

Enhancing sustainable progress: an analysis of supreme audit institutions' performance audits and information disclosure practices

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Journal of Public
Budgeting,
Accounting &
Financial
Management

Received 20 June 2023
Revised 3 November 2023
14 March 2024
22 May 2024
29 May 2024
Accepted 31 May 2024

Abstract

Purpose – This technical paper has two purposes. It firstly aims to explore Supreme Audit Institutions' information disclosure of Sustainable Development Goals' related performance auditing practices by focusing on four Balkan countries: Croatia, Montenegro, North Macedonia, and Slovenia. Secondly, it aims to investigate whether membership in the European Union, in conjunction with the adoption of unified EU legislation and best practices in socio-economic and political spheres, influences the level of disclosure practices in SDGs' auditing and the national approaches to auditing SDG-related topics.

Design/methodology/approach – The study employs a content analysis approach to examine the annual reports of SAIs as government audit bodies in the aforementioned countries. The analysis focuses on the disclosure of SDGs' information and the level of performance auditing conducted concerning the SDGs. Furthermore, the study utilizes the Spearman rank-order correlation test to explore whether membership in the European Union influences the frequency of SDG-related audits and the amount of information disclosed.

Findings – The findings highlight that the Slovenian SAI stands out for its comprehensive information disclosure in annual reports related to SDGs or sustainability reporting. It also demonstrates a high level of performance auditing on SDG topics. Following closely are the Macedonian and Croatian SAIs, which also exhibit noteworthy performance in these areas. In contrast, the Montenegrin SAI displays the lowest level of information disclosure and has conducted fewer performance audits related to SDGs. Furthermore, the study reveals that there is no significant correlation between EU membership and the extent of SDG disclosure in the SAIs' annual reports and the level of performance auditing.

Research limitations/implications – It is important to acknowledge that this study is limited in scope, focusing solely on the annual reports of SAIs in four countries. Additionally, the research does not explore the fundamental factors that contribute to the variations in SDG auditing levels among SAIs.

Originality/value – This paper contributes to the expanding literature on the implementation and monitoring of the SDGs by providing valuable insights into the extent of SDG-related performance auditing conducted by SAIs and the level of information disclosure within their annual reports. The findings have implications for policymakers, auditors, and other stakeholders involved in fostering sustainable development practices and accountability mechanisms.

Keywords Sustainable development goals, Supreme audit institutions, Performance auditing, Balkan countries

Paper type Technical paper

Introduction

All member states of the United Nations (UN) have jointly committed to the Sustainable Development Goals (SDGs) since September 2015. The UN member states, in their declaration titled "Transforming our world: The 2030 Agenda for Sustainable Development" emphasize that it is the primary responsibility of each government to monitor and assess the progress made in achieving the goals over the next fifteen years at the national, regional, and global levels (United Nations and INTOSAI, 2019). The SDGs are pertinent to all nations and



Journal of Public Budgeting,
Accounting & Financial
Management
© Emerald Publishing Limited
1096-3367
DOI 10.1108/JPBAFM-06-2023-0092

societies worldwide, as no government can guarantee the absence of inequality, poverty, or environmental issues such as pollution and climate change. Moreover, no country can assert its immunity against the global forces that impact its progress. The current challenges faced by all countries concerning sustainable development and human advancement transcend national boundaries (Guterres, 2020).

To clarify the role of Supreme Audit Institutions (SAIs) as government audit bodies in contributing to the achievement of the SDGs, the International Organization of Supreme Audit Institutions (INTOSAI) has established a framework (Rajaguguk *et al.*, 2017). This framework empowers SAIs by fostering knowledge development and exchange, elevating global standards of public sector auditing, and strengthening the professional capabilities, standing, and impact of member SAIs within their respective nations. INTOSAI has responded to the global commitment to the SDGs by incorporating them into its key focus areas and aligning its objectives accordingly.

The crucial question lies in how SAIs can actively participate in the realization of the SDGs. Addressing this concern, the UN and INTOSAI (2019) have provided guidance for SAIs, specifically emphasizing the preparation of audits related to the implementation of the SDGs by public sector organizations and governmental bodies. This guidance highlights that the results of SAI audits, which include performance, compliance, and financial audits, play a significant role in enhancing the value and benefits of the SDGs.

An additional crucial principle of the SDGs is their integration and balance of the three dimensions: economic, social, and environmental. This means that any assessment of the implementation of a single goal or multiple SDGs must also consider their interrelationships with other goals.

Moreover, the information obtained from performance audits holds significant importance for the implementation of the 2030 Agenda. This includes establishing a system of performance indicators, collecting data on these indicators, and reporting on the collected data. SAIs, when reviewing the implementation of the SDGs, should thoroughly examine performance information and develop the capacity and approaches necessary to audit performance information and performance measurement systems.

This paper focuses on exploring the link between the SDGs, the function of SAIs, and the specific context of selected Balkan countries: Slovenia, Croatia, North Macedonia, and Montenegro. This study needs to investigate the contributions of SAIs in these Balkan countries, which shared a common national identity more than three decades ago and now operate as independent, sovereign states. Among these, Slovenia and Croatia have joined the EU, while North Macedonia and Montenegro have not yet. This research aims to understand does EU membership, alongside the adoption of unified EU legislation and EU best practices in socio-economic and political spheres, influences national practices for auditing SDG-related topics by the SAIs.

