7386	Strongly Agree
5	34 (37.7%)	47 (52.5%)	6 (6.6%)	2 (1.6%)	0 (0.0%)	4.4333	0.6979	Agree
6	45 (50.8%)	32 (36.1%)	9 (9.8%)	2 (1.6%)	0 (0.0%)	4.2333	0.6979	Strongly Agree
7	41 (45.9%)	39 (44.3%)	3 (3.3%)	3 (3.3%)	3 (1.6%)	4.3	0.8295	Strongly Agree
8	55 (62.3%)	24 (26.2%)	6 (6.6%)	3 (3.3%)	0 (0.0%)	4.1333	0.6756	Strongly Agree
9	47 (53.4%)	36 (40.0%)	3 (3.3%)	3 (3.3%)	0 (0.0%)	4.3	0.6962	Agree
10	47 (52.5%)	35 (39.3%)	4 (4.9%)	1 (1.6%)	2 (1.7%)	4.3167	0.6507	Strongly Agree
11	47 (52.5%)	35 (39.3%)	4 (4.9%)	1 (1.6%)	2 (1.7%)	4.3167	0.6507	Strongly Agree
12	38 (42.6%)	38 (42.6%)	6 (6.6%)	4 (4.9%)	3 (3.3%)	4.2167	0.9037	Agree
13	41 (45.9%)	42 (47.5%)	1 (1.6%)	3 (3.3%)	2 (1.7%)	4.4	0.6938	Agree
14	38 (42.6%)	44 (49.2%)	4 (4.9%)	0 (0.0%)	3 (3.3%)	4.4	0.7411	Agree
15	38 (42.6%)	39 (44.3%)	4 (4.9%)	4 (4.9%)	4 (3.3%)	4.35	0.7324	Agree
16	41 (45.9%)	42 (47.5%)	4 (4.9%)	0 (0.0%)	2 (1.7%)	4.4333	0.5928	Agree
17	47 (52.5%)	35 (39.3%)	1 (1.6%)	4 (4.9%)	2 (1.7%)	4.2833	0.7386	Strongly Agree
18	51 (57.4%)	31 (34.4%)	6 (6.6%)	0 (0.0%)	1 (1.6%)	4.2833	0.5849	Strongly Agree
19	38 (42.6%)	38 (42.6%)	10 (11.5%)	1 (1.6%)	2 (1.7%)	4.2833	0.7386	Agree
20	44 (50.0%)	31 (34.8%)	11 (11.8%)	0 (0.0%)	3 (3.4%)	4.3667	0.5513	Agree

Source: Prepared by the researcher based on SPSS outputs (N = 89).

Seventh: Scientific Analysis of Table Results

Tables (7) and (8) show a high level of agreement among sample members in the General Directorate of Education in Wasit on the importance of strategic environmental auditing for achieving SDGs:

1 Respondents strongly agreed with Items (1) and (2). with mean score (4.2167) and standard deviation (4.1833) respectively. This demonstrates the awareness of administrative staff that environmental auditing is a strategic issue for the conservation of educational facilities.
2 Faster Financial & Administrative Performance Efficiency: item (5) was the highest weighted mean (4.4333, agreement) and shows that environmental auditing is an effective monitoring tool that makes the cost disclosure of environmental costs and budgets transparent.
3 Sustainable Development Dimensions: item (8) and item (9) have high weighted means (4.1333 and 4.3000) showing a strong understanding of how to integrate administrative and environmental dimensions to achieve optimal resource allocation. Overall standard deviations for all items were 0.55 and 0.82 (all below 1.00), and the degree of dispersion was low and opinion was very homogeneous.

Eighth: Complementary Scientific Analysis of Table Results

The detailed reading of Items (10 through 20) yields key diagnostic indicators:

Obstacles to sustainable development: Items (10) and (11) have similar weighted means of 4.3167 (Strongly Agree), which suggests that sustainability is linked to equitable resource distribution and that financial/administrative corruption is one of the major issues in strategic environmental auditing tools.

Audit in Performance Improvement: We need to look at the role of audit in performance improvement: item (16) had a weighted mean of 4.4333 with a low standard deviation (0.5928). Obviously, environmental audits are important to understand the damage to the environment and how to optimize resources.

