SUPREME AUDIT INSTITUTION INFORMATION TECHNOLOGY MATURITY ASSESSMENT

SAI ITMA

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METHODOLOGY

Introduction and Review

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Abbreviations, Acronyms and Glossary

All abbreviations, acronyms and terms described below correspond generally to the documents that make up the SAI ITMA Application Kit.

Application	Type of software or computer programme designed to perform a group of functions, tasks, or activities to support user tasks.
Big Data	Big data refers to extremely large datasets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions
CAATs	Computer-aided Audit Techniques
CCC	OLACEFS Capacity Building Committee (*Comité de Creación de Capacidades*)
CISA	Certified Information Systems Auditor (CISA), certificate issued by ISACA
Cloud Computing	A network of remote servers hosted on the Internet to store, manage and process data, instead of a local server or a personal computer.
Data Analytics	The science of analysing raw data to draw conclusions about that information.
Data model (including geographic ones)	Logical and physical definition of how the data will be stored and how it will be accessed.
Databases	Set of data belonging to the same context and systematically stored for later use.
DP	Development Partners
EGDI	E-Government Development Index issued by the United Nations
EUROSAI	European Organisation of Supreme Audit Institutions
Facilitator(s)	Person(s) who have the task of guiding the entire SAI ITMA implementation process.
FPO World	Finance Performance Oversight (consulting company that developed the first version of SAI ITMA)
Geographic Databases	Set of geographic data organised in such a way as to allow analysis and management of geographically referenced information within Geographic Information System (GIS) applications.
Geographic Information Systems	Any information system capable of integrating, storing, editing, analysing, sharing and displaying geographically referenced information.
Geotechnologies (Geographic Information Science & Technology)	Remote sensors, location systems, matrix data and vector data, GIS. They are included within the concept of Information Technology according to GUID 5100.
GIT	Geographic Information Technology
GIS	Geographic Information Systems (software applications)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GUID	INTOSAI Guidelines (GUIDs) are issued by the International Organisation of Supreme Audit Institutions (INTOSAI) as part of the INTOSAI Framework of Professional Pronouncements.
Help desk	Center of attention to users, the service desk is the single point of contact between the IT service provider and users for day-to-day activities.
ICT	Information and Communications Technology
IDI	INTOSAI Development Initiative

IFPP	INTOSAI Framework of Professional Pronouncements
INCOSAI	International Congress of Supreme Audit Institutions
Information systems	Information systems can be defined as a combination of the strategic, managerial and operational activities carried out in the collection, processing, storage, distribution and use of information and its related technologies. (GUID 5100)
Information systems audit	The information systems audit can be defined as the examination of the controls related to information systems based on information technology, in order to determine cases of deviation from the criteria, which in turn have been identified on the basis of the adopted audit type, that is, the financial audit, the compliance audit or the performance audit. (GUID 5100)
Information technology	Information technology includes hardware, computer programs (software - GIS), communications and other *facilities* used to enter, store, process, transmit and issue data in any form. (GUID 5100)
INTOSAI	International Association of Supreme Auditing Institutions
INTOSAI-P	INTOSAI Principles (INTOSAI-P) are part of the INTOSAI Framework of Professional Pronouncements (IFPP) and they consist of founding principles and main principles. The founding principles have a historical significance and specify the role and functions to which Supreme Audit Institutions (SAIs) should aspire.
ISA	International Standards on Auditing
ISO	International Organization for Standardization
ISSAI	International Standards of Supreme Audit Institutions
ITASA	IT Audit Self-Assessment
ITSA	Information Technology Self-Assessment
ITWG	EUROSAI IT Working Group
Map	Geographical representation of the Earth, or part of it, on a flat surface, according to a scale.
Metadata	It literally means "beyond the data," which can be interpreted as data describing the data.
OLACEFS	Organization of Latin American and Caribbean Supreme Audit Institutions (*Organización Latinoamericana y del Caribe de Entidades Fiscalizadoras Superiores*)
QM	Quality management
QMS	Quality Management System (processes focused on achieving quality policies and objectives)
Personnel clearance procedures	Procedures for personalized attention for software inquiries.
SaaS	Software as a Service, a cloud-based software distribution model centralized on a server.
SAI	Supreme Audit Institution
SAI ITMA	Supreme Audit Institution Information Technology Maturity Assessment developed by GIZ
SAI PMF	Supreme Audit Institutions Performance Measurement Framework developed by IDI
SDG	Sustainable Development Goals defined by the United Nations
Spatial analysis	A process in which problems are geographically modeled, results are obtained through computer processing, and then those results are explored and examined.
Spatial information	All data that has a geographic reference associated with it, in such a way that we can find exactly where it is located within a map.
TCU	Federal Court of Accounts (*Tribunal de Contas da União*, SAI of Brazil)