Specifically, the study explores the extent to which SAIs in these Balkan countries conduct performance audits related to SDGs. Besides that, an important aspect of this research is to uncover any disclosure practices related to SDGs in the SAIs' annual reports. These reports are crucial as they are the sole official source for this research, given the legal mandate for all SAIs to publicly report their audit findings and performance results on their respective websites. Therefore, this investigation includes a content analysis of the SAIs' annual reports from 2015 to 2022, examining how each SAI addresses and reports on their efforts towards achieving the SDGs and the number of performance audits conducted annually focused on specific goals. Finally, the analysis aims to understand the degree of performance audits carried out and the information revealed in the SAIs' annual reports concerning the SDGs.

The literature review, in the beginning, underscores the relevance and growing significance of the SDGs in contemporary society. It also emphasizes the crucial role of auditing in ensuring SDG achievement. Subsequently, the methodology employed in the study is presented, detailing how we analyzed the annual reports of the four audit

institutions. Following the methodology section, the paper reports the results of the qualitative analysis, covering several key aspects of SDGs auditing. We believe that this study contributes to the growing body of literature on the implementation and monitoring of the SDGs, particularly focusing on the role of SAIs in ensuring accountability and transparency in the utilization of public funds toward the achievement of the SDGs. The findings of this research are expected to provide valuable insights into the current state of SDGs auditing and information disclosure practices among SAIs in a less researched region – the Balkans. These insights can inform future efforts to enhance the effectiveness of SDGs implementation and auditing processes.

Public sector auditing and Supreme Audit Institutions: significance and role

Several scholars have underscored the potential for valuable and publishable research in the field of public sector auditing, with an emphasis on contributing to practical improvements. [Hay and Cordery \(2021\)](#) aptly highlight the prospect of such contributions. A few years prior, [Hay and Cordery \(2018\)](#) conducted a comprehensive review of the literature, emphasizing the diverse ways in which public sector auditing holds value and, notably, leaves room for further research.

The historical and structural evolution of public sector auditing and SAIs has been a subject of substantial inquiry within the academic community ([Grossi et al., 2023](#); [Hancu-Budui and Zorio-Grima, 2021](#); [Mattei et al., 2021](#); [Hay and Cordery, 2018](#); [Hay and Cordery, 2021](#); [Dionisijev et al., 2023](#)). It is a recognized fact that SAIs, established in various forms across Europe for centuries, have undergone significant transformations in their structure, remit, and powers. The UK National Audit Office ([National Audit Office, 2005](#)) acknowledges this evolution as an inherent aspect of SAIs' histories. [Bonollo \(2019\)](#), in her work, scrutinized existing literature concerning the outcomes of SAIs' audit activities. Her examination covered measures recommended by researchers in their theoretical or empirical studies, with a predominant focus on performance audits.

The integral role of public sector auditing in ensuring the efficacy of budget policies has been the subject of considerable analysis. It is widely acknowledged that public sector auditing is essential for shaping and endorsing effective budget policies by fostering control over the developers of these policies. This alignment with the concept of high policy effectiveness is underscored by [Bogoviz et al. \(2018\)](#), who argue for the necessity of introducing public sector auditing as a pivotal measure for enhancing policy effectiveness.

Performance auditing is a central theme in the literature on public sector auditing, with a particular focus on its significance. [Johnsen et al. \(2019\)](#), in their comparative analysis across four Nordic countries, investigate the factors influencing the conduct of performance audits. They highlight the positive impacts of such audits, emphasizing legitimacy, high-quality audit reports, adaptability, and effective communication through media attention. In the study conducted by [Grossi et al. \(2023\)](#), the research is notably centered on investigating the opportunities and challenges within the domains of performance auditing, sustainable development auditing, and the digitalized facets of public sector auditing. The study's findings reveal the dynamic evolution of public sector auditing and its potential implications for the management of uncertainties and risks. This extends to issues related not only to corruption but also to the broader scope of public governance development, including collaborative, digital, and emergency governance. The authors offer insightful speculation regarding the potential role that these evolving boundaries of public sector auditing may assume in this context.

Regarding public sector auditing, SAIs are pivotal players, as independent bodies that are entrusted with the responsibility of ensuring the efficient and effective utilization of public funds by governments ([van Winden, 2017](#); [Nagy et al., 2012](#); [OECD, 2016](#)). SAIs are mandated

to perform audits that evaluate the management of public funds, the accuracy and dependability of financial information, and the adherence to policies and regulations. These audits primarily aim to foster transparency and accountability in public expenditure while also identifying and preventing instances of waste, fraud, and corruption (Nguyen, 2012). The importance of SAIs arises from the inherent agency problems in principal-agent relationships within a state's legal-political system. SAIs play a critical role in mitigating these agency problems and ensuring that public funds are utilized optimally, thereby promoting good governance and accountability in the public sector (Streim, 1994). The principal and agent may have differing preferences, and rational agents often seek to maximize their utility rather than that of their principals, leading to conflicts of interest. Furthermore, an information asymmetry exists between the two parties, whereby agents have access to information that is not observed by principals. This can lead to moral hazard problems, where agents use their informational advantage to engage in actions that are not in the best interests of their principals (Streim, 1994; Gailmard, 2014).

SAIs have transformed over the years, from primarily performing financial audits to adopting a more holistic approach, examining the dependability, efficiency, effectiveness, and economy of policies and programs (UNHR and CESR, 2013; van Winden, 2017). Consequently, it has been argued that SAIs are well-suited to audit their respective governments' compliance with international commitments and obligations if given the appropriate mandate (Karlsson-Vinkhuyzen *et al.*, 2018; van Leeuwen, 2004; INTOSAI, 2010; Lafortune and Schmidt-Traub, 2019).