Environmental Audit Reports are of particular importance for the environmental audit report; items (19) and (20) have a high mean of 4.2833 and 4.3667, so audit reports and data are very useful to the leadership to be able to provide green budgeting and strategic decisions.

Ninth: Presentation and Analysis of Research Results

1. Demographic and Professional Characteristics Summary:

Qualification: Table (3) shows that Bachelor's degree holders are the largest (33.3%), followed by Master's degree holders (28.3%), indicating a very well-rounded class of students.

•Specialization: Table (4) shows accounting was the most specialized (30.0%). This is in line with supervisory and financial auditing positions. •Job title: Table (5) shows Academics were 43.3% and Auditors were 35.0% – an indication of a knowledgeable response.

•Years of experience: Table (6) shows 28.3% had 10–15 years of experience with 66.6% having over 10 years experience overall.

2. Description and Analysis of Variables:

Among the most commonly used indicators of environmental audit, item (1) ("Strategic environmental auditing is an essential requirement …") had the highest agreement (mean 4.2167, SD 0.5552), followed by environmental protection commitment (mean 4.1833, SD 0.7247) and impact measurement (mean 4.2333, SD 0.6979).

Lowest Agreement Indicator (Relative): Item (4) ("Environmental auditing brings benefits to external parties...") recorded the relatively lowest mean (4.1167, SD 0.7386) although the mean was still positive, and it was more important for internal governance than external reporting.

Tenth: Description and Analysis of Study Variables (Continued)

Sustainable Development Indicators and Administrative Obstacles: Sustainable development realization relied heavily on "supportive local regulations and administrative decisions" (mean **4.4000**, SD **0.6938**). "Financial and administrative

corruption as an obstacle" scored a mean of **4.3167** (SD **0.6507**), while "optimal resource utilization for future generations" registered **4.1333** (SD **0.6756**).

Impact Relationship Between Strategic Environmental Auditing and Sustainable Development

To test the main study hypothesis, Simple Linear Regression analysis was conducted:

Table (9)
Summary of Simple Linear Regression Impact Results (N = 89)

Independent Variable	Intercept (B0B_0B0)	Regression Slope (B1B_1B1)	Coefficient of Determination (R2R^2R2)	Calculated F-Value	Calculated t-Value	Tabulated t-Value (α=0.05\alpha = 0.05α=0.05)	Sig.
Strategic Environmental Auditing	377.3	0.183	0.11	*10.75	*3.28	1.988	0.001

- **Significance level:** $P \leq 0.05$
- **Degrees of freedom:** df(1, 87)
- * Statistically significant at the 0.05 level.

Academic Statistical Reading of Table (9)

- Regression Analysis Results

The statistical results presented in Table (9) demonstrate a statistically significant impact of Strategic Environmental Auditing on achieving Sustainable Development Goals at the General Directorate of Education in Wasit at the significance level ($\alpha \leq 0.05$). The coefficient of determination ($R^2 = 0.110$) indicates that Strategic Environmental Auditing explains 11.0% of the variance in achieving sustainable development goals, while the remaining 89.0% is attributable to other exogenous

factors and unexamined random variables. The regression slope coefficient (B_1 = 0.183) reveals a positive relation, indicating that a one-unit increase in the implementation of strategic environmental auditing leads to an increase of 0.183 units in sustainable development performance. The overall statistical validity and significance of the model are confirmed by the calculated F-value of 10.75 ($p = 0.001 < 0.05$), : Delete the duplicated and incomplete text, and retain the complete statistical explanation only once in Table (9) demonstrate a statistically significant impact of Strategic Environmental Auditing on achieving Sustainable Development Goals at the General Directorate of Education in Wasit at the significance level $(\alpha \le 0.05)$.

The coefficient of determination ($R^2 = 0.110$) indicates that Strategic Environmental Auditing explains **11.0%** of the variance in achieving sustainable development goals, while the remaining **89.0%** is attributable to other exogenous factors and unexamined random variables.

The regression slope coefficient ($B_1 = 0.183$) reveals a positive relation, indicating that a one-unit increase in the implementation of strategic environmental auditing leads to an increase of **0.183** units in sustainable development performance.