WebGIS	Distributed information system application, comprising at least one server and one client, where the server is a GIS server and the client is a web browser. It can be a desktop or mobile application.

1. Motivation for the updated SAI ITMA

The rapid pace of technological advancement **catalysed by the global pandemic** has triggered an era of significant digital transformation across all sectors, including government operations, known collectively as **GovTech**. This transformation is not only about adoption of new technologies but also about rethinking old business models and paradigms to foster more **resilient, transparent, and efficient systems**. Supreme Audit Institutions (SAIs), as the "watchdogs" of government performance and accountability, find themselves at the crossroads of technological adoption and governance.

In 2024, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH **has updated the Supreme Audit Institutions Information Technology Maturity Assessment (SAI ITMA) model** in accordance with the aforementioned challenges to **support SAIs in building their technological capabilities**. In updating the ITMA model, the following additional factors were considered:

- ***Digital Transformation in GovTech;***
- ***Critical and Emerging Technologies (CETs);***
- ***Critical Information Infrastructure Protection (CIIP);***
- ***SAI's role in the new paradigm;***
- ***Tech capability building in SAIs.***

Digital Transformation in GovTech

The COVID-19 pandemic has significantly accelerated the digital transformation agenda in governments worldwide, thrusting technology to the forefront as a crucial enabler of continued public service delivery. As governments integrate technologies like artificial intelligence (AI), the Internet of Things (IoT), and cloud computing, SAIs face the dual challenge of auditing these complex systems while also harnessing these technologies to enhance their own operations. The transformation extends beyond mere adoption; it includes the integration of digital solutions into the core functional strategies of governments, thereby creating new avenues and challenges for audit institutions in maintaining accountability and transparency.

Critical and Emerging Technologies (CETs)

With national security and economic competitiveness at stake, governments are increasingly turning to Critical and Emerging Technologies (CETs) to secure their technological sovereignty and future-proof their economies. Countries define specific technologies to be critical for their national interests, like Artificial Intelligence, Cloud Computing, Deep Tech, Blockchain etc. Adoption of CETs is a long-term process, which fosters innovation and enables efficient use of tech for the benefit of the society. The SAIs face a new challenge related to CETs: oversight and auditing of the CET adoption efforts to ensure they are effective and efficient, while the same technologies can also be adopted by the SAIs to audit GovTech systems.

Critical Information Infrastructure Protection (CIIP)

As digitalisation of the government and private sector deepens, so does the vulnerability of critical information infrastructures (CIIs) to cyber threats and attacks. The protection of these infrastructures is paramount, not only for national security but also for ensuring the reliability and availability of essential public services. SAIs are increasingly involved in auditing the government-owned critical infrastructures, necessitating a deep understanding of information, operation and cyber security auditing practices. Hence, the role of the SAIs in auditing CIIP efforts and reporting the state of CII resilience to the parliaments increases. The rapid evolution of cyber threats poses a constant challenge to SAIs, requiring them to adapt their audit practices and methodologies continuously to address these risks effectively.

SAI Response to Technological Advancements

The infiltration of advanced technologies into traditional governance processes presents both opportunities and challenges for SAIs. On one hand, technologies such as Big Data and AI offer new tools for enhancing transparency and efficiency in audits. On the other hand, the integration of such technologies into auditing processes demands significant shifts in skills, mindset, and methodologies. SAIs must therefore embrace a culture of continuous learning and innovation to remain effective in their oversight roles.