Sustainable Development Goals and the role of SAIs in auditing for global sustainability

The implementation of the 17 SDGs, comprising 169 sub-targets and 232 distinct indicators, poses a complex and multifaceted challenge. As expressed by Le Blanc (2015), the SDGs have the overarching objective of addressing a comprehensive range of issues related to sustainable development, covering all dimensions of human activity on our planet.

In the domain of assessing progress towards the SDGs, the responsibility for monitoring implementation and ensuring compliance does not lie with a singular entity. National approaches to SDG implementation exhibit diverse characteristics, with some countries integrating the SDGs into pre-existing Sustainable Development Strategies, while others have formulated dedicated national strategies or "roadmaps" to guide their efforts in implementing the SDGs. However, it is important to note that these strategies generally lack a robust legal status and primarily serve as non-binding declarations of intent, influencing governmental actions over multiple legislative periods. Consequently, the absence of judicial oversight or legal recourse hampers the capacity to hold governments accountable for potential non-compliance with their SDG commitments (Breuer and Leininger, 2021).

Recognizing these challenges, recent research and policy literature has begun to explore questions related to how SDG accountability can be ensured at the national level, what standards should be used to assess SDG action, and how governments can be held accountable for their SDG-related commitments (Karlsson-Vinkhuyzen *et al.*, 2018). This emerging literature highlights the importance of parliaments and independent oversight agencies, such as SAIs and National Human Rights Institutions, as key components of effective national SDG accountability regimes.

The Transparency, Accountability and Participation Network (2022) highlights the significant role of SAIs in ensuring transparency and accountability in government budgets and programs. According to their published SDG Accountability Handbook, SAIs can make valuable contributions to assessing progress in the implementation of the SDGs and the 2030 Agenda. SAIs can fulfill this role through various means, including conducting independent

performance audits of the government's SDG implementation efforts, overseeing government budget allocations and expenditures, ensuring compliance of government programs with existing laws and regulations, and assessing the readiness of national governments to implement the SDGs and report on their progress. Moreover, SAIs are also responsible for evaluating the reliability of data generated by governments to support their reporting on the SDGs ([Transparency, Accountability and Participation Network, 2022](#)).

Recognizing the constructive role of SAIs in the accomplishment of internationally agreed-upon development goals, the UN General Assembly has encouraged its member states to consider the potential of SAIs in enhancing public accounting systems in the context of the 2030 Agenda ([United Nations, 2011](#)). Moreover, the INTOSAI has emphasized the "natural mandate and prominent role" of its member organizations in the follow-up and review of SDGs implementation ([INTOSAI, 2010](#)) and has launched a variety of initiatives to assist them in contributing to the success of the 2030 Agenda.

The existence and effectiveness of the SAI can also directly contribute to the implementation of all 17 SDGs by a given country, especially to the goals of fostering transparent, effective, inclusive, and accountable government institutions ([The Transparency, Accountability and Participation Network, 2022](#)).

As SAIs have developed, audits have become increasingly relevant and can be classified as retrospective or prospective. In terms of retrospective oversight, SAIs play a critical role in verifying that national budgets adequately reflect the SDGs, and in performing performance audits to evaluate the implementation efforts of governments concerning the SDGs ([Cardinal *et al.*, 2020](#)).

Although not previously connected to the SDGs, SAIs have audited national environmental performance in the past ([de Vries, 2016](#)). Environmental audits have been the subject of research on many occasions, given their increasing importance in recent decades ([Maltby, 1995](#); [Rika, 2009](#); [Ljubisavljević *et al.*, 2017](#); [Sułkowski and Dobrowolski, 2021](#)).

[Hancu-Budui and Zorio-Grima \(2021\)](#) conclude that the publication of environmental audit reports is influenced by SAI transparency; therefore, the more transparent an SAI is, the more likely it is to publish environmental audit reports. This finding is consistent with previous research on good environmental governance and institutional transparency ([Mason and Gupta, 2014](#)). Their findings also show that more transparent SAIs cover more SDG implementation during audits. Employee age, gender composition/equality, or audit tradition do not influence SAI reporting of environmental audits or SDG coverage ([Hancu-Budui and Zorio-Grima, 2021](#)).

Regarding the SDGs, as a new area of engagement for SAIs, audits can have a major impact in helping governments improve SDG implementation ([Pradhan *et al.*, 2017](#); [Guillán Montero and Le Blanc, 2019](#); [Bryan, 2022](#)). Audits are now being coordinated across borders, as seen in the INTOSAI Development Initiative (IDI) and the Latin American and Caribbean Organization of Supreme Audit Institutions (OLACEFS) parallel audit of SDGs 1, 2, and 5 in ten Latin-American countries.

SAIs can also contribute proactively to the implementation process, such as conducting audits of government preparedness for SDG implementation in the early phase, which has already occurred in 45 countries. These audits urge national governments into action, if needed, and provide constructive recommendations at an early stage ([INTOSAI, 2019](#)). Such audits can result in reputational gain or loss for SAIs, depending on the report's assessment and availability to the public, and thus represent a form of soft sanctioning.

