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Cover Art Source: Adobe Stock Images, EVERST. Aerial view Saltstraumen bridge in Norway.

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Building a Sustainable Future: The National Audit Office of Tanzania Audits Infrastructure for Resilience and Innovation

Author: Mr. Charles Edward Kichere, Controller and Auditor General of the United Republic of Tanzania

1.0 Introduction

Assessing infrastructure resilience is key to mitigating risks, enhancing service delivery, and ensuring long-term value for citizens. Rigorous audits allow us to identify areas for improvement, strengthen governance, promote accountability, and optimize resource utilization. Given the pressures of urbanization, climate change, and technological progress, infrastructure planning and management must be forward-thinking, inclusive, and adaptive to evolving challenges.

The role of auditors in infrastructure projects is multi-faceted, and their responsibilities can be broken down into several key areas, including their work in financial accountability, performance assessment, transparency, risk management, and sustainability. Auditors contribute to the success of infrastructure projects, ensuring they are completed on time, within budget, and in a way that maximizes their long-term value. Independent oversight helps prevent corruption, improves governance, and ensures that infrastructure systems whether roads, energy grids, or water systems serve the public efficiently and equitably. Ultimately, the work of auditors in infrastructure is key to building a prosperous, sustainable future for nations around the world.

This article explores the role of Supreme Audit Institutions (SAIs) in auditing public infrastructure, their methodologies, and the emerging trends shaping the future of infrastructure audits through the perspective and experiences of the National Audit Office of Tanzania. Through a focus on key infrastructure sectors such as transportation, water, energy, and telecommunications, the National Audit Office of Tanzania shares a comprehensive overview of how our auditors assess projects for efficiency, innovation, and sustainability.

2.0 Initiatives Taken by NAOT to Improve the Audit of Infrastructure

Over the years, Supreme Audit Institutions (SAIs) have adjusted their auditing methodologies to keep pace with the growing complexity of infrastructure projects. SAIs, such as the National Audit Office of Tanzania (NAOT), have introduced various innovative initiatives to improve the quality and effectiveness of infrastructure audits. These efforts have significantly enhanced the transparency, accountability, and overall effectiveness of infrastructure audits. Figure 1 provides key initiatives taken by NAOT in the past five years to strengthen the audit process:

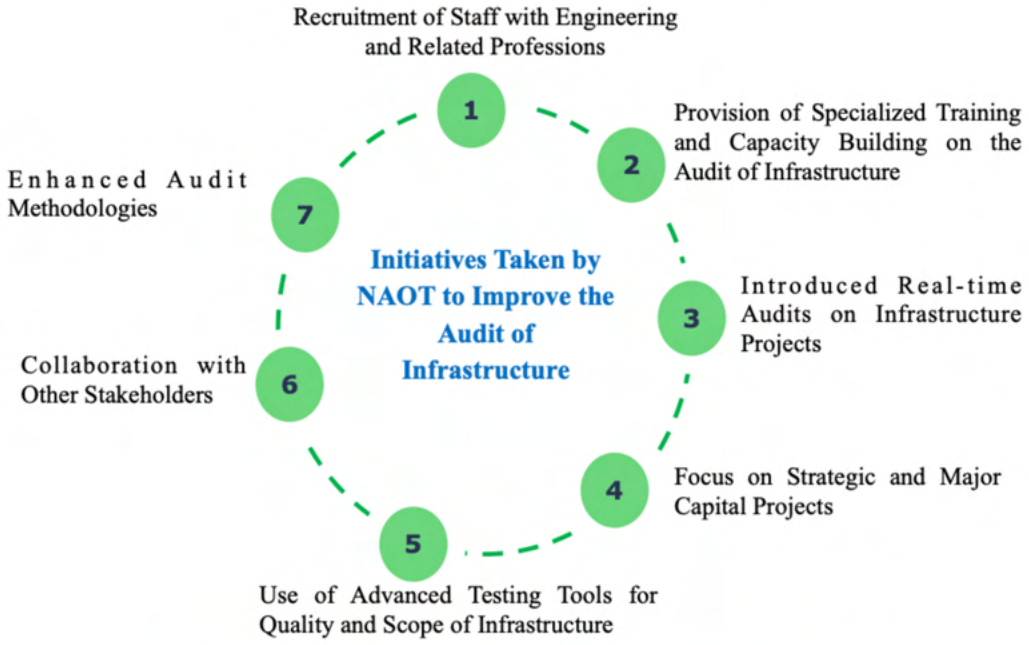

Figure 1: Initiatives Taken by NAOT to Improve the Audit of Infrastructure

3.0 Main Focus Areas during the Audit of Infrastructure

The audit of public infrastructure projects covers several critical focus areas, which can be examined at different stages of the infrastructure development process. These audits typically focus on three main aspects:

1. *Infrastructure planning and implementation at the national level (nationwide infrastructure),*
2. *Project-specific audits, and*
3. *Areas of common problems or challenges in infrastructure development.*

The main focus areas during the audit of infrastructure are presented in Figure 2.

Figure 2: Main Focus Areas During the Audit of Infrastructure

A detailed explanation of the main focus areas during the audit of infrastructure is further described below.

Infrastructure Planning and Implementation at the National Level (Nationwide Infrastructure)

This type of audit focuses on national-level infrastructure projects, particularly those that cover an entire geographical region or the whole country. These projects often require a more holistic evaluation due to their large-scale nature and cross-cutting impact. A prime example is large-scale water distribution projects, where the audit evaluates not only the effectiveness of the infrastructure but also the broader national plan that supports it. This comprehensive approach allows NAOT to provide strategic recommendations to improve overall infrastructure planning rather than focusing solely on isolated project issues that may be affected by broader national planning challenges.

Infrastructure Project-Specific Audits

Project-specific audits focus on individual infrastructure projects, examining all aspects of the project, from planning and feasibility studies to procurement, contract management, and post-completion evaluation. In these audits, NAOT assesses several critical components to ensure the success and sustainability of each infrastructure project. The NAOT incorporates environmental and sustainability considerations into infrastructure audits by assessing the long-term impact of projects on the environment and ensuring compliance with relevant environmental regulations. This process includes evaluating resource usage, waste management, and the sustainability of construction materials and practices.

Areas of Common Problems or Challenges in Infrastructure Development

In some cases, NAOT's audits focus on specific areas of concern that affect multiple infrastructure projects. These targeted audits allow auditors to identify recurring issues across different projects. The results enable NAOT to make broad recommendations that can be implemented across all similar projects within an organization or by a specific government agency. For instance, instead of auditing quality control in a single roadwork project, NAOT might audit several road projects and identify recurring issues. Based on this analysis, NAOT would issue recommendations to the Tanzania National Roads Agency (TANROADS) to improve quality control practices across all roadwork projects they manage.

4.0 Common Findings in Infrastructure Audits

Despite improvements in auditing practices, several recurring issues continue to emerge across audits of infrastructure projects. These issues include failure to conduct detailed feasibility studies, inadequate design of project components, cost overruns, delays in project completion, lack of maintenance planning, poor quality control, and insufficient risk management.

Additionally, an analysis of common findings from audits conducted by NAOT has been carried out. **Table 1** presents the findings related to Infrastructure Planning and Implementation at the National Level (Nationwide Infrastructure), while **Table 2** outlines the findings from Infrastructure Project-Specific Audits.

Table 1: Common Findings from the Audits on Infrastructure Planning and Implementation at the National Level

Aspect	Finding
Prioritizing National Infrastructure Investment	Inadequate identification of priorities at the national level
	Lack of coordination between different Ministries in identifying suitable projects
	Insufficient criteria for the prioritization of national infrastructure
Effectiveness of the prioritization process	Multiple implementations of projects that constrain funds
	A mismatch between the prioritized infrastructure project and the allocation of funds
Mobilization of resources from public and private sources	Lack of critical analysis of possible sources of funds
	Reliance on funds from a few sources (e.g., fuel levy, railway levy, etc.)
	Conditions of loans for construction projects not favorable to some projects

Table 2: Common Findings from the Infrastructure Project-Specific Audits

Aspect of the Project Management	Finding
Initiation and planning	Inadequate feasibility studies of the infrastructure project
	Inadequate planning of the construction projects
	Unrealistic project duration estimates with a risk of project cost escalation
	Inadequate preparation of plans and strategies for monitoring the construction
	A mismatch between feasibility study reports and the actual employer's requirements
Design of the Infrastructure	Inadequate detailed designs and specifications of the infrastructure projects
	Inadequate preparation of bills of quantities in construction projects
	Non-compliance with standards, manuals, specifications, designs, and drawings
	Inadequate assessment of design parameters
	Challenges in the management of design changes and design review of the investment projects
	Unrealistic designs
Procurement of contractors and consultants	Irregularities in the evaluation process
	Undertaking of procurement without approving
	Delayed commencement of the procurement of works
	Weaknesses in the negotiation
	Unjustified Tender Board decisions

Table 2 Continued: Common Findings from the Infrastructure Project-Specific Audits

Aspect of the Project Management	Finding
Contract management	Project cost overrun
	Key staff and equipment were not deployed at the site.
	Inadequate management of performance guarantee, security and bond of the contractor
	Materials delivered to the site and constructed items were not tested for quality.
	Delay in engaging supervising consultants
	Change in scope of work without approval.
	Executed works did not adequately conform to the specifications.
	Inadequate approval of variation orders
	Inadequate recovery of advance payment
	Abnormal increase in supervision contracts
	Varying minimum threshold of interim payment certificates

5.0 Key Considerations for Effective Audit of Public Infrastructure

Effective audits of public infrastructure must take into account several crucial factors:

Expertise and technical knowledge: Due to the complex and technical nature of infrastructure projects, auditors must possess specialized knowledge in engineering, quantity surveying, architecture, contract and project management, environmental sciences, and financial management. These areas of expertise are essential for accurately evaluating the effectiveness and impact of public infrastructure projects.

Collaboration and stakeholder engagement: Effective audits require close collaboration with various stakeholders, including organizations like the Engineers Registration Board, the Architects and Quantity Surveyors Registration Board, the Public Procurement Regulatory Authority, and academic institutions. Engaging with these stakeholders ensures that auditors comprehensively understand the project and its associated complexities.

Use of Advanced Non-Destructive Testing Tools for Assessing Quality and Scope: Using high-tech testing equipment and software, like concrete test hammers, concrete thickness gauges, reinforced concrete rebar detectors, and Geographic Information Systems (GIS) during the auditing process, makes them more useful. These tools help auditors monitor project performance, identify potential issues early, improve transparency, and ensure infrastructure projects progress as planned.

Long-Term Impact Assessment: Auditors should also focus on assessing the long-term sustainability and resilience of infrastructure projects. This process involves evaluating how well the infrastructure will perform over time, considering potential future challenges such as climate change, population growth, and evolving societal needs.

6.0 Emerging Trends and Future Directions in the Audit of Infrastructure

Several emerging trends are reshaping the landscape of public infrastructure audits and are expected to significantly influence the direction of future audits. These trends reflect the evolving challenges and opportunities in infrastructure development, driven by technological advancements, global environmental changes, and an increasing focus on sustainability. Auditors are now placing greater emphasis on assessing the resilience of infrastructure projects. As infrastructure projects increasingly incorporate innovative technologies, auditors will play a crucial role in assessing how well these technologies are integrated into the projects. Auditors will have to look at the ability of these technologies to be scaled up, their cost-effectiveness, and their effect on the environment to ensure they meet the needs of stakeholders and contribute to long-term sustainability goals.

These emerging trends reflect a broader shift in the way infrastructure is being developed and managed. As sustainability, technology, and global collaboration become more central to infrastructure projects, auditors will need to adopt new methodologies, tools, and expertise to address the challenges and opportunities of the future. Auditors can ensure that infrastructure projects are effective, efficient, resilient, sustainable, and aligned with the needs of future generations by embracing these trends.

