WGISTA Project Report

"Create a list or database of experts or consultants at Supreme Audit Institutions that can be shared and used by INTOSAI members and Regional Organizations"

Annex-II

Quality Assurance Certificate of the Chair of the
Working Group on Impact of Science and Technology on Auditing

This is to certify that WGISTA project "**Create a list or database of experts or consultants at Supreme Audit Institutions that can be shared and used by INTOSAI members and Regional Organizations**" which is placed at level 3 of Quality Assurance as defined in the paper on "Quality Assurance on Public goods developed outside Due Process" approved by the INTOSAI Governing Board in November 2017; has been developed by following the Quality Assurance processes as detailed below:

(i)   The project proposal was formulated by the Project Team, consisting of WGISTA Chair SAIUAE (the project team Lead) as well as member SAIs including SAI Estonia, SAI Kenya, SAI China and SAI Hungary. Approval for the project proposal was granted by the WGISTA Chair in June 2022,

(ii)   The project team developed the project report and the database list template,

(iii)   Following the protocol for QA level 3 documents; the Exposure Draft was circulated to all members of WGISTA for comments and feedback on 27th October 2022 to receive feedback by 14th November 2022,

(i)   This Endorsement version has been finalized by the project team after incorporating all the comments and feedback received from WGISTA members.

The product developed is consistent with relevant INTOSAI Principles and Standards. The structure of the product is in line with the drafting convention of non-IFPP documents.

The product will be subject to review and update every two years or as deemed necessary. As this paper is not directly linked to a specific ISSAI, no expiry clause is included.

H.E. Humaid Obaid Abushibs
Chair of WGISTA
INTOSAI KSC

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Quality Assurance Certificate of the Chair of the Knowledge Sharing and Knowledge Services Committee

Based on the assurance provided by the **INTOSAI Working Group on Impact of Science and Technology in Auditing (WGISTA)** and the assessment by the Goal Chair, it is certified that the WGISTA Project Report on **"Create a list or database of experts or consultants that can be shared and used by INTOSAI members and Regional Organizations"** which is placed at level **3 (three)** of Quality Assurance as defined in the paper on "Quality Assurance on public goods developed outside Due Process" approved by the INTOSAI Governing Board in November 2017, has been developed by following the Quality Assurance processes as detailed in the Quality Assurance Certificate given by the Working Group Chair.

The product will be subject to review and update every two years or as deemed necessary. As this paper is not directly linked to a specific ISSAI, no expiry clause is included.

Girish Chandra Murmu
Chair of Knowledge Sharing and
Knowledge Services Committee

Preface

This project has been undertaken as part of the Working Group in Science and Technology (WGISTA) 2022-2023 work plan. The fundamental aim of this project is to foster collaboration and establish connections among INTOSAI members and regional organizations by leveraging the expertise and knowledge in emerging and advanced technologies, facilitating the exchange of valuable insights and experiences.

The project team comprised dedicated members from SAIUAE (project lead), SAI Estonia, SAI Kenya, SAI China and SAI Hungary.

The project was conducted in adherence to the requirements of Quality Assurance of products developed outside the Due Process - QA level3. The project report has been shared with all WGISTA members as required by the protocol. Constructive feedback and comments received from WGISTA members have been adequately addressed by the project team.

We would like to express our sincere gratitude to all the individuals and organizations whose active participation has enriched the outcome of this project. Their valuable contributions and unwavering support have greatly enhanced the quality and relevance of this report.

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Introduction

When working on issues related to emerging and advanced technologies, many Supreme Audit Institutions work in isolation from experts at other SAIs who might have relevant knowledge. Connecting SAIs to experts and knowledgeable resources could improve strategic decisions and policy-making processes on implementing emerging and advanced technologies.

One possible tool for making such connections is a database of experts, with descriptions on their areas of expertise, locations, languages spoken, and other salient characteristics. This tool would not only provide a ready database of experts in advanced technologies, it may also serve as a starting point to connect experts of advanced technologies and knowledgeable resources from different SAIs for exchange of ideas and sharing of knowledge.

In October 2021, the INTOSAI Working Group on Impact of Science and Technology approved a project titled "Create a list or database of experts or consultants that can be shared and used by INTOSAI members and Regional Organizations."

There are two mandatory and one optional deliverables for the project:

- **Deliverable one:** A well-researched document that identifies effective and practicable options for creating a database of experts/consultants related to advanced and emerging technologies. The database will be a common pool for INTOSAI members and regional organizations. The document should help identify the criteria for inclusion in the database, the competencies to be listed, the kinds and levels of support expected from the experts, the frequency and responsibility for updating the database, the best ways to access it, and the protocols to be followed for accessing the experts.
- **Deliverable Two.** A List of Experts. Using the approach described in the document from Deliverable One, the WGISTA secretariat will ask SAIs to nominate experts for inclusion in the list/database.
- **Deliverable Three (Optional).** A web-based application to implement the database of SAI experts. If WGISTA Secretariat decides to acquire a custom-built software application for the purpose, the project team may help as project managers for the application. The WGISTA Secretariat will identify and purchase the software. This phase will be optional and occur after the end of the main project.