Tech capability building in SAIs

To keep pace with rapid technological changes and increasingly complex governance ecosystems, SAIs must focus on building their maturity in handling advanced technologies. This involves not only upgrading their technical capabilities but also enhancing their strategic thinking regarding technology's role in governance and audit. Developing a strategic approach to technology adoption and audit, supported by training programs and international standards, is crucial for SAIs aiming to maintain relevance and effectiveness in a digital age.

2. About SAI ITMA

The 2019 International Congress of Supreme Audit Institutions (INCOSAI), among its general resolutions, called on SAIs to make better use of Information Technology (IT) in carrying out their mandates, through planning specific IT audits, developing IT analytical skills, and introducing new IT techniques into public auditing practice.

These new dynamic underscores the relevance of knowing the level of maturity in terms of the use of IT, based on the evaluation of a set of measures or activities implemented by SAIs in order to promote, monitor and maintain specific IT-related activities where such controls or activities are framed within the INTOSAI Framework of Professional Pronouncements (IFPP).

This challenge is considered greater for SAIs in developing and transition countries due to their limited technical, financial and human resources. This is why measuring the degree of maturity becomes as important for SAIs as for Development Partners (DP), whose contribution could be instrumental in supporting the continuous development of the technological capacity of these SAIs.

SAI ITMA provides a method for objectively and transparently assessing the performance of SAIs. It reports on the state of the SAI's institutional capacities concerning technology adoption, including both internal information systems and external information system auditing capabilities. The framework also encompasses areas such as strategic planning, and the technical, budgetary, and human resources aspects that require strengthening. The importance of measuring institutional maturity in IT lies in its ability to provide senior management with an assessment of various elements critical to achieving objectives. This includes productivity, the specific equipment required for tasks, and the suitability of job profiles

Short timeline of the SAI ITMA development:

- **2019 - SAI ITMA was originally conceived** by the Sector Programme "Good Financial Governance" (SP GFG), implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) of Germany, with support from external experts[1].

- **2020** - with support from the Organisation of Latin American and Caribbean Organisation of Supreme Audit Institutions (OLACEFS), SAI ITMA was piloted (in Chile, Colombia and Guatemala) and enhanced to include aspects of geotechnology.

- **2022-2023** – SAI ITMA was piloted in AFROSAI-E region. Namely, the assessment was done in the following SAIs: Malawi, Ethiopia, Zimbabwe, Ghana, Tanzania, Rwanda.

- **2023-2024** – SAI ITMA was updated by GIZ with the support from an external expert[2]. Combined feedback from the AFROSAI and OLACEF region, and the INTOSAI Development Initiative (IDI) was considered when preparing the updated model.

Bearing in mind the aforementioned, this Manual is presented with the main objective of providing a clear and specific guide that facilitates the understanding of the SAI ITMA application methodology and guarantees the optimal operation and development of the different tasks and activities around the application of the instrument.

The specific objectives of the manual are as follows:

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[1] SAI ITMA model was elaborated by the consulting company "FPO World". Team Leader: Ferdinand Pot, subject matter expert: Davit Shavgulidze.

[2] SAI ITMA V2 was elaborated by the external expert Davit Shavgulidze.

- Make users aware of the basic concepts of the SAI ITMA tool.
- Present the characteristics and ways of operating the SAI ITMA tool and provide the necessary information to use it.
- Facilitate the management and support the personnel involved in the SAI ITMA implementation process in SAIs.
- Provide a comprehensive vision of the entire process by specifying the capabilities and responsibilities of each participant.
- Offer a guide for the application of the SAI ITMA excel tool that describes the steps, phases, participants (people designated by the SAI to participate in the entire process), exchanged communications (e-mails) and time periods required to meet the objectives.

This manual is part of the SAI ITMA toolkit that includes all the materials necessary to develop the implementation: **Manual**, **User's Guide** (Handbook), **Assessment Tool** (Excel), **Template for Reporting**, and other materials (see Table 2).