7.0 Conclusion and Way Forward

Auditing public infrastructure is crucial for ensuring the effective and responsible use of public funds. As infrastructure projects become more complex and interconnected, the role of auditors is expanding beyond traditional financial oversight. Today, auditors are tasked with performance evaluations, sustainability assessments, and resilience considerations. SAIs can help governments reach their infrastructure goals efficiently, fairly, and sustainably by using cutting-edge technology, working with stakeholders, and focusing on long-term effects.

Furthermore, INTOSAI P-12 (The Value and Benefits of SAIs) has been realized while auditing infrastructure by ensuring that public investments are directed towards sustainable and resilient infrastructure, ultimately benefiting the country's economy and society. Through these infrastructure audits, NAOT has provided valuable insights that enhance transparency, accountability, and long-term value in infrastructure development.

Looking ahead, the future of infrastructure auditing will increasingly focus on ensuring that projects are resilient to emerging challenges. Auditors will play a key role in assessing the capacity of infrastructure to adapt to issues like climate change, population growth, and technological advancements. Once adequately implemented, it will help build more sustainable, innovative, and inclusive societies.

FEATURE ARTICLE

Quality inspector checking waste sorting machine in a waste sorting plant. Source: Adobe Stock Images, bird_saranyoo

Waste Management and Performance Audits: A Framework for Sustainable Infrastructure

Author: Sherlita Nurosidah (SAI Indonesia)

Waste, often regarded as the byproduct of industrialization and urbanization, has become one of the most critical global issues, with municipal waste generated worldwide exceeding two billion tons each year. This number will continue to rise due to increased human activity throughout the entire lifecycle of non-municipal waste as well, including that from agriculture, construction, industry, and healthcare.

Waste management continues to pose challenges as the intricacies of social, economic, and environmental impacts become more complex in terms of variability and composition. Since the 1992 Rio Declaration, municipal waste has garnered global attention with the issuance of the Polluter Pays Principle and has become one of the priorities of Agenda 21, which encourages sound management. Referring to the United Nations Sustainable Development Goals (SDGs), waste management is seen as essential in fostering the development of infrastructure, education, technology, creativity, and employment opportunities, thus creating efficiency and reducing financial risks, as outlined by the United Nations Development Program (2024). A summary of the aforementioned relationship can be accessed through https://bpk.id/appendix-waste-management.

In 2006, led by the Ministry of Public Works, Indonesia began developing a waste management system as part of the National Policy and Strategy to promote a healthier living environment. Following this initiative, the government issued Law Number 18 of 2008 on waste management and Government Regulation Number 81 of 2012 on the management of municipal waste and waste-like materials. A report in 2016 showed that the presence of more defined infrastructure would support the government in achieving their goal more quickly, such as through the use of sanitary landfills over open dumping, the more widespread initiation of waste banks, incentivizing producers who effectively manage extended responsibility, and the utilization of waste-to-energy facilities. Over the years, Indonesia has firmly believed that a waste-free state can be achieved by continuing to include waste management in the National Plan, which is renewed every five years to this day.

In 2024, as recorded by the information system of national waste management at the Ministry of Environment, Indonesia achieved 59.75% on well managed waste.

Audit Objectives

A SAI's capacity is undoubtedly demonstrated in guarding national progress through its performance audits, especially in the case of waste management. This also applies to SAI Indonesia over the past decade. As a continuous lifelong externality borne by all of society, waste management is a challenge that all stakeholders, including SAI communities, are working to address. Table 1 elaborates further on the emphasis of SAI Indonesia's audit objectives as referred from the performance audit reports on waste management compared to the one published by the INTOSAI Working Group on Environmental Audit (WGEA) in 2003, entitled "Towards Auditing Waste Management".

Table 1. Comparison of Audit Objectives between INTOSAI WGEA and SAI Indonesia

Audit Objectives	**INTOSAI WGEA**	**SAI Indonesia**
The existence of waste policy	Covering all stages of the waste stream and ensuring policy consistency with the general environmental policy.	Establishing adequate policies and strategies for waste management by the local government.
Compliance with national environmental policy	Reflecting waste management policies in legislation and regulations.	Reflecting the national waste management strategy and master plan in the local government's regulation.
Risk Management	Managing risks sufficiently.	Planning for resource needs (budget, human resources, facilities, and infrastructure) at all stages of waste management.
Quality of the implementation process	Implementing policies effectively and conducting environmental impact assessments.	Effectively managing waste and ensuring facilities meet required standards.
Performance of the waste management system	Delegating responsibilities to appropriate bodies and ensuring efficient use of necessary instruments.	Implementing adequate waste segregation, collection, transportation, reduction, final processing, and waste fee management, while ensuring proper landfill provisions and end-of-waste processing.
Compliance with national laws and regulations	Complying with national rules and procedures by the relevant actors.	Appointing the right personnel as outlined in national regulations.
Compliance with international obligations	Ensuring policies, legislation, and practices comply with international obligations and agreements.	Adhering to international standards.
Monitoring	Establishing and ensuring the efficiency of necessary monitoring systems.	Overseeing monitoring and evaluation of waste handling activities.
Effects of other government activities	Managing all government activities in accordance with waste management legislation and regulations.	n/a
Effective Communication to people's participation	n/a	Conducting communication, education, and information strategies, facilitating community-based recycling, and promoting innovations in reuse.

Source: Author's compilation from INTOSAI WGEA (2003) and SAI Indonesia's audit reports (2018 - 2022)

As illustrated in the table, SAI Indonesia's performance audit on waste management has generally followed the guidance issued by the INTOSAI WGEA. SAI Indonesia emphasizes the infrastructural aspects of waste management, prioritizing them while maintaining relevant policies and personnel. Raising awareness in the country remains an ongoing concern, making it paramount to evaluate the waste management process, including infrastructural facilities related to waste segregation, collection, transportation, and processing.

SAI Indonesia's uniqueness in their audit on waste management's objectives is on the necessity of fostering effective communication by providing the right infrastructure to elevate people's participation. Indonesia, a vast and multicultural nation with over 17,000 islands and hundreds of distinct ethnic groups, faces unique challenges in ensuring efficient collaboration across regions, each with its own local characteristics and governance structures. An emphasize has to be put in strengthening coordination across diverse villages to overcoming environmental challenges and ensuring sustainable practices.

While national contexts vary and there is no one-size-fits-all solution that can be used to move towards zero waste and a circular economy, it is clear that the hidden costs of waste are unaffordable for current and future generations. It is important to note that for waste management systems to be effective and efficient, behavioural change of households is strongly required. Commitment by households, citizen awareness and participation offer the difference for managing waste in a multicultural country. Research shows that waste management is 20 percent about technology and 80 percent about people (United Nations Development Program, 2024). Successful waste management underlines the influence of stakeholder participation, social support and a strong social contract with citizens.

From the performance audit, it can be gathered that local government's strong encouragement towards community-based infrastructural development is beneficial to strengthening citizen participation. Infrastructures are monitored from planning to segregating, collecting, and processing the waste. It eases the process as localities have the sense of ownership making socialization and education becomes more approachable. Special attention also placed to incentivization mechanism to all stakeholders allowing them to reflect on the consequences of their deeds. Greener public spaces are also exuded by the local government as per request. Personnel rotation is operationalized to waste collection plan acting as per one to four times a day or once, two, to three times per week depending on the location connectivity. It is also possible to have a door-to-door collection system when certain areas do not have any available landfill nearby.

In the future, addressing spatial overlap between local governments will be a key area for improvement in Indonesia's performance audits of waste management, as guided by the INTOSAI WGEA. SAI Indonesia’s current attention to clear and open communication channels will be beneficial for resolving these overlaps and navigating the complexities arising from the country’s diverse social and administrative landscape. This approach will promote the equitable distribution of resources and services, leading to more efficient and sustainable waste management solutions.

About the Author

Sherlita Nurosidah has been with SAI Indonesia for over seven years, handling responsibilities that cover finance, auditing, and international cooperation. She has actively contributed to academic journals and conference papers on a wide range of topics, including accounting, public auditing, economic issues, flypaper effects, sustainable energy, SAI independence, sustainable agriculture and food security, and legal studies.

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Li River in Guangxi Province, China. Source: Adobe Stock Images, saravut

Enhancing the Role of Auditing in Building a Safe and Resilient Water Network

Author: Department of Fixed-Assets Investment Audit of the National Audit Office of China

I. Introduction

In China, water security is considered a critical aspect of infrastructure, focusing on optimizing the water resource distribution system and improving the flood control and disaster mitigation system. In 2022, to accelerate the construction of a national water network and build a modern, high-quality water infrastructure network, and to comprehensively address issues of water resources, water ecology, water environment, and water disasters, the Chinese government issued the "National Water Network Construction Planning Outline" (hereinafter referred to as the "Water Network Plan"). In 2023, the National Audit Office of China carried out a special audit on construction and operation of major water diversion projects, aiming to assist in building a safe and resilient modern water network.

The audit focused on revealing prominent problems in the construction and operation of major water diversion projects and finding out the systemic barriers, mechanistic defects, and institutional loopholes behind these issues. This article, based on relevant planning and constructions of the national water network, studies key areas that audits should focus on, and discusses experiences, practices of audit, and shares typical cases for reference.

II. Overview of the Water Network Plan and Its Construction

I. Background of the Water Network Plan

China's water situation has always been characterized by floods in summer and droughts in winter, with water scarcity in the north and abundance in the south. The spatial and temporal distribution of water resources is extremely uneven, with the per capita water resources in China being only 1/4 of the world average, respectively. To form a unified national market and facilitate domestic economic circulation, and to promote coordinated development between the north and south, it is important to strengthen the distribution of water resources across river basins and regions. At the same time, China is frequently hit by floods and droughts. The middle and lower reaches of major rivers are vulnerable to basin-wide floods and strong typhoons, while the central and western regions are threatened by heavy rainfall and mountain torrents. To effectively respond to floods and droughts, it is essential to systematically plan the layout of water infrastructure systems, leverage the advantages and comprehensive benefits of networked water engineering systems for the safety of economy and society.

II. Layout of the National Water Network Construction

According to China’s Water Network Plan, a comprehensive national water network, consisting of backbone, mesh and knot projects, will be completed by 2035. First, efforts will focus on the “backbone projects” of the national water network, based on the main stems of major rivers and important lakes, with the South-to-North Water Diversion Project as a key component. This involves properly advancing the planning and construction of a series of major water diversion, drainage, and discharge projects. Second, the “mesh projects” of the national water network consist of major national and regional water resource distribution projects. This includes promoting comprehensive management of major tributaries and small-to-medium rivers, regional river-lake water system connectivity, and the construction of diversion, drainage, and discharge projects, forming an integrated and interconnected water network pattern for both urban and rural areas. Third, the "knot projects" of the national water network consist of water controlling projects and key water source projects.

III. Progress of National Water Network Project Construction

The Chinese government in recent years has strengthened and improved macro-control, implemented proactive fiscal policies and moderate monetary policies, and fully leveraged the guiding role of fiscal funds to promote water infrastructure investments and financing landscape where fiscal, financial, and social capital work together.

National water conservancy construction investment has exceeded one trillion yuan for three consecutive years, with 47,000 water conservancy projects implemented and 1.35 trillion yuan invested in 2024. Currently, with the completion of major projects like the first phases of the South-to-North Water Diversion's eastern and central routes, and key milestones in the Yangtze-to-Huaihe River Water Diversion, a cross-basin and cross-regional water network is gradually forming. In the coming period, China will accelerate the construction of a national water network that is "systematically complete, safe and reliable, intensive and efficient, green and smart, smoothly circulating, and orderly regulated," ensuring national water security.