It is evident that the closer SAIs cooperate with the government in the SDG implementation process, the better they can fulfill their proactive role of providing constructive criticism. It therefore seems advisable that SAIs should be represented in the national SDG coordination body or at least in one of the working groups or technical

committees supporting this body. Furthermore, they are particularly qualified to contribute to the localization of the 2030 Agenda by participating in the development of national indicator frameworks and should be allowed to feed their expertise in the development of national SDG implementation plans or processes of aligning national development plans to the 2030 Agenda (Breuer and Leininger, 2021).

SAIs have gained experience in evaluating the effectiveness of national development policies and programs, with examples from various countries such as Brazil, China, Colombia, Hungary, Indonesia, Jamaica, and Norway (Colombia SAI, 2015; OECD, 2017; State Audit Office of Hungary, 2012). This experience has increased their capability to assess development policies and programs, creating opportunities for SAIs to play a role in the SDGs. Furthermore, INTOSAI's active engagement in intergovernmental processes and its collaboration with the UN have been critical factors in enabling SAIs to become involved in auditing the SDGs. With the help of INTOSAI's strategy to promote itself on the international sustainable development agenda, SAIs are now able to contribute to the follow-up and review process of the SDGs by conducting audits that assess the implementation of the SDGs at the national level (IDI, 2016).

INTOSAI has pushed for recognition of the important role that both INTOSAI and national SAIs play in promoting sustainable development, as outlined in UN Resolutions A/66/209 and A/69/228, which focus on the role of SAIs in promoting efficient and accountable public administration (United Nations, 2015). INTOSAI's strategic plan for 2017–2022 recognizes the support that SAIs can provide in the follow-up and review of the SDGs, with a particular focus on four approaches: assessing national readiness for implementing the SDGs and reporting progress, conducting performance audits of programs that contribute to the SDGs, supporting the implementation of SDG 16, and modeling transparency and accountability in their operations (INTOSAI, 2016). In its new strategic plan for 2023–2028, INTOSAI (2022) commits to actively contribute to the realization of the 2030 Agenda. It aims to do so by leveraging its working bodies and Regional Organizations, assisting its member SAIs in their pivotal role of conducting high-quality audits of national initiatives that align with the 2030 Agenda.

Furthermore, the efforts of SAIs to audit the SDGs have been driven by several initiatives, including the INTOSAI Development Initiative (IDI) programme on Auditing SDGs launched in 2016 (IDI, 2016). This programme aims to assist SAIs in conducting high-quality performance audits of SDGs and ensures that the audits are performed following applicable performance audit standards (ISSAIs). Apart from this programme, many SAIs have taken individual and collaborative initiatives to audit SDGs (Austria, Canada, the Netherlands, coordinated audits of 11 Latin American SAIs, and six Arabic SAIs with support from the Netherlands) (IDI, 2019).

Initially, SAIs focused on auditing government preparedness for SDG implementation. However, they have now started to shift their focus towards auditing SDG implementation and assessing the performance of programs aimed at advancing specific SDG areas (Costa Rica SAI, 2018). For instance, Costa Rica conducted an audit on poverty reduction (SDG 1) and is currently conducting six audits on different SDG sectors, including health, transportation, agriculture, water and sanitation, and judicial institutions (Costa Rica SAI, 2018). Similarly, Brazil's SAI is coordinating an audit on the implementation of selected targets of SDG 14 and 15, which includes subnational audit institutions in Brazil, as well as Latin American and African SAIs (TCU, 2016).

KPMG (2022) in its Survey of Sustainability Reporting has outlined that, in a general sense, the SDGs that are the most popular include SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Meanwhile, a relatively smaller number of entities prioritize the three SDGs associated with SDG 2 (Zero Hunger), SDG 14 (Life below Water), and SDG 15 (Life on Land).

According to the results of [Hancu-Budui and Zorio-Grima \(2021\)](#) in terms of transparency, environmental engagement, and SDG coverage, the average age of SAI employees affects the transparency of institutions, which means that SAIs with younger staff are more transparent, which can be understood according to the actor-network theory ([Lounsbury, 2008](#)) and from the perspective of institutional logic ([Battilana, 2006](#)), because the practices and habits of actors tend to drive changes in the organizations where they work. Their results that SAI transparency affects environmental audit reporting as well as SDG coverage in audits is consistent with legitimacy theory ([Suchman, 1995](#)), providing evidence that institutions often act to promote social welfare -in this case, with a detailed examination and evaluation of socially important and urgent topics such as these. It also confirms previous research that found that, although not legally binding, incorporating social responsibility actions into organizational activity brings a strong motivation to align with public interests ([Patten, 2019](#)).

Finally, the SDGs are a global call to action to end poverty, protect the environment and climate, and ensure that all people enjoy peace and prosperity, and these are goals that the UN is also working on in Slovenia, Croatia, Montenegro, and North Macedonia.

Research methodology

We used content analysis as a methodological approach to examine textual data, with a specific focus on annual reports issued by four SAIs, namely Slovenia and Croatia as EU members, and North Macedonia and Montenegro as non-EU member states. These annual reports serve as the primary means through which SAIs communicate and summarize their work and audit outcomes. Each of the four SAIs adopts a distinct approach to reporting and disclosing information within their annual reports, according to domestic laws.

In the context of this research, data extraction from the annual reports centered on identifying the presence of information related to the SDGs. The process involved determining whether the reports: (1) contained relevant SDG information, (2) included a separate section on SDGs or sustainable development, or (3) mentioned any specific performance audit concerning SDGs implementation.