3. Assessment Models and the SAI ITMA

This chapter discusses frameworks within the scope of SAIs that enable the assessment of their capacities in various fields. It also examines the extent to which existing frameworks can support an understanding within SAIs, as well as a shared understanding between SAIs and DPs, for the design of IT-related capacity building projects or initiatives.

SAI ITMA is based on several internationally recognised frameworks. Each of the frameworks is reviewed below.

- **Information Technology Self-Assessment (ITSA[3])** developed by the Information Technology Working Group (ITWG) of the European Organisation of Supreme Audit Institutions (EUROSAI).
- **Information Technology Audit Self-Assessment (ITASA[4])** developed and implemented by the same Information Technology Working Group (ITWG).
- **Supreme Audit Institutions Performance Measurement Framework (SAI PMF)** developed by a Task Force led by IDI, within the INTOSAI Working Group on the Value and Benefits (WGVBS) of SAIs, approved at the XXII INCOSAI in Abu Dhabi in 2016,[5] and since then managed by the INTOSAI Capacity Building Committee (CBC).
- **Control Objectives for Information and Related Technology (COBIT 2019) –** developed by the Information System Audit and Control Association (ISACA) as an IT Governance and Management Framework.
- **UN's Electronic Government Development Index (EGDI)** developed by the United Nations to measure the maturity of electronic governance in UN countries.

3.1. ITSA and COBIT 2019

ITSA suggests a set of simple standard actions to improve IT performance according to the specific needs of a SAI. The method is based on COBIT 4.1[6] and aims to provide SAI management with information on the current state of IT support processes, IT infrastructure and IT management[7]. The assessment takes into account two domains:

- The primary and secondary business processes of SAIs;
- The governance of the SAI's IT environment.

3.2. ITASA

The IT Audit Self-Assessment uses a self-assessment approach similar to that of the ITSA, but with a different focus. While ITSA focuses on the administrative IT function, ITASA focuses on the IT audit function within the SAI.

ITASA uses the systems analysis approach (input-process-output pattern) together with an assessment of the external environment as a precondition, and quality management procedures. Consequently, ITASA defines five specific areas to evaluate the IT audit function:

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[3] See https://eurosai-it.org/about/activities/itsa.

[4] See https://eurosai-it.org/about/activities/itsa.

[5] See document "The Abu Dhabi Declaration": https://www.intosai.org/fileadmin/downloads/about_us/Organs/Congresses/2016_Abu_Dhabi_Declaration/SP_AbuDhabiDeclaration.pdf.

[6] Document reference "COBIT system in the auditing processes of computer systems:" https://core.ac.uk/download/pdf/235501363.pdf.

[7] ITSA Leaflet available at https://eurosai-it.org/itsa.

1. External requirements (national and international regulations, IT auditing standards)
2. Internal requirements: Input and resources (IT audit strategy, organization and focus, IT audit staff and training, IT audit tools)
3. Internal requirements: IT audit process (risk analysis and planning, IT audit work, reports and documentation)
4. Internal requirements: Output (reports and quality assurance)
5. Quality Management, control and monitoring.

3.3. SAI PMF

The Supreme Audit Institution Performance Measurement Framework (SAI PMF) [8] assesses the performance of a SAI in a holistic manner and encompasses audit work, internal governance and ethics, relationships with external stakeholders and the legal framework. IT audit and IT governance are minor elements in the SAI PMF. IT auditing is not explicitly mentioned in the framework that focuses on financial, compliance and performance auditing as the audit categories recognized by the IFPP.

SAI PMF indicator SAI-21 "Financial Management, Assets and Support Services" includes a dimension (ii) "Planning and effective use of assets and infrastructure" to evaluate the management of the SAI's IT networks, hardware and software (among others). No more attention is paid to IT governance and the use of IT in primary audit processes and secondary business processes.

However, the SAI PMF establishes explicit criteria as points of reference for evaluating the performance of the SAI. This facilitates the establishment of an objective baseline on SAI performance that informs both the SAI management and the DPs that intend to support that SAI in capacity building.

3.4. SAI ITMA Criteria

SAI ITMA V2 assessment model sets unique requirements related to the SAI context. Those requirements are classified as ITMA requirements and refer to Critical and Emerging Technologies (CETs), Critical Information Infrastructure (CII), legal requirements related to technologies, recommendation tracking and etc.