III. Priority Areas for Auditing Major Water Diversion Project

I. Audit of Implementation of Major Plans and Key Projects

As a large-scale and complex systematic project, the national water network involves multiple departments and regions, requiring the coordination of multiple objectives. The coordination of work among water network projects and resource elements, evaluation of water demand, and estimation of water condition changes and their impacts could be challenges. In response to these challenges, auditors should focus on:

Consistency of Plans.

Determining whether the "Water Network Plan" aligns with spatial planning, ecological protection, and other policy plans; whether the goals of the "Water Network Plan" are detailed and implemented, key tasks are effectively decomposed, and whether the "backbone," "mesh," and "knot" projects included in the plans were progressed in a consistent way.

Implementation of Key Projects.

Assessing whether the key projects in the "Water Network Plan" and its detailed implementation plans are progressing as scheduled, and whether there are difficulties or bottlenecks in project approval and construction. Special attention should be paid to whether projects were negatively affected by inconsistent policies, inadequate resources, or lax performance by relevant departments.

II. Audit of Funds Management and Use

Major water diversion projects have significant social benefits, as their implementation strengthens inter-connectivity, enhances water resource allocation capabilities between basins and regions, and improves urban and rural water supply security. Due to their long construction cycles and large scales, these projects require substantial funding. Therefore, audits should focus on:

Compliance of Financing Activities.
Given the public welfare nature of these projects, which primarily rely on fiscal funds, auditors should verify whether governments and construction contractors have raised funds through multiple channels as required by feasibility study approvals, whether the proportion of self-raised funds by contractors meets regulations, and whether there are undelivered financing commitment that negatively affected the progress.

Fund Allocation
Auditors should examine whether project budgets, investment plans, and funds are allocated and disbursed in a timely and sufficient manner, whether funds have been misappropriated, and whether fund disbursement and bank loans match project progress. Issues such as excessive idle funds due to over-allocation should also be scrutinized.

Fund Use
Auditors should assess whether fund management is compliant and expenditures are reasonable, and whether there are losses or wastes due to inadequate preliminary work or lax fund management. Issues such as illegal impoundment, delayed refunding of impoundment, and delay in payments to small and medium-sized enterprises and workers should also be investigated.

III. Construction Management
Major water diversion projects, usually involving multiple industries and long supply chains, play a crucial role in addressing infrastructure gaps, and improving employment and people's well-being. Therefore, auditors should focus on key issues such as project bidding, material and equipment procurement, and quality of projects:

Project Approval
Assessing whether projects are unrealistic, overestimated, or progressed in weak conditions. Issues such as inflating project quantities, lowering construction standards and reducing construction scope without approval should be examined.

Bidding and Contract Management

Identifying whether there are issues such as failure to conduct required bidding, fraudulent bidding, bid-rigging, or illegal subcontracting. Cases of unqualified contractors, inflation of costs, or significant losses due to mismanagement should also be investigated.

Quality Control

Investigating whether there are issues such as cutting corners, unauthorized changes of working scope of main projects. Special attention should be paid to major quality defects caused by inadequate supervision by construction contractors or negligence of supervision duties.

IV. Project Operation, Maintenance, and Performance

To fully unleash the benefits of major water diversion projects, it is essential to improve their construction, operation, and management mechanisms. Some auditees neglected the fact that water diversion projects may not form a synergy without simultaneous completion of supporting facilities such as storage reservoirs and distribution networks, in addition to single conservancy projects. Therefore, auditors should focus on:

Performance of Major Projects

By comparing actual water diversion volumes of a completed project with its planned diversion scales and annual water supply plans, auditors can analyze whether the lack of supporting facilities has led to ill or limited performance of completed projects.

Operation and Maintenance

Auditors can review whether a regular operation and maintenance mechanism has been established, whether quality defects are repaired in a timely manner, and whether efforts are made to separate management and maintenance to reduce costs and improve professional and standardized management levels. Additionally, auditors should examine whether emergency water supply plans for extreme scenarios have been formulated.

Water Fee Collection and Expenditure.

Auditors should assess whether the water pricing mechanism is reasonable and conducive to promoting water conservation and the sustainable operation of water projects. Audits should also check whether water fees are collected duly and managed and used in compliance with regulations.

III. Typical Cases of Auditing Major Water Diversion Projects

I. An Audit Case in Project Approval Process

In auditing a major water diversion project, auditors compared investment estimates, financing plans in feasibility studies, preliminary engineering budgets, bidding budgets, and final accounts at various stages. It was found that the project exaggerated water demand to inflate construction costs in project proposal for acquiring more funds from central fiscal funds. The project was also found reduction of the project scope, lowered standards, and delayed supporting facilities. This not only affected the benefits of the main project but also undermined the effectiveness of government investment in driving broader economic impact. In response, the audit report recommended that relevant managing departments, adhering to principle of "Reality, Eco-friendliness, and Sustainability," assess water demand in specific areas, deepen the preliminary project study, and accelerate the construction of major national water network projects.

II. An Audit Case in Project Construction Activities

Preliminary survey and engineering are the "root" of quality and safety in construction projects, directly impacting the quality, investment efficiency, and lifespan of the project. In the audit of a major water diversion project, auditors made the project preliminary survey and engineering their audit focus considering the project's complex geological conditions. By analyzing the consistency of material usage, construction acceptance records, and survey and engineering data, and using technical methods such as ground-penetrating radar and on-site measurements, they found that the project contractor’s survey work was not sufficient. Consequently, the project experienced frequent accidents, delays, and significant economic losses during construction. The auditors recommended the relevant departments should improve the supervision system for survey and engineering in major water projects, enhancing system resilience, and increasing water supply security.

III. An Audit Case in Project Operation and Maintenance Work

Auditors found that some major water diversion projects after completion had poor performance due to the absence of a reasonable water pricing mechanism. In such context, when the water prices were high, end users would continue to over-extract limited underground water in local areas instead of buying water from the market. Conversely, if prices were low, water conservancy projects could not operate effectively due to the fact that they did not generate adequate income. Additionally, some projects lacked advanced management systems and administrative mechanisms for rational water allocation. To address these problems, auditors recommended the relevant departments should build reasonable operation and maintenance mechanisms during the project planning, establish reasonable water pricing mechanisms tailored to local conditions, and ensure sustainable operation of projects.

FEATURE ARTICLE

Source: Adobe Stock Images, Vera Kuttelvaserova

Auditing Infrastructure for Resilience and Innovation: Performance Audit on Biodegradable Waste Sorting in Latvia

Author: Agnese Jaunzeme, Sector Head, SAI Latvia

Role of infrastructure in waste management

Infrastructure is a fundamental pillar of resilience and innovation, particularly in sectors that impact sustainability and environmental management. Supreme audit institutions (SAIs) play a crucial role in evaluating whether public infrastructure investments align with national and international commitments, including climate goals and circular economy objectives. An audit conducted by the State Audit Office of Latvia (SAI Latvia) on biodegradable waste sorting provides valuable insights into the challenges of infrastructure planning, execution, and governance.

Biological waste	
Biological waste includes biodegradable waste from gardens and parks, food and kitchen waste from households, offices, catering establishments (restaurants, eateries, etc.), wholesale and retail establishments, and other similar waste from food production facilities.	
Produce	**Yard waste**
Damaged fruit and vegetables, peels and cores, bread products, baked goods, cheese products, raw and cooked meat and fish (including bones), eggs and eggshells, nut shells, tea and coffee grounds, or similar leftovers.	Wilted and dead flowers and plants, roots, raked grass and leaves, weeds, mulch, small branches and other green waste from the house or yard.

Source: Latvia Waste Management Law, Section 1, Paragraph 4.

Methodology and expertise

To ensure a comprehensive and well-rounded assessment, SAI Latvia collaborated with an independent expert in waste management. The most significant challenge for the audit was the lack of reliable data in the national databases, which meant that the expert conducted the data analysis and developed a methodology based on an economical and mathematical model to calculate the estimated volume and flow of biodegradable waste. This approach made it possible to conduct an audit. This cooperation resulted in an in-depth analysis of technical aspects, including the efficiency of waste sorting systems and the suitability of the existing infrastructure to the predicted volumes and flows. The expert contributed to evaluating whether municipalities had adequate facilities to support biodegradable waste collection and processing, and in identifying technological and operational gaps.

The audit applied a combination of methods, such as: document analysis, site visits, stakeholder interviews, including discussions with municipal representatives, waste management companies, and policymakers. The methodology also included benchmarking against best practices within the European Union, enabling auditors to assess Latvia's progress in comparison to other EU countries. Financial data and investment efficiency were also examined to determine whether funds allocated for waste management were being utilized effectively.

Audit results

The audit revealed that, while Latvia has made progress in establishing a system for biodegradable waste management, significant gaps remain in implementation. Infrastructure for waste sorting, collection and processing is in place but lacks the necessary efficiency and innovation to meet environmental targets. Delays in infrastructure projects have resulted in higher costs and inefficiencies, undermining the country's ability to achieve waste management goals.

One of the most concerning findings was that some municipalities received substantial funding for waste sorting infrastructure – amounting to a total of over 10 million euros – yet the implementation of projects lagged behind expectations. In some cases, the planned waste processing facilities were not built on time, leading to a reliance on alternatives that were more expensive and were less effective solutions. Furthermore, procurement delays and a lack of coordination among national and local governments exacerbated these inefficiencies.

The results of SAI Latvia's calculations indicate that, by not implementing a sorting and collection system for biodegradable waste in the entire country, the residents of Latvia were not able to gain a potential savings amounting to at least 16.576.830 euros in the period from the years 2012 to 2023.

Challenges in municipal waste sorting

Despite legal requirements for municipalities to implement separate biodegradable waste collection, only a fraction of municipalities had fully established systems. In some cases, collection points were inaccessible or inconvenient for residents, leading to low participation rates. The audit found that in certain regions, as little as 20% of households actively sorted their biodegradable waste, significantly below national targets.

The lack of investment in infrastructure for sorting and processing biodegradable waste has created inefficiencies in achieving waste reduction targets. For example, a municipality in central Latvia received 2 million euros for the development of a modern composting facility. However due to administrative complications, the facility was not operational at the time of the audit. This resulted in increased transportation costs since waste had to be sent to facilities in other regions.

Furthermore, funding allocated for waste management infrastructure has not always been used effectively, with some projects experiencing delays due to administrative barriers or ineffective coordination between responsible institutions.

Inconsistencies in waste collection fees

A significant issue identified in the audit was the inconsistency in waste collection and processing fees, which varied widely across municipalities. Some residents were paying nearly double the amount for waste collection compared to neighbouring regions with similar service levels. In one case, a municipality was charging 15 euros per household per month for biodegradable waste collection, while another municipality nearby offered the service for just 7.50 euros.

The audit recommended the need for a more standardized approach to pricing and service availability, ensuring that all residents have equal access to waste sorting infrastructure. Furthermore, the lack of monitoring and control mechanisms has made it difficult to assess whether the objectives of waste sorting policies are met. The audit suggested that better data collection and analysis would enable decision-makers to refine strategies and improve infrastructure efficiency.

Importance of public awareness and participation

In the audit, SAI Latvia also highlighted that public awareness and participation are crucial factors in ensuring the success of waste management infrastructure. Without clear communication and incentives for proper sorting, infrastructure investment risks being underutilized. Public surveys conducted during the audit revealed that nearly 40% of residents were unaware of the proper procedures for sorting biodegradable waste. In some cases, even where appropriate infrastructure was available, it was not utilised due to a lack of understanding of its use by the population.

Recommendations from the audit included increasing efforts to educate the public, improving transparency in how municipalities manage biodegradable waste, and developing strategies to encourage higher participation rates. The report highlighted a successful case in one municipality where an extensive public awareness campaign, combined with financial incentives for households participating in sorting programs, increased waste separation rates by 60% within two years.