The project team is being led by SAI UAE, and the following SAIs also opted to be part of the team:

- SAI Kenya
- SAI China
- SAI Estonia
- SAI Hungary

This document is the Deliverable One of the Project.

WGISTA may also consider regular virtual meetups of experts with SAIs for knowledge sharing discussions. This will serve two purposes: First, it will provide knowledge exchange among experts from different SAIs to keep everyone abreast of the latest trends and possibilities with these emerging technologies. Second, it will keep the list of experts active so that it does not become redundant.

Defining Advanced Technologies and SAI's Requirements

According to the WGISTA terms of reference for this project, the database should include experts with competencies in the following advanced technologies:

- Artificial intelligence
- Blockchain technology
- Robotic process automation
- Cybersecurity
- Data analytics
- 5G wireless technology
- Machine learning
- Quantum computing

Because strategic understanding of advanced technologies is also important, we have also included it as a desired area of expertise. And because many of the above technologies depend heavily on underlying data, we have included advanced data analytics and its related competencies.

Competencies To Be Included In The Database

It is important that the whole spectrum of needs and requirements is addressed. While the operational/implementation needs are vital, it is also crucial that SAIs can have access to expertise in understanding business needs of advanced technologies and planning phase of advanced technology audits. The competencies may belong to following three broad segments.

Understanding business

Understanding the landscape of emerging technologies from a public sector auditor's perspective, having insight into how SAIs are faring with respect to these technologies and the best approaches to mainstream these technologies in public sector auditing will be a key. WGISTA has a forthcoming *Environment Scanning Report* to understand such perspectives on emerging technologies from a public sector auditor.

Planning

Another key area of expertise will be in applying appropriate criteria, frameworks and standards. Additionally, scanning the legal environment and its application; determining the most effective project plans and suggestions for optimal resource planning; as well as selecting/generating proper methodologies.

Auditing

In the auditing area, various competences will be needed regarding data management and analysis – descriptive data analysis (verifying data integrity, sampling – requires data science competence), diagnostic analysis (reasoning behind potential issues - needs more domain-related competence), predictive analysis (what will the process result in – requires data science competence, and also domain-related competence) and prescriptive analysis (what are the possibilities for mitigating the risks, needs more domain-related competence);

- Horizontal capacities: large (or big) data analysis, cluster analysis, process mining, Natural Language Processing (NLP) including semantic analysis;
- Competencies in developing access to data (Application Programming Interface-API development, communicating with databases via SQL, R, Python etc);
- Competencies in processing data (Extract Transform Load-ETL, data warehouse development);
- Formulating audit results (stakeholder relations, international comparison – are there similar solutions developed elsewhere, graphical representation of the information and data using visualization).

Based on above discussion, here is a list of key competencies which should be included in the database:

- Understanding strategic environment of implementation of advanced technologies
- Understanding SAI's strategic environment vis a vis advanced technologies
- Mapping SAI's key inner competencies related to Technology
- Analyzing SAI mandate vis a vis advanced and emerging technologies
- Advanced Data Management and Analytics (including descriptive, diagnostic, predictive and prescriptive)
- Artificial Intelligence Risks
- Artificial Intelligence implementation at SAIs
- Understanding/Auditing Artificial Intelligence algorithms
- Machine Learning
- Blockchain Understanding

- Blockchain Risks
- Auditing Blockchain based systems
- Understanding of frameworks/standards of advanced technologies
- Natural Language Processing (NLP including semantic analysis)
- Developing access to data (API development, communicating with databases via SQL, R, Python etc);
- Data visualization concepts
- Data warehouse concepts
- ETL (Extract, Transform, and Load) Data
- Advanced Cybersecurity Concepts
- Advanced Cybersecurity Audits
- Robotic Process Automation
- Quantum Computing
- 5G concepts

Nature Of Support/Help Expected From The Experts

The nature of expertise and support these experts may provide will mostly depend upon the SAIs who are requesting expertise and the concurrence of the expert resource and their SAI. The duration of the needed support should also be clarified before engagement.

It should also be noted that the support/advice/help from expert resources will be advisory in nature and arranged in spirit of knowledge sharing and will not form basis of any financial decisions or critical decisions by borrowing SAIs, solely relying on their advice. The support/help can be in any of the following forms:

- Technical discussion (virtually) on a SAI project related to emerging technology
- Technical discussion (virtually) on implementation of any of the advanced technologies
- Technical discussion (virtually) on any advanced technology as listed in the Competencies included in the database/list of experts
- Capacity building/training (virtually) on any of the emerging technologies
- Technical discussion (in-person) on a SAI project related to emerging technology
- Technical discussion (in-person) on implementation of any of the advanced technologies
- Technical discussion (in-person) on any advanced technology as listed in the Competencies included in the database/list of experts
- Capacity building/training (in-person) on any of the emerging technologies
- Any other related support agreed between borrowing and lending SAIs

NOTE: The experts appearing on the list will be listed on a voluntary basis and their availability for a borrowing SAI will be subject to their concurrence and with knowledge of the lending SAI. The detailed contours of the assignment will be mutually agreed between the borrowing SAI and the expert/lending SAI after WGISTA secretariat connects them.