Furthermore, the analysis extended to the reporting section of the SAIs concerning their work and the performance audits conducted between the years 2015 and 2022. This timeframe is significant as it aligns with the implementation period of the SDGs. The data collected were organized for each SAI individually, aiming to identify:

- (1) The annual number of conducted performance audits,
- (2) The topics these audit engagements covered, and
- (3) The linkage of each performance audit to a specific SDG.

To address the limitation of relying solely on descriptive data, an objective approach is employed, involving the formulation of a SDGs Auditing Index (SDGAI) that utilizes simple binary coding. This approach assigns a value of 1 if any information exists for SDGs or sustainable development (or if an SDG-related performance audit is conducted) and 0 if there is no information (or no SDG-related performance audit is conducted). The index is calculated based on the aggregate result of all selected information ([Ehsan *et al.*, 2018](#)). As previously stated, the SDGs consist of 17 broad goals, each containing a total of 169 sub-targets and 232 distinct indicators. Considering this, we have developed the SDGAI, comprising 20 general indicators that serve to evaluate the level of SDGs-related performance auditing conducted by SAIs and the level of SDGs' information disclosed in their respective annual reports. These indicators are comprised of:

- (1) 3 indicators that focus on the type of information disclosed in the annual reports concerning the SDGs (including any information, a specific section of the report, or an audit dedicated to the SDGs).
- (2) 17 indicators for performance audits that align with the SDGs.

Table 1 refers to the 20 general indicators and binary scoring used in this study. The development of the SDGAI involved a two-step methodology:

- (1) The first three indicators were evaluated, and a binary score of 0 or 1 was assigned based on the presence or absence of corresponding information within the analyzed data.
- (2) For indicators 4–20, a score of 1 was allocated if at least one performance audit addressed a specific SDG. For example, in 2021, Macedonian SAI conducted a performance audit on the topic “*Actions and Strategies Implemented by North Macedonia/Competent Authorities to Alleviate Climate Change*” and with that audit, SDG13 – Climate Action is covered. Slovenia SAI the same year has done a performance audit on the topic of *Effectiveness in reducing poverty*, which covers SDG1 – No Poverty. In this way, all conducted performance audits whose topic is mainly related to a specific SDG were allocated. If a certain topic is linked to more than one SDG, then the point is assigned to the SDG that, with its sub-targets and indicators, best corresponds to the topic of the performance audit. For instance, the Montenegrin SAI in 2021 has undertaken a performance audit focusing on the “*Efficiency of the mechanism of regulation, monitoring, and reporting on air quality in Montenegro.*” This audit broadly falls within the scope of two SDGs: SDG 3 (Good Health and Well-

Indicator no.	Indicator description	Binary scoring methodology	
		Yes	No
Indicator 1	any disclosed information concerning the SDGs	1	0
Indicator 2	separate section of the annual report that refers to the SDGs	1	0
Indicator 3	specific performance audit concerning SDGs implementation	1	0
<i>Performance audits related to</i>			
Indicator 4	SDG 1 No Poverty	1	0
Indicator 5	SDG 2 Zero Hunger	1	0
Indicator 6	SDG 3 Good Health and Well-being	1	0
Indicator 7	SDG 4 Quality Education	1	0
Indicator 8	SDG 5 Gender Equality	1	0
Indicator 9	SDG 6 Clean Water and Sanitation	1	0
Indicator 10	SDG 7 Affordable and Clean Energy	1	0
Indicator 11	SDG 8 Decent Work and Economic Growth	1	0
Indicator 12	SDG 9 Industry, Innovation, and Infrastructure	1	0
Indicator 13	SDG 10 Reduced Inequality	1	0
Indicator 14	SDG 11 Sustainable Cities and Communities	1	0
Indicator 15	SDG 12 Responsible Consumption and Production	1	0
Indicator 16	SDG 13 Climate Action	1	0
Indicator 17	SDG 14 Life Below Water	1	0
Indicator 18	SDG 15 Life on Land	1	0
Indicator 19	SDG 16 Peace and Justice Strong Institutions	1	0
Indicator 20	SDG 17 Partnerships to Achieve the Goal	1	0
<i>Total max. points</i>		<i>20</i>	<i>0</i>

Table 1.
List of indicators and
binary scoring
methodology

being) and SDG 11 (Sustainable Cities and Communities). However, upon a detailed examination of SDG sub-targets and indicators in our research, it becomes apparent that this topic is specifically connected to SDG 11, target 11.6.2. This target aims to mitigate the environmental impact of cities by enhancing air quality.

It is crucial to underscore that no weighting was applied to the indicators, as they were presumed to possess equal significance within the assessment framework. To facilitate a standardized evaluation of each SAI performance, a weighted sum formula was applied to calculate the SDGAI score for each SAI in each year. This approach, aligned with the equal weighting principle, facilitates consistent comparison of audit performances across SAIs, offering insights into the extent of SDG incorporation in their auditing practices over time. When employing a binary scale for assessing the availability of information, the resulting index will always fall within the range of 0–1, including both endpoints.

$$\text{Formula : SDGAI} = (1/20) \times (i1 + i2 + \dots + i20)$$

Where:

- (1) SDGAI: the final index value
- (2) $i1, i2, \dots, i20$: the values obtained from your content analysis for each indicator (values: 0 or 1)

This study represents a pioneering effort in the assessment of information availability, transparency, and the score of performance auditing related to SDGs. To assess the accessibility of information and the score, we have developed a ranking system inspired by well-established scales commonly employed by leading companies in the field of Environmental, Social, and Governance (ESG) evaluations. Notable among these scales are those implemented by [LSEG Data and Analytics \(2023\)](#), [Institutional Shareholder Services \(2023\)](#), and [Sustainalytics \(2023\)](#), which are acknowledged benchmarks for assessing transparency and disclosure in the context of ESG-related information. While the focus of this research differs from the disclosure of ESG factors by companies in the private sector, the lack of a dedicated data evaluation scale used by SAIs involved in performance audits for SDGs requires the adaptation of an assessment framework.