Moving forward: strengthening waste management infrastructure

The findings of the audit underscore the need for improved planning, investment and oversight in biodegradable waste infrastructure. Timely investments, better regulatory frameworks and enhanced data monitoring would help optimize waste management processes and contribute to environmental sustainability.

A key recommendation from the audit was the establishment of a national digital monitoring system that would track waste collection and processing in real time. Such a system would provide policymakers with accurate data on waste flows, enabling them to adjust policies dynamically and address inefficiencies. In addition, the audit recommended improved financial oversight mechanisms be introduced to ensure that allocated funds are spent effectively and that waste processing infrastructure projects are completed within the set deadlines.

Latvia's experience demonstrates the importance of ensuring that infrastructure investments align with national objectives and deliver tangible benefits to society. The audit findings serve as a reminder that public funds must be used efficiently and that, without proper oversight and planning, even well-intended infrastructure investments may fail to achieve their intended impact. By addressing these challenges, public authorities in Latvia can strengthen the waste management system in the country and contribute to a more sustainable future.

FEATURE ARTICLE

Passenger train at the station in Koluszki, Poland. Source: Adobe Stock Images, Tomasz Warszewski

Crisis Management System on Rail Networks in Poland

Author: Iwona Zubrzycka-Wasil, Supreme Audit Office of Poland

The audit of crisis management functioning within rail infrastructure was undertaken on the Supreme Audit Office of Poland, Najwyższa Izba Kontroli (NIK)'s own initiative and covered among other, procedures applied during the biggest breakdown of rail traffic control that occurred in March 2022, 3 weeks after Russia invaded Ukraine. The audit was also driven by a significant number of issues and accidents on railways. In 2020, 516 railway accidents occurred, of which 6 were serious accidents caused by collisions or derailment of trains and affected the safety of people within railway areas. Moreover, 1,218 incidents were noted that did not result in any fatalities or serious injuries or in material or environment damage.

However, these incidents could have turned into events requiring actions provided for in crisis management plans. The also audit investigated issues identified during the mass coal transports from seaports at the turn of 2022-2023, issues related to movements of refugees from Ukraine, difficulties in rail traffic in the area of Warsaw Junction caused by investment works in 2020-2023 and disturbances in rail traffic caused by an unauthorized broadcasting of radio-stop signals in 2020-2023.

The nationwide railway traffic control breakdown in March 2022 was related to a failure of electronic traffic control systems, which yielded the suspension of rail traffic on approximately 80% of railways. The breakdown covered a total of 1,123 kilometres of lines and stopped rail traffic control of 13 out of 23 Railway Departments. 457 trains were recalled, and 1,328 trains delayed, with delays often exceeding 2 hours. 19 rail traffic management system centres were not operating. This event took place during the third level of CRP threat, the Charlie and Code Red terrorism threat at the main Polish Rail Lines Operator, PKP PLK S.A., after Russian aggression on Ukraine.

Diagram 1-Railways Departments areas affected by the breakdown of 17 March 2022

Diagram Railway Departments areas

Source: SAI Poland

Diagram 2 – Rail network lines - indicated sites of rail traffic devices failures in March 2022

Rail network lines - indicated sites of rail traffic devices' failures in March 2022

Source: SAI Poland

The rail transport system is an essential component of critical infrastructure. The main goal of protecting railway networks is to maintain continuity of services crucial for state and citizen security and for the efficient functioning of administration, institutions and business.

For this audit, NIK identified 3 main systems of crisis management on the rail networks:

1. The crisis management system of the Minister of Infrastructure, in charge of transport,
2. The safety management systems (SMS) of railway infrastructure operators (lines, stations),
3. The SMS of trains operators (carriers, vehicle maintenance services).

The NIK's audit purpose was to issue an opinion on whether the crisis management systems guaranteed appropriate protection of critical infrastructure and passenger safety in trains, rail stations and rail areas, through answering the following questions:

- To what extent did the management system adopted and applied by the rail lines and infrastructure manager PKP PLK S.A. ensure proper and effective preparation of the infrastructure, proper management of railway traffic and safety of persons on railway premises in the case of crisis situations?

- To what extent did the management system adopted by train operator, including its organization, tools and procedures, ensure the safe operation of railway vehicles and railway infrastructure and the safety of passengers in crisis situations occurring on the railway?

- To what extent did the rail stations operator PKP S.A ensure proper organization, tools and procedures, allowing for maintenance and protection of rail stations and safety of people within rail area in crisis situations?

- To what extent did entrepreneurs providing services necessary for rail transport functioning, including IT, telecommunications and energy supply, to the benefit of rail infrastructure managers, railway station managers and rail carriers, have an organisation, resources and procedures to ensure safe operation in crisis situations on the railway, in the segments of the rail system entrusted to their service?

- Did the Minister responsible for rail transport correctly and reliably perform his tasks related to the supervision of rail transport safety in crisis situations occurring on the railway network?

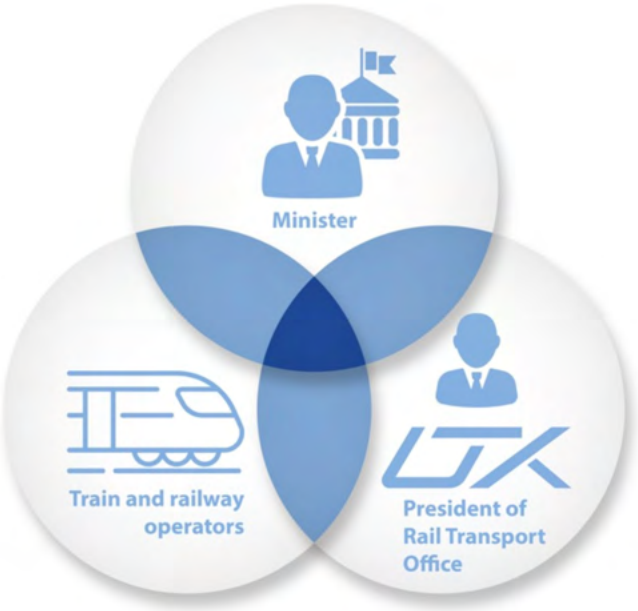
The audited period was from 2020–2023. Audited units' selection was purposeful and came from identified issues that occurred in a given area. The audit covered the following infrastructure operators, trains operators and authorities in its scope:

- Minister of Infrastructure,
- National Railway Network Manager, PKP PLK S.A.,
- Rail Stations Manager of PKP S.A.,
- Rail operators: PKP Informatics, PKP Telkol, PKP Linia Hutnicza Szerokotorowa,
- Rail carriers: Koleje Mazowieckie, Polregio, Koleje Wielkopolskie, Koleje Śląskie, PKP Szybka Kolej Miejska w Trójmieście, Arriva sp. z o.o.

During this audit upon NIK's request, the Office of Rail Transport performed a series of ad hoc audits of the functioning of safety management systems (SMS) of the following operators:
- PKP Cargo S.A. (freight),
- PKP Intercity S.A. (passenger),
- PGE Energetyka Kolejowa S.A. (energy supply),
- and in eight PKP PLK S.A. Railway Departments (rail lines maintenance).

3. Diagram relationship within the railways crisis management system

Diagram relationships within the railways crisis management systems



Source: SAI Poland

Audit results

NIK's audit found that the Minister responsible for rail transport did not ensure an effective operation of the crisis management system on railways, which created a risk of improper functioning of critical infrastructure protection and safety of people within the railway area, rail stations and in trains, as well as of residents of towns located on the rail routes of transportation of dangerous goods.

The crisis management system implemented by the Minister did not ensure coherence and full correlation of actions taken on the basis of various regulations. The areas lacking coherence included the statutory crisis management system, the railway system for managing crisis situations and the safety management system.

The Minister did not specify principles or procedures for cooperation with railway companies in the statutory crisis management system on the railway. The activities of these railway entities were an essential link in ensuring the effective functioning of the entire crisis management system. The Minister did not identify, and in any way qualify in the crisis management plan rail transport risks or crisis events on the railway, which allowed the possibility of destabilizing appropriate critical rail infrastructure system functioning caused by its destruction or disruption. The Minister identified similar risks and events in the area of road transport, yet did not do so for the railway.

The Minister did not take effective actions to define or agree (e.g. in the form of an agreement or understanding) the principles and procedures for the organization and functioning of railway companies and entrepreneurs operating within the crisis management system within the government administration transport department. The improper functioning of the crisis management system was confirmed by Minister's failure to classify the rail traffic control breakdown in 13 out of 23 PKP PLK S.A. railway line departments. In such crisis situations, the Minister did not launch his own crisis management procedures on the railway network.

The cooperation of the bodies legally obliged to develop crisis management plans for railways (i.e. Minister of Infrastructure and President of Rail Transport Office), had no impact on the effectiveness of task implementation within the framework of railways crisis management system. During the biggest breakdown of rail traffic control, the President of Rail Transport Office, the national safety authority and national regulator of rail transport, was not notified by PKP PLK S.A. with advance information regarding the rail lines manager's deliberate and planned remedies that might have an impact on the disruption of rail traffic on nearly the entire rail network. The Rail Transport Office pointed out that in case of disruptions of train traffic, the infrastructure manager should have taken all necessary steps to restore uninterrupted train traffic. and at the same time, should have notified the Rail Transport Office of the recovery plan. PKP PLK S.A. should have implemented appropriate mechanisms in external communication and crisis management.

4. Diagram – Rail traffic crisis management organisation chart

Rail traffic crisis management organisation chart

Source: SAI Poland

In NIK's opinion, the procedures adopted and applied by the railway companies under the leadership of PKP PLK S.A., within the framework of the railway crisis management system, enabled operators to reliably prepare the railway infrastructure, manage railway traffic and ensure the safety of people on railway premises in the event of a crisis situation.

The procedures developed were a grassroots initiative of railway companies. The Minister of Infrastructure, despite being obliged to create a crisis management system on the railway, did not even join the agreement concluded by railway companies in 2017.

The agreement of 2017 was concluded between the following entities: PKP S.A. (railway stations) PKP Informatyka Sp. z o. o. (IT systems & operational security), PKP Telkol sp. z o. o. (radio communication & Radio-Stop system), PKP Energetyka S.A. (energy) with company PKP PLK S.A., as a leader. The agreement concerns the organisation of national rail crisis management system and monitors current operational and transport work on railways managed by PKP PLK S.A. at rail stations and terminals. The railway companies crisis management system was created by specially appointed teams at various management levels to be triggered in the event of threats and crisis situations.

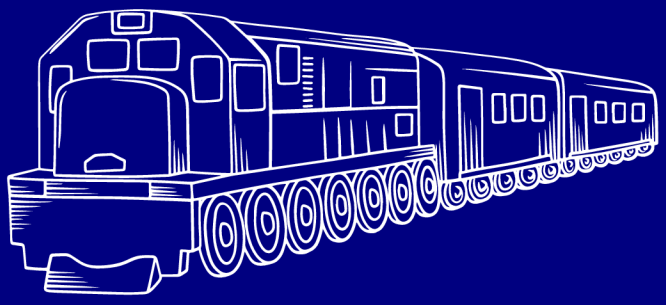
The audit stated that the safety management systems of rail operators implemented by rail carriers enabled the safe operation of rail vehicles and appropriately managed rail infrastructure by regulating a wide range of procedures and rules of conduct in the event of specific events, including those of a crisis nature. However, this system, required by the provisions of the Rail Transport Act, was not an element of crisis management within the Crisis Management Act, but was only its informal supplement.

Audit recommendations

NIK recommended to the Prime Minister first to undertake action within his supervisory authority, which aims to ensure formal participation of the President of the Office of Rail Transport in the railway crisis management system. Secondly, the Prime Minister should undertake legislative initiatives aimed at specifying the substantive scope of crisis management plans of ministers and heads of central offices. NIK stated that the present provisions of laws do not uniformly specify requirements as to the content of crisis management plans developed at various levels of public administration, thus the coherence and complementary of crisis management plans of all public administration are missing.