Criteria For Inclusion In The Database Of SAI Experts

Criteria should be proven positive experience in a reference project, described by SAIs methodological representative (not expert himself/herself). We would not suggest adding any more criteria as it's up to a SAI to decide, whether experience described is sufficient for a particular engagement.

For reference, at EUROSAI expert database, the following dimensions have been considered: First Name; Surname; SAI; Position; Years in SAI; Previous ICT- related experience before SAI (if any); Main competencies; Certification; Project portfolio; Audit portfolio; Engagement possibilities; Languages; E-mail; Phone.

Definitely private experts should be included, but we only suggest enlisting those experts who have been included in SAI projects before – if there are positive use-cases, the spill-over effect might benefit the SAI.

How To Approach SAIs

WGISTA Secretariat will be responsible for connecting SAIs to the experts. A virtual form will be sent to all SAIs for nominating resources to be included in the database. The virtual form should capture the details as per the template attached at the end of this report.

The Template lists detailed information about the expert. Experts should be officially nominated by SAIs.

How To Access The Database?

The below details apply, in case, WGISTA opts to have a formal online and live database (which is optional deliverable subject to WGISTA's approval), based on the list of experts. In case WGISTA decides to go for the online database, the formal Requirements Specifications document will need to be created. However, the basic structure of the database and access protocols are proposed below:

a) Given that besides the SAIs, there could be other development partners who may wish to engage these experts on behalf of the SAIs, the expert's database can be public, however, it should be behind a login screen and only those with approved registration should be able to access it. The WGISTA website can have a link to the database, where interested parties can search for the experts. The search filters (or criteria) to be used and based on the experts details provided, can be:

1. Education Degree

3. Main Competencies

4. Area of expertise

5. SAI Region

6. Language

7. Years of Experience

We can have multiple search filters to cater for specific details an interested party would wish to look for. We suggest that the areas of experts should be identified with the numbers of experts in each field and their classification to determine the fields that have shortage.

b) The search would then lead to a page that shows the details of probable experts that meet the set criteria and upon identifying the preferred expert(s), a submit request button can be activated. This will send the details of the search i.e. who did the search and the potential expert, to the WGISTA secretariat.

c) The secretariat would then officially communicate the request to the respective SAI(s) indicating the following, after getting this information from requesting SAI:

1. Expert identified and probably the criteria used

2. Details of the assignment to be undertaken

3. Period and location of the assignment

4. Travel, accommodation and incidental costs associated with the assignment, if it will be an in-person assistance

5. Contact person

d) Upon approval by the lending SAI, the expert can directly engage with the interested party. This process will enable WGISTA to also track and report on experts' utilization within the globe.

NB: There is a need for the experts to give consent on sharing their personal information in compliance with applicable data protection laws.

Till the time the online/ web based version is made available, WGISTA secretariat will be custodian of the offline database/list. It will not be advisable to publish a file online containing the details of the experts' because of the privacy concerns. The requesting SAIs may approach WGISTA secretariat with

their requirement for experts and WGISTA secretariat will look up the list and share the matching experts.

Upon expression of interest by a SAI in an expert, the requesting SAI will submit a formal request to WGISTA secretariat, which will follow the process given in Section C and D above. WGISTA will keep a record of the Experts engagements with SAIs and Summary of the Projects and this has also been added to the report.

Updates To The SAI Expert List/Database

It will be important to keep the list/database updated to ensure that the names of expert resources appearing on the list/database are current. WGISTA secretariat will have custody of this data/list, therefore, it is suggested that the responsibility to keep the database updated may rest with WGISTA secretariat.

Since emerging technologies advance at a rapid pace and also because the SAIs are continuously trying to update and upgrade the capacities and competencies within their institutions, it is suggested that WGISTA may undertake an exercise every two years after first publishing of the list to update it in order to avoid any redundancies and inactive/invalid entries in the data. This will also provide an opportunity to add more names and competencies to the database as they become available. WGISTA will undertake this exercise after a survey from SAIs if any additional competencies need to be added to the list/database.

Template Of List/Data To Be Captured

First Name;

Surname;

SAI;

SAI Region e.g ASOSAI, EuroSAI Etc;

Position;

Education Degree;

Years of experience in SAI;

Previous ICT- related experience before SAI (if any);

Main competencies; (to be selected from the list that will be part of the virtual form)

How the expert can help other SAI (A short paragraph about experiences of expert and how the expert can help SAIs) (Optional field.)

Certification (if any);

Project portfolio; (Up to top 5 projects name)

Audit portfolio; (Up to top 5 audit assignments)

Engagement possibilities; (virtual, in-person, short duration, long duration)

Languages;

E-mail;

Phone;

Other virtual meeting platforms contact details.

Template Of List/Data To Be Captured