The scale presented below has been derived from existing scales employed in practice for evaluating the extent of information disclosure:

- (1) 0 to 0.25 (0%–25%): Within this range, there is minimal information available, indicating a significant lack of disclosure regarding SDGs or sustainability development and there is a low level of performance auditing covering SDGs.
- (2) 0.25 to 0.50 (25%–50%): In this category, some information has been shared, but it is inadequate to offer a comprehensive understanding of SDGs auditing. The extent of performance audits addressing the SDGs is insufficient. Additional disclosure is necessary to enhance transparency and facilitate a more thorough evaluation of sustainability development practices.
- (3) 0.50 to 0.75 (50%–75%): Falling within this range suggests a substantial amount of information has been shared for SDGs or sustainability development and provides readers with a solid understanding of SDGs performance auditing practices. Despite this, there remains room for improvement in delivering a more comprehensive overview of sustainability development and performance auditing.
- (4) 0.75 to 1.0 (75%–100%): This range indicates that a significant amount of information has been shared for SDGs or sustainability development, allowing readers to gain a

thorough and complete understanding. The level of performance auditing processes related to SDGs is comprehensive.

By utilizing this scale, we can assess how much information regarding the SDGs is disclosed to the first three indicators, and the coverage of specific SDGs through the performance audits conducted by all four SAIs. This method provides an evaluation of the transparency and accountability in SDGs implementation and auditing practices, offering valuable insights for continuous improvement.

Finally, research on non-financial or sustainability reporting in the private sector has demonstrated that EU membership significantly influences the extent of reporting and information disclosure in company reports (Atanasovski *et al.*, 2022). This finding is logical, given the regulatory framework established at the EU level through non-financial reporting directives. Despite the absence of specific directives regarding the auditing of SDGs by SAIs and minimum requirements for reporting on their SDG-related work, we contend that this could serve as a valuable foundation. This foundation can be used to assess whether EU membership, through its unified legislation and best practices in socio-economic and political spheres, influences national practices for reporting on SDGs in annual reports and the level of performance audits conducted for specific SDGs. In alignment with this insight, we use the Spearman rank-order correlation coefficient to determine if there is a correlation between EU membership and the value of the resulting index. In the statistical analysis, SAIs from EU member states, namely Slovenia and Croatia, are assigned a code of 1, while SAIs from non-EU member states, including Montenegro and North Macedonia, are assigned a code of 0. The use of Spearman's rank-order coefficient allows for the examination of the strength and direction of this relationship without imposing any assumptions about the underlying data distribution.

Results and discussion

Following the established research methodology, this study conducted an in-depth analysis of three key indicators to assess the availability of information within the annual reports of the four SAIs. As mentioned before, these indicators include: (1) the presence of disclosed information about the SDGs, (2) the inclusion of a separate section within the annual report that addresses sustainable development or the SDGs, and (3) the presence of a separate performance audit specifically focused on the SDGs.

Table 2 presents a point-based system, where each year in which specific information related to the aforementioned categories is present is awarded one point. This scoring mechanism allows for a quantitative evaluation of the extent to which the SAIs incorporate SDG-related information in their annual reports.

Considering that the adoption of the 2030 Agenda and the SDGs occurred in 2015, it is worth noting that the Slovenian SAI has been disclosing information related to the SDGs since 2016. Moreover, since 2017, the institution has incorporated a dedicated section on sustainable development in its annual report. In 2021, the Slovenian SAI performed a performance audit to evaluate the state's readiness to implement the SDGs. On the other hand, the Croatian SAI has also been disclosing information related to the SDGs in their annual reports since 2018. In 2020, they conducted a special performance audit that examined the implementation of the SDGs. Conversely, both the Montenegrin and Croatian SAIs have yet to feature a separate section in their annual reports concerning sustainable development or the SDGs. The Montenegrin SAI has released information about the SDGs in 2017, 2020, and 2021. In contrast, the SAI of North Macedonia commenced its information disclosure related to the SDGs in 2020 and has continued this practice in 2021 and 2022, incorporating a dedicated section on the SDGs in its annual report. However, no special audit has been

	Indicator 1: any disclosed information about the SDGs								Indicator 2: a separate part of the annual report that refers to sustainable development or the SDGs								Indicator 3: separate performance audit for the SDGs								
	'15	'16	'17	'18	'19	'20	'21	'22	'15	'16	'17	'18	'19	'20	'21	'22	'15	'16	'17	'18	'19	'20	'21	'22	
SAI-SI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								1	
SAI-HR				1	1	1	1	1																1	
SAI-ME			1			1	1	1																	
SAI-MK						1	1	1																	
Source(s): Authors' calculation																									

Table 2.
Points allocated for
disclosing information
about sustainable
development and
the SDGs

conducted to evaluate the success of the state’s readiness to fulfill the SDGs until now. Nonetheless, the annual work program for 2023 foresees the implementation of such a performance audit.