The NIK recommended the Minister of Infrastructure to develop and implement detailed rules and procedures for the operation of the Statutory Crisis Management System on the railway, taking into account the participation and specifics of activities of all operators within this system, in particular, railway companies and President of the Office of Rail Transport.

Train Hacking Case



NIK's audit on rail safety crisis management functioning aimed to explain reasons of events and issues connected with rail lines' crisis management systems functioning. However, the audit did not cover a worth mentioning trains' hacking case, as disclosed by a company which provided maintenance services for one of rail operators, Koleje Dolnośląskie. In this case, 30 trains were produced by a different Polish company, which, after having an obligatory maintenance, "refused cooperation", when serviced by the company that won the tender. The company that provided maintenance was different than original train manufacturer, who also applied but was unsuccessful with their bid. Despite being fully operational, these trains did not run, so the maintenance company decided to hire hackers to better understand the reasoning behind the malfunctioning. Suspicions of the original manufacturer's potential sabotage were exposed when hackers analysed the software of the train control computers. Their findings indicated that the train manufacturer may have deliberately programmed faults that occurred after other companies serviced the trains, or after a certain number of kilometres. These faults would immobilize trains when certain conditions were met, such as when. a train spent more than ten days in a location within specific GPS coordinates, pinpointed to the locations of repair facilities of several different companies that compete with producer for service contracts. The trains' software was modified to cause false "failures" , thus immobilizing trains. Some experts suggested that the faults may have been the result of deliberate actions by the train manufacturer that had lost tenders for servicing and maintenance due to higher prices. Hence, the suspicion is that the company may have sabotaged the trains in order to regain orders for their maintenance.

The NIK at present does not intend or plan undertaking audit of this trains hacking case. The above information illustrates a case difficult to imagine, anyways worth mentioning.

FEATURE ARTICLE

Nanay Bridge, the longest in Peru, located in the city of Iquitos and allows people to cross over the Nanay River. Source: Adobe Stock Images, Gino Tuesta

Innovation in Improvements to Concurrent Control Reports for Government Auditing of Large Public Infrastructure Projects

Author: Elio Canario Zelada, Supervisor, Office of the Comptroller General of the Republic of Peru

Some Supreme Audit Institutions (SAIs) have been implementing the Concurrent Control, a process created by the SAI of Peru, as it is a valuable tool for control of large projects. However, it is appropriate to raise innovative proposals aimed at improving the process of concurrent control in order to improve adverse situations identified by government auditors. Based on the lessons learned to date, it is important to improve the levels of effectiveness and efficiency in their interventions, with the goal of replicating their effect on the control by other SAIs that have decided to implement similar controls.

The Concurrent Control of public programs is one of the best practices for the control of the execution of large public infrastructure projects and is effective due to its functional autonomy and systematic and multidisciplinary nature. The concurrent control process does not imply interference in the management processes or the administration of the entity, nor does it limit the exercise of other governmental control services.

In the planning of the audit, the government auditor should study the project's technical file to understand any underlying doubts, and should dissipate them in a visit to the meet with the project's Works Supervisor. The audit's first key milestone should be the analysis of the technical file to rule out cost overruns, duplicative items, inconsistencies in the metrics, and above all, to ensure a degree of certainty of the technical support of the work to be performed. This review will ensure that the work will meet the objectives for which it will be built.

In the construction of bridges, railroads and airports, the auditors must review the technical file to verify if it has sufficient support. Within the technical file, auditors should ensure that the projects have all the permits in the route of travel and the correct location of the components necessary for the work, which must align with the pronouncements of specialized studies that support the technical file. It is not enough for auditors to review the compliance of the contractual clauses, as they should ensure that such clauses contain adequate protection of the main risks for the infrastructure construction.

After auditors have ensured that there is an approved technical file, and that the land where the work will be built has been delivered to ensure the correct execution of a project, it is very important to analyze if the work has adequate technical support, and if it will comply with the purposes for which it was built.

In Peru, there are experiences to reflect on, such as the construction of a high technology oil refinery. The refinery has a high volume operating capacity, and required a strong investment. However, the project planning did not justify the supply side of refining raw materials. Peru may lack the appropriate number of oil wells needed to meet the demand for the use of the refinery's capacity for which it was constructed. Without having justified the demand for raw materials, it did not guarantee efficient use of the refinery due to its large capacity.

Additionally, due to lack of appropriate technical studies, Peru has drinking water infrastructure projects that, in the end, are not used because the water extracted from the subsoil is in contact with minerals and is not suitable for human consumption. This fact can be noticed in the initial stage of drilling. In this stage, the Control Organ can halt the work if the regulations allow it, because it would not comply with the purposes for which it was built. However in some cases, we can see the construction of elevation tanks and laying of networks which have remained inoperative, resulting in greater inefficiencies and waste for the State.

As another example, Peru has the construction of bridges in sandy places where water currents easily undermine their foundations, while there are other nearby rocky places that guarantee stability and durability of the bridges built. Peru also has airports built next to an abyss and therefore, the airports cannot be expanded. This prevents the landing of large-scale airplanes, especially in the Sierra, while there are nearby places with the characteristics of the terrain that are more favorable for their construction.

Another component to take into account is the timeliness of the interventions of the government auditor. For example, it is a critical stage for the government auditor to be present in the construction of roads during the filling of the asphalt layer. During this stage, the auditor should verify whether it is in accordance with the provisions of the technical file. However, this requires the government auditor to have sufficient judgment to judge the technical file, to analyze whether the thickness of the layer is adequate in the circumstances, depending on the type of traffic to which the work will be subjected once completed. In this sense, if the asphalt layer executed by the contractor does not meet the characteristics foreseen in the technical file, the auditor should proceed to determine the economic damage, carrying out the audit with indication of the damage and the identification of those responsible and not wait until the work is concluded. By doing so, while the work is not fully executed, the contractor can correct what is wrongly done. It should not be an obstacle for the immediate execution of the audit that the damage caused was identified.

In this sense, the SAI of Peru has regulated the form and scope of the audit procedures by defining the issues under examination to ensure the quality and content of the reports. It is extremely important that expert auditors study the risks associated with each activity when reviewing the technical files. SAI Peru needs professional experts, not only to verify the seven subcategories that have been established for review on substantive issues, but so that government auditors can focus their work on the main risks associated with each activity. With expert review, the adverse situations contained in the resulting reports would be even more relevant and important, and thus, save the State resources when there is the need to justify the stoppage of a work that would not meet the objectives for which it is being built. By not waiting until all disbursements are made according to contract, this can limit and reduce the economic damage caused to the State.

These seven subcategories are related to:

1. Unexecuted penalties,
2. Payment for non-executed metrics according to the contract, partially executed or unsubstantiated;
3. Non-withheld performance bonds,
4. Legal interest to be recognized,
5. Unsubstantiated additional work,
6. Unsubstantiated term extensions, and
7. Others that the current regulations require their analysis and understanding within the scope of the audit.

These seven subcategories do not cover the most important risks reported by the public in the execution of works, especially if the penalties are not executed and the payment for non-executed metrics, according to the contract, can be solved by creating sanctioning regulations to force the Entity to carry out the work within a reasonable period of time.

In Peru, for example, there is no sanction for those responsible for not having executed the liquidation of the work. It is feasible for auditors to identify penalties for work not executed, which are generally due to deadline extensions caused by the contractor and the lack of participation of key personnel in the execution of the project.

In addition, in alignment with the technological development in the work of SAI Peru and the SAIs of the region, there are applications for artificial intelligence in this process. Artificial intelligence can be used to assess whether there is alignment across the contract agreement, whether the contractor presented the guarantee of work for the established amount, and if this guarantee has been issued by a competent entity supervised by the Superintendence of Banking and Insurance. This would expedite the verification profess, and not require waiting until the control commission is accredited for the exercise of the Concurrent Control.

On the other hand, with respect to the recognition of interests, payments of additional work and term extensions, regulations can be established so that this information is communicated to the Comptroller's Office within a determined period of time by the Supervisor of the Work, or provide for the integral publication of the documentation of the execution of the works on the entity's website, thus complying with the immediacy of the interventions of the SAIs.

If government auditors would evaluate the study of the technical file as milestone No. 1 in the Concurrent Control process, paying attention to the most common risks, interventions could be carried out in due time and identify immediately if the economic damage caused to the entity. The Concurrent Control audit would significantly improve the adverse situations in the SAI reports, being that this approach should be replicated in order to achieve better standards in the Audit and Control of large infrastructure projects.

FEATURE ARTICLE

Electric vehicle charging station in Indonesia. Source: Anzz Stock - stock.adobe.com

Auditing Infrastructure in Indonesia: Addressing Challenges in Closing the Infrastructure Investment Gap

Authors: Indah Noor Hafidias, MBA, CFE, CISA, Muhammad Septian Wicaksono, MA, CFE, GRCA

Introduction

Infrastructure is a fundamental part of economic growth, contributing to approximately 14% of the global gross domestic product (GDP)[1]. The lack of robust infrastructure can have wide-ranging consequences, affecting societal risks such as societal polarization, health and well-being, inequality and lack of economic opportunity or unemployment[2]. The Word Economic Forum (WEF) stated that insufficient public infrastructure ranks among the top 20 global risks. Given its significance, leveraging infrastructure is essential for fostering economic development.

In developing countries, the multiplier effect of infrastructure spending is often greater than in Western economies[3]. In Indonesia, infrastructure development is a national priority, but the investment gap is large, with only 37% of the government budget allocated to infrastructure. As a result, the Indonesian government has shifted its approach in the last five years, using public funds as a last resort[4].

To support the government in achieving the goals in the National Medium-Term Development and the Sustainable Development Goals (SDGs), Supreme Audit Institution (SAI) of Indonesia carries an important role in auditing various government initiatives to close the infrastructure investment gap. This article showcases audits finding and recommendations in key areas like communication, electricity, and transportation which have significant impact on developing nations like Indonesia[5]:

1. Auditing the Financing of Infrastructure Development Though Government Bonds and Foreign Loans
2. Auditing the Effectiveness of Public-Private Partnerships (PPP) In Closing the Infrastructure Investment Gap
3. Auditing the Innovation in Electricity Infrastructure for Electric Vehicles
4. Auditing the Transition of the Broadcasting Service to Strengthen the Digital Public Infrastructure

Auditing the Financing of Infrastructure Development Through Government Bonds and Foreign Loans

To meet the growing demand for infrastructure and to boost economic growth, the government has taken loans through regular government bonds, government sharia bonds, and foreign loans. SAI Indonesia conducted a special purpose audit to assess the effectiveness of the loan management in 2020-2022 to finance the urban development and electricity infrastructure projects[6].

The audit identified that the bond issuance exceeded the planning and benchmark/yield, and was determined without proper procedures, which lead to non-compliance with the sharia principle. This also caused inaccurate budgetary projections and financial burden. The audit pointed out the underperformance of the loan withdrawal and highlighted the need to increase government credibility with the lender, particularly for the electricity infrastructure project. Low withdrawal rates in foreign loans led to higher financial expenses, thus increasing commitment fees for the government.

In response, SAI Indonesia recommended the government enhance decision-making policies and governance to improve loan management. The audit emphasized the need for a reward and penalty system to address unfinished or delayed projects, as such delays pose risks to urban development targets and timely loan utilization by State Owned Enterprises. This recommendation aligns with a recent suggestion to utilize outcome-based funding where investment payment is directly linked with the result of the project[7]. In response, the government improved the accounting policies and standard operating procedures, enhancing the effectiveness and governance of loan management.