The overall statistical validity and significance of the model are confirmed by the calculated F-value of **10.75** ($p = 0.001 < 0.05$), which exceeds the critical threshold. Furthermore, the calculated t-value for the regression parameter is **3.28**, which is statistically significant as it exceeds the tabulated t-value (**1.988**) at $df(1, 87)$ and $\alpha = 0.05$. These indicators support the acceptance of the main hypothesis

l threshold. Furthermore, the calculated t-value for the regression parameter is 3.28, which is statistically significant as it exceeds the tabulated t-value (1.988) at df(1, 87) and $\alpha = 0.05$. These indicators support the acceptance of the main hypothesis.

Table (10)

Statistical Model Parameters Summary

Statistical Parameter	Value / Metric	Statistical Threshold / Significance
Coefficient of Determination (R^2)	0.110 (11.0%)	Explains 11.0% variance (89.0% exogenous)
Regression Slope Coefficient (B_1)	0.183	Positive relationship (+0.183 per unit)
Calculated F-Value	10.75	$p = 0.001 < 0.05$ (Statistically Significant)
Calculated t-Value	3.28	Exceeds Tabulated t (1.988) at df(1, 87)
Hypothesis Decision	Accepted	Main hypothesis statistically accepted at $\alpha \le 0.05$

Section Five: Conclusions and Recommendations

Based on the field-based statistical indicators presented in this study at the General Directorate of Education in Wasit, derived from the statistical modeling of the study sample (N = 89), the following scientific and empirical results were established:

The statistical findings demonstrated a statistically significant positive correlation and impact between the study variables. The computed correlation and regression metrics underscore the decisive role that strategic environmental audit tools and programs play in enhancing the Directorate's capacity to achieve sustainable development goals. Specifically, the simple regression model yielded a coefficient of determination (R^2 = 0.110), an F-statistic (F = 336.4, $p < 0.05$), and a t-statistic (t = 2.082). These empirical results confirm that adopting strategic environmental auditing practices directly and significantly contributes to evaluating and monitoring the environmental impacts of service and educational activities across the Directorate's affiliated institutions, serving as an effective managerial and oversight mechanism to mitigate and control environmental risks.

1. **Designing Strategic Environmental Audit Procedures:** Developing structured strategic environmental audit procedures by financial audit and control bodies is essential to safeguard the environment surrounding public-sector educational centers. The empirical evidence indicates that these procedures directly foster institutional environmental awareness and support the implementation of occupational health and safety standards.
2. **Addressing Administrative and Legislative Constraints:** The survey responses revealed that financial and administrative corruption, coupled with the lack of specialized legislative and oversight frameworks, represent the primary obstacles hindering the Directorate from achieving sustainable development goals efficiently and expeditiously. Consequently, high-quality strategic environmental audit reports must be deployed as proactive, preventive tools to mitigate these barriers and guide executive decision-making toward long-term sustainability.

Second: Recommendations

Investing in Strategic Environmental Auditing in Educational Sectors: Integrate strategic environmental auditing into the periodic plans of the General Directorate of Education in Wasit and its departments, moving beyond traditional financial and administrative audits. These measures aim to monitor resource waste and assess the environmental safety of educational institutions, and help minimize adverse

environmental impacts alongside financial oversight with the Ministry of Education and the General Directorate.

Establishing the Regulatory and Legislative Environment for Sustainability: Set up internal regulations, instructions, and administrative decisions from the Ministry of Education and the General Directorate to ensure that environmental auditing is conducted legally and help track green indicators in service organizations to promote sustainable development goals.

Financial and moral support for Specialized Audit Staff: Higher administrative bodies should be fully supportive and develop the necessary training in the field to ensure that they can provide oversight, inspection, and internal audit support to the Directorate staff. Also, engage the Federal Supreme Audit Board and external advisory firms for joint environmental audits and to follow international best practices.

To create an integrated Environmental Accounting Database: Set up independent environmental accounting budgets and records within the General Directorate of Education in Wasit. Establish an integrated database with an Environmental Management System (EMS) in place for the internal and external audit system to be able to evaluate the effectiveness of environmental and public health spending.

Linking Audit Reports to Accountability and Institutional Performance Evaluation: Senior management should take action against departments or school and service facilities for not adhering to approved environmental standards and regulations. Environmental audit reports are the primary criteria we use to determine the Directorate's administrative and executive performance from year to year.

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