These conclusions align with the practices and initiatives discussed in the literature, where various SAIs from countries worldwide, such as Australia, Canada, the Netherlands, Latin American states, and Arab nations, have in recent years undertaken both individual and collaborative efforts to audit the SDGs. Both, Slovenian and Croatian SAI have similarly undertaken such audits, and Macedonian SAI is currently in the process of conducting that kind of audit.

Furthermore, to identify the extent and numbers of conducted performance audits by the four SAIs from 2015 to 2022, their annual reports were analyzed, and data were extracted on the topics of performance audits carried out. Specifically, each performance audit topic was mapped to a corresponding SDG it covered. The obtained results for all SDGs that were covered by the audits during the analyzed period are presented in Table 3, segmented by country.

During the period from 2015 to 2022, the Slovenian SAI conducted a total of 103 performance audits, with the most frequently audited SDGs being **SDG9** (Industry, Innovation, and Infrastructure), **SDG3** (Good Health and Well-being), **SDG11** (Sustainable Cities and Communities) and **SDG4** (Quality Education). In comparison, the Croatian SAI performed 34 performance audits, and **SDG9** (Industry, Innovation, and Infrastructure), **SDG8** (Decent Work and Economic Growth), and **SDG16** (Peace, Justice, and Strong Institutions) were the most commonly audited SDGs. Similarly, the Montenegrin SAI conducted 31 performance audits, with the highest coverage for **SDG16** (Peace, Justice, and Strong Institutions), **SDG8** (Decent Work and Economic Growth), and **SDG3** (Good Health and Well-being). Finally, the Macedonian SAI conducted 68 performance audits, with **SDG8** (Decent Work and Economic Growth), **SDG11** (Sustainable Cities and Communities), **SDG3** (Good Health and Well-being) and **SDG9** Industry, Innovation, and Infrastructure) being the most frequently audited SDGs. In general, across all four SAIs analyzed, the highest emphasis was placed on:

Table 3.
SDGs coverage by
performance audits

Sustainable development goals	SAI_SI	SAI_HR	SAI_ME	SAI_MK	Total
SDG 1 No Poverty	5	2	0	2	9
SDG 2 Zero Hunger	3	1	0	1	5
SDG 3 Good Health and Well-being	13	1	6	7	27
SDG 4 Quality Education	9	2	1	4	16
SDG 5 Gender Equality	0	0	0	2	2
SDG 6 Clean Water and Sanitation	8	0	1	8	17
SDG 7 Affordable and Clean Energy	3	1	1	3	8
SDG 8 Decent Work and Economic Growth	9	4	5	12	30
SDG 9 Industry, Innovation, and Infrastructure	13	7	1	5	26
SDG 10 Reduced Inequality	5	1	0	1	7
SDG 11 Sustainable Cities and Communities	12	3	0	11	26
SDG 12 Responsible Consumption and Production	3	3	1	3	10
SDG 13 Climate Action	2	0	0	2	4
SDG 14 Life Below Water	1	2	1	0	4
SDG 15 Life on Land	4	0	3	4	11
SDG 16 Peace and Justice Strong Institutions	9	4	9	2	24
SDG 17 Partnerships to Achieve the Goal	4	3	2	1	10
Total	103	34	31	68	

Source(s): Authors’ calculation

- (1) **SDG8** (Decent Work and Economic Growth) – total: 30 audits
- (2) **SDG3** (Good Health and Well-being) – total: 27 audits
- (3) **SDG9** (Industry, Innovation, and Infrastructure), and **SDG11** (Sustainable Cities and Communities) – total 26 audits for each SDG.

It can be affirmed that the finding regarding the heightened scrutiny of SDG 8 aligns with KPMG's global survey, where they identify this goal as the most popular. In terms of less popular objectives, SAI audits also confirm the relatively lower attention to SDG 2 and SDG 14 in performance audits.

To evaluate the performance audits against the SDGs, a binary scoring method was used, where an indicator score of 1 was assigned if at least one performance audit covered a specific SDG. Based on this methodology and the developed index, the results are presented in [Table 4](#).

The analysis reveals that the Slovenian SAI obtained the highest value of the index, with a score of 0.75 in 2021, indicating that the information disclosed in its annual reports and the level of performance auditing processes related to SDGs are comprehensive and provide a thorough understanding of the most SDGs. In addition, a value of the index ranging from 0.50 to 0.75 was observed in 2019, 2020, and 2022 for the Slovenian SAI and in 2015 and 2022 for the Macedonian SAI, indicating a moderate level of disclosure and sharing of a substantial amount of information, providing readers with a solid understanding of SDGs performance auditing practices.

On the other hand, the remaining values of the index were below 0.5, with the Croatian SAI from 2017 to 2020 indicating that only some information has been shared, but not enough to provide comprehensive coverage of the SDGs, and the extent of performance audits addressing the SDGs is insufficient. Similarly, for the Montenegrin SAI, only the information from 2017 and 2022 had values in the index ranking, with a value below 0.25 in the other years, suggesting that the performance audits conducted covered insufficient SDGs, and the information provided in the annual reports was limited.

In summary, the findings suggest that the Slovenian SAI has been the most successful in providing comprehensive information on the topics or issues analyzed, and the level of performance auditing covering SDGs, followed by the Macedonian SAI and the Croatian SAI, while the Montenegrin SAI showed the lowest level of disclosure and sharing of information.

Subsequently, a Spearman rank-order correlation analysis was conducted to examine the potential relationship between the variables being investigated: the SDGAI values and the classification of SAIs as either from EU or non-EU countries. The results are presented in [Table 5](#).