Auditing the Effectiveness of Public-Private Partnerships (PPP) In Closing the Infrastructure Investment Gap

The private sector plays a crucial role in infrastructure, due to its involvement in a public-private partnership (PPP) system[8]. The government has worked to establish a PPP framework: setting the regulation, conducting annual assessments on infrastructure projects to endorse the PPP scheme (which is called the PPP book), providing funding from the Project Development Facility (PDF) and the Viability Gap Fund (VGF), and guaranteeing funds for risk mitigation.

In 2023, SAI Indonesia conducted a performance audit on PPP governance in 2020-2023. This audit highlighted the inefficiency of PPP governance in meeting the infrastructure and urban development targets[9]. SAI Indonesia found that the implementation of PPP lacks comprehensive planning to assess the feasibility and priority of PPP projects. Several projects are behind the government targets. Incentives such as funds from the PDF and guarantee fund were not effectively implemented due to lack of regulation and unclear procedures.

To address these challenges, SAI Indonesia has urged the government to improve the initial assessment of PPP projects before being included in the PPP book. SAI Indonesia also recommended the government perform rigid monitoring and evaluation during each phase of the PPP, as well as increase cross-ministries collaboration to achieve the targets. Although there is still room for improvement, the government has improved the assessment of infrastructure projects in the latest PPP book, providing better information to the public, investors and the government itself.

Auditing the Innovation in Electricity Infrastructure for Electric Vehicles

The National Medium-Term Development Plan (RPJMN) for 2020-2024 highlighted the importance of increasing the use of clean energy in transportation, particularly through electric vehicles (EVs). Despite some progress—EV numbers surged from 1,439 units in 2019 to 133,225 units in 2024[10]—challenges remain. The government set ambitious targets, aiming for 2 million EVs and 13 million electric motorcycles by 2030, supported by a USD 455 million subsidy[11]. To meet this target, 32,000 charging stations will be needed by 2030.

Realizing the significance of EV infrastructure in achieving the SDGs, SAI Indonesia conducted a performance audit on the Provision of Battery-Based Electric Vehicle Infrastructure in 2019-2021[12]. One of the key findings was the growing need for innovative financing schemes to support the expansion of EV infrastructure.

SAI Indonesia identified several challenges hindering the growth of electric charging stations, including the high cost of investment, underexplored business model schemes of charging stations, the lack of clear regulation on charging station businesses, and the reluctance among citizens to switch to electric vehicles. As a result, there has been limited entry into the electric charging station market.

To address these challenges, SAI Indonesia recommended that the government implement monitoring and evaluation of the sharing economy model and suggested using the Provide, Privately Owned and Operated (PPOO) scheme to attract both private sector and state-owned enterprise investment. Additionally, SAI Indonesia recommended offering bulk-rate incentives to encourage private investment in charging stations. Currently, the public electric charging stations has risen to ninefold into 2.667 stations since 2021[13].

Auditing the Transition of the Broadcasting Service to Strengthen the Digital Public Infrastructure

Indonesia has recently transitioned from the analog to digital broadcasting in 2022, catching up with other Association of Southeast Asian Nations (ASEAN) countries. The Analog Switch Off (ASO) is a crucial step in enhancing Digital Public Infrastructure, as it enables more efficient use of the frequency spectrum, improves broadcast quality, and supports both fixed and mobile broadband networks. In the long run, this shift aims to expand access to better quality information, reaching more citizens across the country, including remote areas and islands, surpassing the 50% coverage recorded in 2019[14].

SAI Indonesia conducted a performance audit on the provision of digital broadcasting infrastructure in 2021-2022 at the Public Broadcasting Agency. The audit report highlighted the inefficiencies in the digital transformation process. Despite that digital transformation has become a national priority, digital broadcasting coverage remains low. The audit revealed that only 28% of 225 areas reached the minimum coverage of 70% of the population, while 29% of the population fell below this threshold. Alarmingly, 41,9% of population, which is approximately 116 million of citizens, remains untouched by digital broadcasting.

SAI Indonesia emphasized the importance of improving the digital broadcasting coverage. Consequently, the Public Broadcasting Agency was recommended to have the necessary number of transmitters and its supports, sufficient human resources to operate them, and appropriate budget planning to support both the infrastructure and personnel. Additionally, the decision-making process of determining the location of the transmission also plays an important role in increasing the coverage.

Key Takeaways

Infrastructure plays a vital role in fostering economic growth and development. While many developing countries, including Indonesia, are striving to improve their infrastructure, challenges such as financing gaps, inefficiencies in governance, and a lack of sufficient resources hinder progress. In a recent discussion on improving infrastructure, experts agree that while the financing gap in infrastructure development is inevitable and continuous, it is key not to spend billions of dollars on investments, but to act differently by adopting innovative approaches to ensure efficiency and sustainability in infrastructure projects[16].

Indonesia's infrastructure development highlights the need for strategic planning, collaboration between public and private sectors, and innovative financing models. Despite considerable efforts, such as the issuance of government bonds, the transition to digital broadcasting and the implementation of PPPs, significant challenges remain in managing government loans, expanding digital broadcasting coverage, and improving electric vehicle infrastructure.

To address these challenges, SAI Indonesia's audits provide critical recommendations to improve decision-making processes, strengthen monitoring systems, and implement innovative financing models. By adopting these measures, Indonesia can not only bridge the infrastructure investment gap but also ensure that infrastructure projects are more sustainable, efficient, and aligned with national development goals. In the long term, audits conducted by SAI Indonesia are expected to have an impact on enhancing overall project management and ensuring that infrastructure investments are used more effectively, reducing financial burden on the government and increasing loan utilization effectiveness, and enhancing the effectiveness of PPPs and helping close the infrastructure investment gap.

Footnotes

1. World Economic Forum, “Closing the Global Infrastructure Investment Gap.”
2. Schwab and Malleret, The Global Risks Report 2025.
3. Nisa and Khalid, “Impact of Infrastructure on Economic Growth.”
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Source: INTOSAI Supervisory Committee on Emerging Issues

Foresight and Supreme Audit Institutions: Navigating Global Trends

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Introduction

According to the United Nations Development Programme (UNDP) Global Centre for Public Service Excellence, foresight explores possible and probable futures, generating insights that enable transformative actions in the present, which are compatible with the unfolding future.

In an era of rapid transformation, foresight has become essential for public institutions to anticipate and respond to emerging challenges and opportunities. For INTOSAI and Supreme Audit Institutions (SAIs), this strategic tool ensures relevance and resilience in addressing complex, interconnected global trends.

By integrating foresight into their operations, SAIs can provide insight, strengthen accountability, and support good governance, ensuring they remain valuable partners in the pursuit of sustainable and equitable development for the future.

The report "Navigating Global Trends: Future Implications for Supreme Audit Institutions", approved by the INTOSAI Governing Board in October 2024, presents possible implications for INTOSAI and the SAI community arising from major drivers of change that will continue to affect the world over the next 15 years, reshaping societies and governance.

Methodology

The Global Trends Report gathers information from reports issued by multilateral institutions and think tanks, as well as insights from INTOSAI working bodies and Regional Organizations.
It primarily aims to provide approaches and inputs for INTOSAI's strategic planning, but is also intended to support SAIs in preparing for emerging issues, especially those SAIs with limited resources to conduct their own foresight initiatives.

The following provides an overview of the seven mega-trends identified and outlines the implications for consideration, while the full report offers lenses to explore a wider perspective.

1. Erosion of Trust

Although studies show that people want to trust institutions, trust is gradually declining across the globe, while conspiracy theories are on the rise. Trust can vary between institutions within the same country and among different countries. The erosion of trust in institutions is dangerous because it can lead to the erosion of democratic values and human rights.

- **Implications for Governments and Societies:** Weakened governance; misinformation proliferation; reduced civic engagement; international cooperation at risk.

- **Implications for SAIs:** Challenges in ensuring transparency and SAI independence; need for effective communication; enhancing citizen engagement to mitigate mistrust.

2. Economic Challenges and Debt

The global economy is currently navigating a complex and volatile landscape, characterized by a number of emerging trends and challenges. Key drivers influencing these dynamics include the lingering economic impact of the COVID-19 pandemic, ongoing international geopolitical tensions, the urgent need for a transition to sustainable economy, the rapid emergence of new technologies, and an all-time high in global debt, including borrowing by governments, businesses and individuals.

- **Implications for Governments and Societies:** Need to balance the demands of debt service with development spending, alongside efforts towards sustainable production and consumption.

- **Implications for SAIs:** SAIs need to be prepared to audit government initiatives to promote sustainable economic development and growth, as well as public debt management to ensure accurate reporting and responsible fiscal practices.

3. Digital Transformation of Governments and Society

Digital technologies are revolutionizing governance, economies, and citizen interactions. The rapid and profound advances are expected to further accelerate changes in scientific development and to offer unprecedented opportunities for efficiency, personalized services, and tackling complex problems.

However, these developments also carry major societal risks, ultimately presenting potential threats to human values and interests.

- **Implications for Governments and Societies:** Enhanced service delivery; cybersecurity threats; cybersecurity versus civil liberties; digital exclusion risks.

- **Implications for SAIs:** SAI digital transformation; auditing of digital systems; capacity-building for IT audits; addressing data privacy concerns.

4. Climate Change and the Triple Planetary Crisis

Current research indicates that multiple planetary boundaries have been breached, marking the onset of a “triple planetary crisis” that includes climate change, biodiversity loss, and pollution. Together, these crises have profound social and economic implications, affecting every aspect of life on earth.

- **Implications for Governments and Societies:** Increased risk of disaster and high associated costs; opportunities and risks linked to the green transition; social impacts of the crisis, including mass migrations.

- **Implications for SAIs:** Ensuring responsible resource management; collaboration on climate financing; auditing adaptation measures.

5. The Widening Demographic Gap

The demographic gap refers to the disparity in population characteristics, particularly age distribution, across different regions or countries. In the next decade, the demographic gap is expected to widen significantly due to varying birth rates, aging populations, and migration patterns. This divergence is set to shape global economic, social, and political landscapes in profound ways.

- **Implications for Governments and Societies:** Political unrest and youth unemployment; immigration tensions; economic challenges; more demand for international aid and cooperation for development.

- **Implications for SAIs:** workforce challenges in the SAIs themselves, more relevance on auditing effectiveness and efficiency of social programs.

6. Global Migration

This dynamic and evolving phenomenon requires robust and adaptive governance because of its economic consequences, such as labor flows, inflation, living standards, and government budgets, as well as ethical and security challenges and societal risks that can threaten human values and interests.

- **Implications for Governments and Societies:** It poses new challenges, such as enhancing emergency preparedness and dealing with fragile social systems.

- **Implications for SAIs:** SAIs will need to adapt their audit practices and address emerging risks and their impact on citizens' lives.

7. Rising Inequalities

The persistence and intensification of inequality are evident, both within and between countries. As numerous studies have shown, rising inequality undermines trust, limits the capacity of societies to change, stifles economic growth and places further strain on social protection systems.

- **Implications for Governments and Societies:** Economic growth constraints, political instability, pressure on public finance, reduced social cohesion, and a lack of shared identity or common goals. increased different perceptions by population groups.

- **Implications for SAIs:** more demand for public scrutiny of government actions and the use of public funds, increasing need for effective communications with stakeholders, potential for public auditing to have a greater impact.

Conclusion

The SCEI annual meeting of October 2024 focused on its next initiatives and emphasized the need for improved foresight collaboration within INTOSAI. Key discussions included identifying regional challenges and fostering partnerships with different INTOSAI bodies, starting with the Goal Committees.

Effective communication and avoidance of duplication of effort remain critical to success. As such, on March 2025, the SCEI expert group presented webinars to the whole INTOSAI community to explore the findings of the Global Trends Report.

The SCEI is also currently preparing a document to provide guidance on how to integrate the findings of this report into SAI´s operational and strategic planning as means for INTOSAI and SAIs to remain agile and effective in a rapidly evolving world.