	SAI – SI	SAI – HR	SAI – ME	SAI – MK
2015	0.25	0.2	0.1	0.5
2016	0.2	0.2	0.1	0.3
2017	0.35	0.25	0.25	0.35
2018	0.45	0.25	0.15	0.15
2019	0.7	0.25	0.1	0.2
2020	0.55	0.3	0.15	0.3
2021	0.75	0.15	0.25	0.3
2022	0.50	0.20	0.25	0.65

Source(s): Authors' calculation

Table 4.
SDGAI values

Table 5 displays Spearman’s rho correlation coefficients between the SDGAI values and the SAI classification based on EU/non-EU countries. The obtained correlation coefficient of 0.249 suggests a positive relationship between the variables, indicating a tendency for them to change in the same direction. However, the significance value of 0.169 suggests that the observed correlation is not to be statistically significant at the conventional significance level of 0.05.

Based on these findings, it can be concluded that there is no significant correlation between the membership of SAIs in the EU and the level of SDG disclosure found in their annual reports, and the extent of performance auditing of the SDG topics. In other words, being an EU or non-EU member does not appear to have a significant impact on the extent of SDGs-related performance auditing and the level of SDGs disclosure in the SAIs’ reporting practices. These results are in line with the conclusions drawn from the earlier analysis.

It is important to note that the lack of a significant correlation does not necessarily imply the absence of any relationship between the variables. Other factors not considered in this analysis may contribute to the level of SDG disclosure in SAIs’ annual reports. Further research and exploration of additional variables are recommended to gain a more comprehensive understanding of the factors influencing SDG disclosure and auditing practices among SAIs.

Conclusion

In conclusion, this study contributes to our understanding of the availability and extent of information about the SDGs in the annual reports of four SAIs, as well as the scope of performance audits related to SDGs. The findings highlight both progress and gaps in reporting on the SDGs within the SAIs’ practices.

The information regarding the number of SDG-related audits conducted by SAIs is a significant contribution to the extant public sector audit literature and it offers valuable insights into the operations of SAIs, their level of involvement in assessing SDGs, and their capacity to report on these critical SDGs. This data can serve as a benchmark for assessing SAI performance, facilitating comparisons across nations, and highlighting best practices and areas in need of improvement. Furthermore, it has direct policy implications by emphasizing the role of SAIs in promoting transparency and accountability in government activities related to sustainable development. Understanding the extent of SDG-related audits is essential for tracking progress toward these global goals, and this study highlights the importance of robust reporting practices by SAIs. It also opens doors for further research into the dynamics of public sector auditing in the context of SDGs, making it a crucial contribution to the field.

The findings demonstrate the strong performance of the Slovenian SAI, showing a high standard of comprehensive reporting on the SDGs and substantial commitment to conducting numerous performance audits. This sets a noteworthy benchmark for other

Table 5.
Spearman rank-order correlation between the SDGAI values and SAI from EU/non-EU countries

			Scores	EUNonEU
Spearman's rho	Scores	Correlation Coefficient	1.000	0.249
		Sig. (2-tailed)		0.169
		N	32	32
	EU/nonEU	Correlation Coefficient	0.249	1.000
		Sig. (2-tailed)	0.169	
		N	32	32
Source(s): Authors' calculation				

SAIs to follow. The Macedonian and Croatian SAIs also demonstrate a notable level of information disclosure and the execution of performance audits related to the SDGs. However, the Montenegrin SAI falls behind in both the extent of SDG disclosure and performance auditing, indicating the need for significant improvements in this area.

Given the absence of specific reporting standards for SAIs concerning the SDGs or minimum requirements for conducting performance audits covering multiple SDGs, the findings related to EU-related SAIs take on a different perspective. While the results indicate no statistically significant correlation between EU membership and the index value, the positive performance of the Slovenian SAI, (EU member country), suggests that the broader regulatory framework within the EU, including non-financial reporting directives, may indirectly contribute to a more comprehensive approach to SDG reporting and conducting more performance audits. Similarly, the positive disclosure noted in the SAIs of North Macedonia and Croatia (despite one being an EU member and the other a non-EU member but both considered EU-related entities) could suggest a potential impact stemming from their alignment with EU practices. On the other hand, the challenges faced by the Montenegrin SAI emphasize the requirement for an approach customized to the specific context. Acknowledging the absence of explicit standards, it becomes crucial to formulate personalized strategies aimed at enhancing SDG disclosure and conducting more performance audits. This scenario underscores the importance of considering specific factors and motivates further exploration into the dynamics influencing SDG reporting practices within the audit domain.

The implications of the study's findings are substantial for policymakers, auditors, and other stakeholders involved in advancing sustainable development. The results emphasize the importance of enhancing reporting on the SDGs in the annual reports of SAIs, necessitating more detailed and comprehensive information on the scope and coverage of performance audits related to the SDGs. However, it is important to acknowledge the limitations of this study. The research focused solely on the annual reports of SAIs in four specific countries, which may restrict the generalizability of the findings to other contexts. Furthermore, the study does not explore the underlying reasons for the variations in the level of SDG auditing among SAIs, warranting further investigation.

To address these limitations and advance the field, future research could include a broader range of SAIs across various countries, exploring the factors influencing the level of SDG disclosure. Additionally, qualitative inquiries may uncover the barriers and facilitators that impact the reporting practices of SAIs concerning the SDGs.

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