To learn more about the SCEI and its work, please visit the newly updated webpage here.

Footnotes

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Source: Adobe Stock Images, Dumitru

Strengthening the Fight Against Gender-Based Violence in PALOP-TL through Coordinated Auditing

Author: Osvaldo Rudloff Pulgar

The Organization of Supreme Audit Institutions of Portuguese-speaking Countries (OISC-CPLP), with the support of the European Union-Funded United Nations Development Programme (UNDP) Multicountry Public Financial Management (Pro PALOP-TL), in collaboration with the Good Financial Governance Programme in Mozambique of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, (GIZ), successfully launched the Coordinated Performance Audit on Gender-Based Violence (CAGBV) on December 2, 2024. Hosted by the Tribunal de Contas de Cabo Verde, the international seminar marked a significant milestone in the collective efforts of Portuguese-speaking Countries: Angola, Cape Verde, Guinea-Bissau, Mozambique, São Tomé and Príncipe, and Timor-Leste (PALOP-TL) Supreme Audit Institutions to address the pervasive issue of gender-based violence.

Source: Osvaldo Rudloff Pulgar

The CAGBV aims to strengthen the capacity of SAIs to promote gender equality and empower women by conducting coordinated audits on gender based violence. Recognizing the alarming rates of gender based violence in the region, as highlighted by the World Bank, this initiative is a crucial step towards building more just and equitable societies. The audit will not only inform policymaking but also serve as a valuable resource for civil society organizations working to combat gender based violence.

Following the launch event, the audit teams participated in a four-day training course with the objective of strengthening their knowledge and skills. The event addressed two fundamental axes: awareness on gender issues and the deepening of audit procedures.

The event's program on gender issues unfolded across several thematic panels. It began with a comprehensive look at progress in respecting women's rights, providing a global and African perspective on gender equality, and noting both successes and remaining obstacles. The program then shifted to a discussion of the impacts and effects of gender-based violence, highlighting the problem's complexity and the call for coordinated action, with attention to the specific needs of vulnerable populations. Discussions on gender-responsive budgeting followed, emphasizing its role in improving women's lives and the importance of integrating gender considerations throughout the budget cycle. Finally, the event concluded with a panel dedicated to the institutional reforms necessary for promoting gender equality in Supreme Audit Institutions. In addition, the training provided practical guidance for conducting the audit, including the development of work plans, data collection and analysis, and the preparation of reports. Participants also had access to specific tools and methodologies for evaluating public policies related to gender-based violence.

Source: Osvaldo Rudloff Pulgar

It is important to emphasize that to complement the theory, several practical activities were carried out, such as analysis of real cases on gender, debates and group discussions to discuss relevant topics, such as the importance of civil society participation in audit processes, the challenges of implementing public policies with a gender perspective and good practices in gender auditing. The combination of theory and practice in the ACVBG training was fundamental to ensure that the teams acquired the necessary skills to conduct high-quality gender audits.

The CAGBV, spanning from last quarter of 2024 and the first quarter of 2026, is structured into five phases: capacity building, planning, execution, consolidation, and dissemination of results. The final reports, both national and consolidated, will provide evidence-based insights to inform policy and programming.

Through this coordinated effort, PALOP-TL SAIs are demonstrating their commitment to promoting gender equality and accountability. The CAGBV is expected to yield valuable findings that will contribute to the development of effective policies and programs to address gender based violence among Portuguese-speaking Countries.

Source: Adobe Stock Images, melita

Advancing Gender Equality in the Face of Challenges? SAIs Have an Important Stake

Principal contributor: Petra Schirnhofer, IDI Gender and Inclusion Focal Point

Gender equality is at the heart of a peaceful, prosperous and sustainable future for everyone, everywhere. Over many decades, progress on women's and girls' rights has laid the foundation to gender equality and inclusion in many parts of the world. For example, today, more than 100 countries track budget allocations for gender equality.

Gender equality is a benefit for all societies, and not only for women and girls, but for everyone. At a global level, the 2030 Sustainable Development Goals (SDGs) will only be achievable if we ramp up support to gender equality.

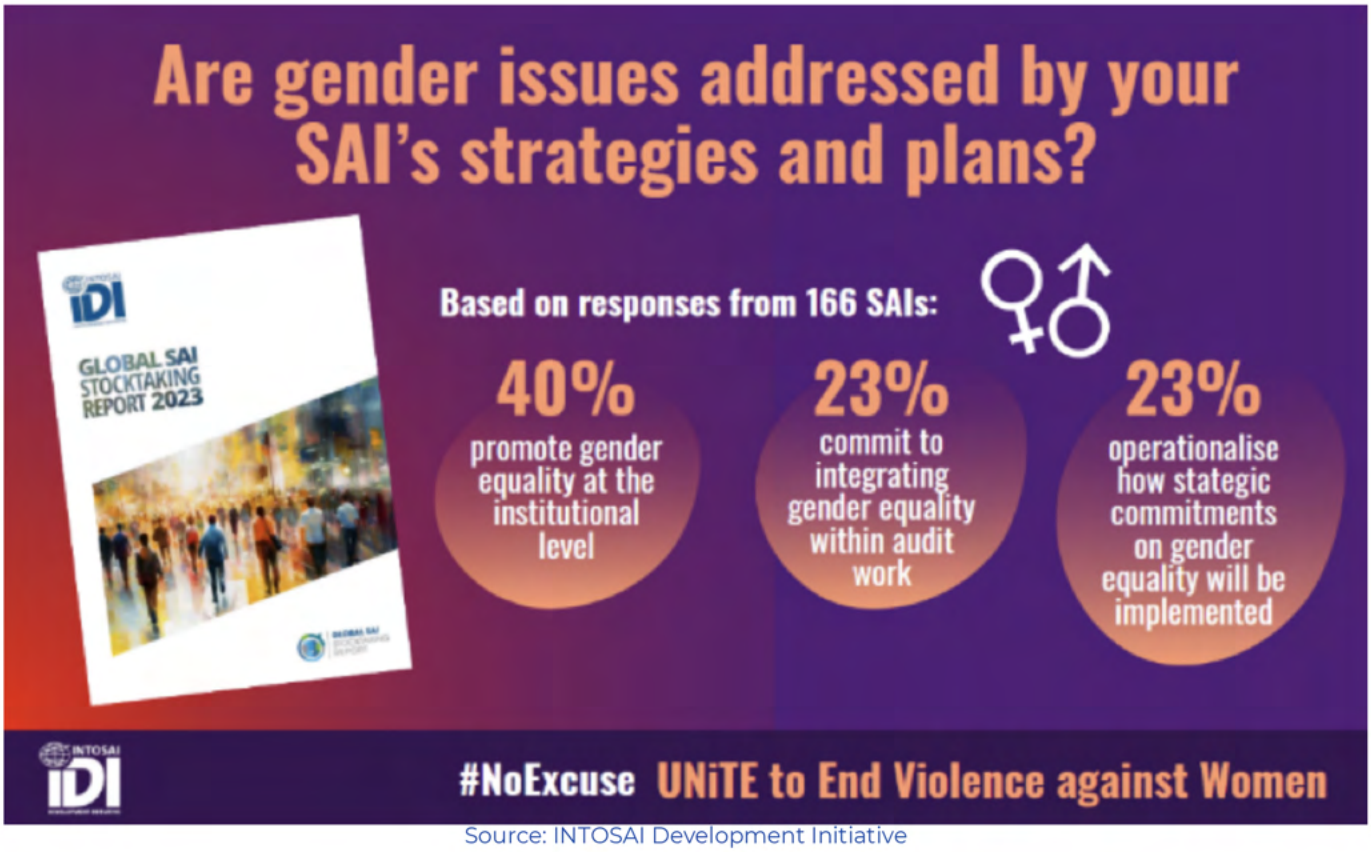
And yet, the world continues to face challenges on gender, diversity and inclusion efforts. Many people, including women and girls, have been left behind during COVID-19, in the climate and economic crisis and in conflicts[1]. In an increasingly polarised world, 'anti-gender' movements try to affect institutional, legal and policy frameworks.

This year's theme for International Women's Day was "For ALL women and girls: Rights. Equality. Empowerment." 2025 is a pivotal moment in the global pursuit of gender equality and women's empowerment. It also marks the 30th anniversary of the Beijing Declaration and Platform for Action.

To advance rights for ALL women and girls is now more important than ever – for gender equality, for sustainable development and for a better tomorrow. Supreme Audit Institutions (SAIs) contribute in their countries. They can make a difference. SAIs can hold governments accountable for their efforts in advancing gender equality.

How SAIs address gender equality – a global picture

The INTOSAI Development Initiative's (IDI) triennial Global Surveys and Global SAI Stocktaking Report 2023, show that SAIs have become more gender-sensitive in some areas.



Source: INTOSAI Development Initiative

At the SAI Governance level, more than 60 per cent of SAIs say they have institutionalised gender responsibilities to some extent.

Of particular interest, in 2023:

- 37 per cent of SAIs had gender focal points,
- 30 per cent of SAIs report having a gender policy,
- 40 per cent of SAIs state that their Strategic Plan promotes gender equality at the institutional level, and
- 37 per cent of SAIs say they address gender and inclusion in their human resources (HR) strategy.

At the SAI audit level, 31 per cent of SAIs report having conducted at least one gender related audit and 21 per cent say that they had mainstreamed gender into their audits. By applying a gender lens in their audits, SAIs can reflect and assess the needs and voices of women, girls and marginalised groups and make a difference to the lives of people. They can lead by example as an institution and live up to the spirit of INTOSAI Principle 12 on the value and benefits of SAIs. Results from the Global Surveys and Stocktaking show more SAI engagement but there is still a way to go.

How IDI supports SAIs on gender equality and inclusion

IDI is looking at ways to continue building momentum on gender equality and inclusion through its work with SAIs and internally. In fact, IDI's support is based on the very needs of SAIs on gender equality and inclusion. Here are some examples of how IDI engages with SAIs:

SAI Governance:

Supporting gender responsiveness and inclusion in SAI human resource management, through TOGETHER. Since 2022, this IDI initiative has supported 36 SAIs in English, French and Arabic across several INTOSAI regions to mainstream gender and inclusion in different dimensions of their HR management system.

Source: INTOSAI Development Initiative

Measuring SAI Performance through the Performance Measurement Framework (SAI PMF): IDI is leading efforts to better reflect gender and inclusion in the current revision of the framework.

Supporting SAI leaders: MASTERY, an IDI initiative for heads of SAIs, and the SAI Governance Academy, include elements and modules on inclusive leadership.

SAI audits:
Supporting more equal futures through Equal Futures Audit (EFA): IDI launched the EFA Changemakers initiative in 2023. Together with SAIs, IDI identified six key areas of marginalisation in the initiative: gender, poverty, ethnicity, migration, age and disability. IDI offered EFA in English and Spanish to 24 participating SAIs.

Source: INTOSAI Development Initiative

The idea is to support a pool of senior auditors to become change agents and champions for integrating equality and inclusion into SAI audits and audit strategies. By the end of 2024,14 SAIs had developed and started implementing EFA change strategies, including Brazil, Egypt, Kosovo, Mauritania and the Philippines. At the start of 2025, the SAIs of Chile, Costa Rica, Mauritania, Thailand and Uruguay have issued their EFA reports as per their mandates. Other participating SAIs are expected to complete their strategies and audit in 2025.

Supporting SAIs in leaving no one behind: To be gender responsive and inclusive, we need to work together and leave no one behind. IDI has revised the IDI SDG Audit Model (ISAM) and developed frameworks for auditing Policy Coherence and Leave No One Behind (LNOB) in 2024.

Providing **P**rofessional **E**ducation for **S**AI **A**uditors **(PESA)**: For IDI, PESA also stands for inclusive education materials, diverse virtual mentors, reflecting categories of gender, ability, ethnicity and culture, and examples and case studies that are mindful of gender and inclusion.

SAIs in challenging situations:
Together with partners, IDI supported a number of challenged SAIs in finding ways to better reflect gender, diversity and inclusion in their governance and audit work. One result of this was a recently published audit report on gender-based violence by SAI Madagascar.

These are some examples showing what SAIs can do to strengthen gender equality and how IDI supports them. This support builds on IDI's Gender and Inclusion Policy and ongoing journey. It also requires advocacy within the INTOSAI Community and SAI engagement. We know that the current scale and speed of progress are insufficient to achieve gender equality by 2030[2]. In parts of the world, we even see an increased pushback against gender equality. Yet, we need to move forward, not backwards. Let's advance together. Now is the time.

See here for IDI's short video on Equality Matters: https://youtu.be/E78yOHdG5ns?si=0LVSCisvqfVvaxOT

Footnotes

1. See here for a link to UN Women policy briefs also looking at the negative impact of COVID-19 on gender equality and here on how climate change and gender inequality are connected.
2. See also the World Economic Forum's Global Gender Gap Report 2024.

Source: Adobe Stock Images, Hanna

The Role of Organizational Culture Audits: GCA's Case Study to Foster a Culture of Diversity, Equity and Inclusion

Author: Dr. Seita Al Mandeel, Supervisor General of the Internal Audit Department at the GCA.

As SAIs navigate today's rapidly evolving technological and regulatory advancements, the morality, resilience, and productivity of their auditors can experience significant fluctuations. These variations, if remained uncaptured, pose a threat to the core mission of SAIs, which is to ensure transparency, accountability, and the effective use of public resources.

To address these challenges, it is imperative for SAIs to establish a robust framework for auditing their organizational cultures and to ensure that the institution's auditors and operations adhere to the highest values and principles while exercising their role to the public in a continuously evolving ecosystem. However, the intangible and widely conceptual nature of organizational culture presents a significant challenge in drawing solid added value about the impact of transformative advancements on the institution auditors' behaviors, diversity, equity and inclusion and so on, the core-mission of SAIs.

This spotlight explores the critical role of organizational culture audits within SAIs, drawing insights as learned from The Saudi General Court of Audit (GCA)'s recent case study.

GCA's Case Study

GCA has recently undergone a significant transformation as part of the broader Saudi National Transformation Program. The transformation within GCA has been multifaceted, encompassing enhancements in transforming human capability, digital advancements and communication with government entities.

To ensure that these transformative initiatives have preserved the institution's core mission, GCA conducted an organizational culture audit to achieve the following objectives:

1. Ensure that GCA's mission, values, and principles are deeply ingrained in the behavior and actions of all individuals within GCA.
2. Ensure that the internal value system remains robust and resilient, particularly during periods of significant transformation and evolution within the organization.
3. Ensure that culture values and leverages diversity, promotes equitable opportunities, and ensures that all individuals are included and valued for the best interest of overall organizational performance.

To achieve these audit objectives, GCA's internal audit team developed a tailored framework to navigate both the tangible and intangible aspects of culture.

Designing a Culture-Focused Audit Model

A critical step followed by GCA in the pre-audit stage was to conduct a thorough analysis of the core values and principles that guide GCA. This involved developing a deep understanding of the foundational beliefs and standards that shape GCA's operations. The purpose of the analyses aims to define the key pillars of GCA's culture that captures the essence of its organizational culture.

This has been followed by developing a measurable model of culture by translating abstract cultural concepts into concrete, measurable pillars that can be systematically evaluated and aggregate the sub-measure of pillars into an overall level at the GCA.

Harnessing Stakeholder Input for Comprehensive Insights

While the cultural audit aims to encompass insights from the entire workforce, a detailed analysis helps in selecting the most effective methods to gather insights. This process includes segmenting the workforce based on various criteria such as departmental roles, hierarchical levels, and tenure within the organization. This targeted analysis enables the identification of specific cultural dynamics and issues unique to different groups and sub-cultures within the organization, facilitating a more nuanced and accurate assessment of the overall culture.

To gather insights, establishing robust and diverse data collection methods is crucial for capturing a holistic view of the organizational culture. For the GCA, this includes designing and implementing surveys to gather quantitative data, conducting focus groups to explore qualitative insights, arranging one-on-one interviews for in-depth personal perspectives, and facilitating brainstorming sessions to encourage open dialogue and creative thinking.

Mapping Risks Through Preliminary Conclusions

Once the data has been collected, the next step is to analyze the survey results and other gathered information to draw preliminary conclusions. This involves scrutinizing the data to identify emerging patterns, trends, and key themes that provide an initial understanding of the organizational culture.

Another step in this phase is to develop a risk and control matrix that involves mapping out the identified preliminary conclusions to identify cultural risks, evaluating their potential impact, and determining the existing or mitigation strategies.

Probing the Depths of Organizational Culture

The next step is to analyze gaps between different data sources. Comparing survey responses with the results of focus groups and interviews helps identify significant discrepancies. For instance, survey data might indicate high employee satisfaction, while focus groups reveal underlying issues related to communication or leadership.

In addition to analyzing gaps, it is essential to identify negative indicators within the data. Negative results from surveys, such as low participation rates or weak evaluations, can signal potential problems. By comparing these results with focused groups and interview outcomes, auditors can gain a holistic understanding of the cultural landscape.

Interpreting discrepancies between quantitative and qualitative data is a critical step in the culture audit process. Analyzing the reasons behind these differences allows auditors to link the discrepancies to the organizational context and cultural objectives. For example, a discrepancy between high engagement scores in surveys and negative feedback in focus groups might indicate a communication gap or a misalignment between leadership and employees.

Lessons Learned

1. GCA's exercise unveiled the necessity of translating the abstract and intangible concepts of culture into defined pillars for effectively measuring and assessing organizational culture, making it easier to identify specific areas for improvement and development. This is achieved by developing a measurable model of culture.

2. The importance of involving personnel from all levels ensures a comprehensive understanding of the organizational culture and fosters a sense of ownership and commitment to the audit and its outcome.

3. The culture audit should not be viewed as a one-time exercise. It is critical to re-conduct the audit regularly and, most importantly, whenever significant organizational changes occur.

Conclusion

The organizational culture audit was crucial in identifying how transformative changes impact the SAIs, by understanding and addressing the cultural dynamics, SAIs can contribute to fostering a resilient, satisfied, and productive workplace where all individual feel included and valued, ultimately supporting SAIs' diversity, equity and inclusion while upholding the highest values.

Source: Adobe Stock Images, Michael Traitov

Strengthening Public Sector Cybersecurity Audits: Leveraging NIST Standards for Supreme Audit Institutions

Author: Thiago de Oliveira Teodoro

Introduction

The Supreme Audit Institutions (SAIs) play an essential role in assessing the effectiveness of government policies. In an era marked by rapid technological shifts, policies governing cybersecurity and data protection are under immense pressure to meet high standards of resilience and compliance. This article aims to broaden our understanding by examining new insights that can complement the existing guidelines provided by the International Organization of Supreme Audit Institutions (INTOSAI), mainly described in the:

1. Working Group on IT Audit (WGITA)-INTOSAI Development Initiative (IDI) Handbook on IT Audit for Supreme Audit Institutions
2. Guid-5100: Guidance on Audit of Information Systems and the related initial draft version.
3. Cybersecurity and Data Protection Audit Guideline from WGITA

The Cybersecurity and Data Protection Audit Guideline, in particular, lists several best practices from the National Institute of Standards and Technology (NIST), which were used as a baseline for showing how they can add security features to the existing INTOSAI guidelines. The NIST framework provides a comprehensive framework and a flexible, customizable catalogue of security and privacy controls to help organizations manage system risks, address cyber threats, and support comprehensive, organization-wide risk management.

This review will highlight what one can consider the five most critical NIST security and privacy control families referenced by INTOSAI guidelines and that can be correlated with high-impact cyberattacks.

Five Essential NIST Control Families: Lessons from High-Impact Cyberattacks

1. **Supply Chain Risk Management (SR)**
Supply Chain Risk Management has become a critical concern due to the growing prevalence of supply chain attacks that threaten both public and private sector entities. One notable example is the SolarWinds Attack in 2020, where adversaries infiltrated software updates, leading to widespread compromises, including among government agencies. Such incidents show the importance of robust oversight and risk assessment when dealing with third-party suppliers. To mitigate these risks, SAIs should establish clear guidelines for evaluating supplier vulnerabilities and verifying the authenticity of components and services. Implementing standards like NIST 800-161 can enhance security by providing structured frameworks for identifying and managing supply chain risks.

2. **Incident Response (IR)**
Incident Response Management is essential for minimizing the impact of security breaches, particularly in the face of ransomware and Advanced Persistent Threats (APTs). A simple example is the April 2022 Conti ransomware attack on Costa Rica, which severely impacted multiple government agencies, including the Ministry of Finance, disrupting tax collection and other critical services. Such incidents highlight the need for proactive incident response planning to ensure organizations can detect, contain, and recover from cyberattacks. SAIs should promote comprehensive incident management strategies, including assistance frameworks, structured response plans, and regular testing of incident protocols. Adopting industry standards like NIST SP 800-61 can further strengthen response capabilities and enhance overall cybersecurity resilience.

3. **Personally Identifiable Information (PII) processing and Transparency (PT)**

Privacy and Data Protection have become paramount as regulations, such as the General Data Protection Regulation (GDPR), impose strict requirements on managing and safeguarding personally identifiable information (PII). Failure to protect sensitive data can lead to severe breaches, as seen in 2020 when adversaries compromised governmental communications and critical political information in the Norwegian Parliament. Such incidents highlight the importance of strong privacy governance and compliance measures. SAIs should implement privacy impact assessments and establish comprehensive data protection frameworks to mitigate risks. Incorporating the NIST Privacy Framework allows SAIs to develop a structured approach to privacy governance, ensuring compliance, accountability, and sustained public trust in data handling.

4. **Continuous Monitoring and Automated Security Operations (CA, SI)**

Continuous Monitoring and Automated Security Operations are essential for identifying and mitigating vulnerabilities in real-time, especially in critical systems. A significant example is the MOVEit Transfer Vulnerability Exploitation in 2023, where adversaries successfully embedded malware in legitimate data transfers, impacting multiple organizations, including the U.S. Department of Energy. This incident shows the importance of proactive and automated security monitoring to detect and respond to threats before they escalate. SAIs should adopt automated tools, adaptive security methodologies, and continuous monitoring frameworks to enhance cyber resilience. Leveraging guidelines from NIST 800-137A can help establish robust security operations that dynamically respond to emerging threats and vulnerabilities.

5. **Internet of Things (IoT) and Operational Technology (OT) Security (PE, SC)**

The Internet of Things (IoT) and Operational Technology (OT) play a central role in critical infrastructure, but their weak configurations make them prime targets for cyber threats. A singular example is the Colonial Pipeline Ransomware Attack in 2021, where adversaries disrupted fuel distribution across the U.S., leading to widespread shortages and triggering a federal response to enhance critical infrastructure security. This incident describes the need to secure IoT and OT environments to prevent similar disruptions. Supreme Audit Institutions (SAIs) should adopt risk-based auditing strategies that address IoT and OT vulnerabilities, including device authentication, encryption, and secure communications. Utilizing the guidance from NIST SP 1800-25, 1800-26, 800-82 can strengthen the resilience and security of these systems.

Conclusion

These five security areas tackle key threats, but numerous other NIST security and privacy control families could also be considered. A similar methodology can be applied to broaden the analysis, focusing on specific security controls and offering more targeted recommendations. This approach can leverage existing INTOSAI guidelines while incorporating detailed insights from other standards, such as NIST.

Finally, by enhancing cyber security controls, SAIs can better audit and reinforce security controls, ultimately improving the resilience of public sector information systems.

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