SAI ITMA V1 was based on the ITSA, hence, COBIT 4.1 version, which is outdated for the purposes of the SAI ITMA V2. Consequently, the decision was made to substitute all the ITSA requirements with the current version of COBIT 2019. As a result, some of the requirements from ITMA V1 are no longer available in the V2 and some of them are modified in line with COBIT 2019.

3.5. UN's E-Government Development Index (EGDI)

The E-Government Development Index (EGDI) presents the development of national e-government capacities of the United Nations Member States. The EGDI is a composite measure of three important dimensions of e-government that are equally weighted, namely: **provision of online services**, **telecommunication connectivity and human capital**.

[8] Document reference "Supreme Audit Institutions Performance Measurement Framework": https://idi.no/elibrary/well-governed-sais/sai-pmf/1698-2022-sai-pmf-document/file

The three components of the E-Government Development Index (EGDI)

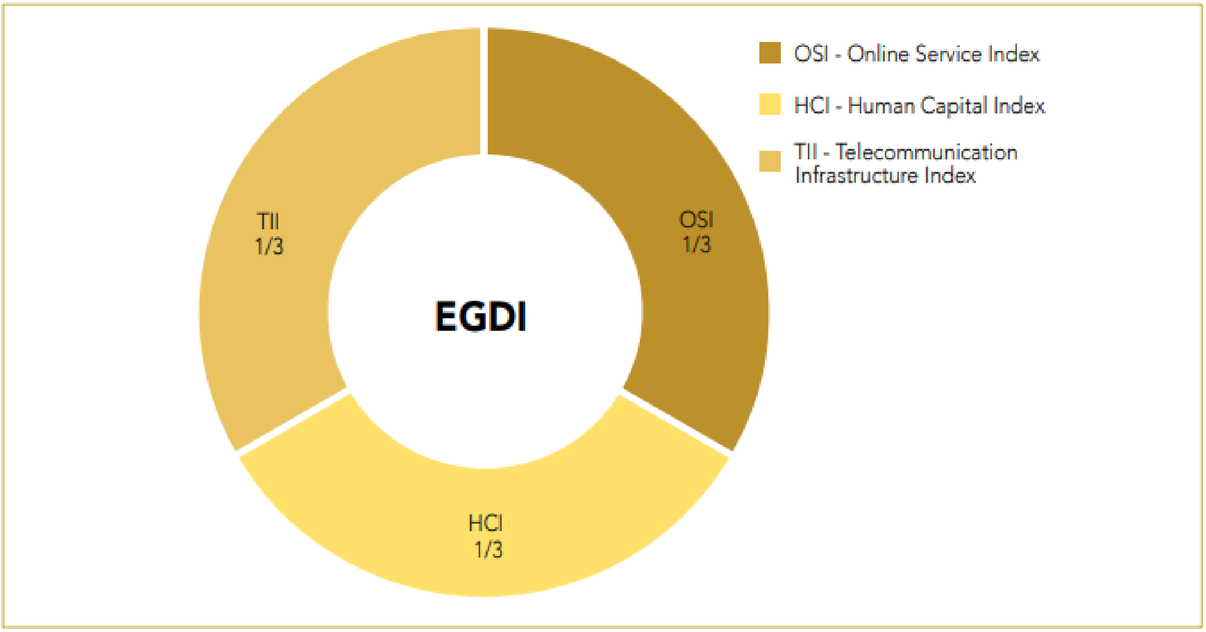

Figure 1: The three components of EGDI

SAI ITMA uses the EGDI as a reference for measuring the context of the country in which a SAI operates.

4. The SAI ITMA Methodology

The Supreme Audit Institution Information Technology Maturity Assessment (SAI ITMA) is an instrument created to support the **measurement of the degree of maturity** of a **SAI in the use of information technology for internal and external work**. With this instrument, once the maturity level has been determined, it is possible to determine the logic and design of the interventions that the SAI requires in terms of technology. Figure 1 presents the SAI ITMA methodological framework.

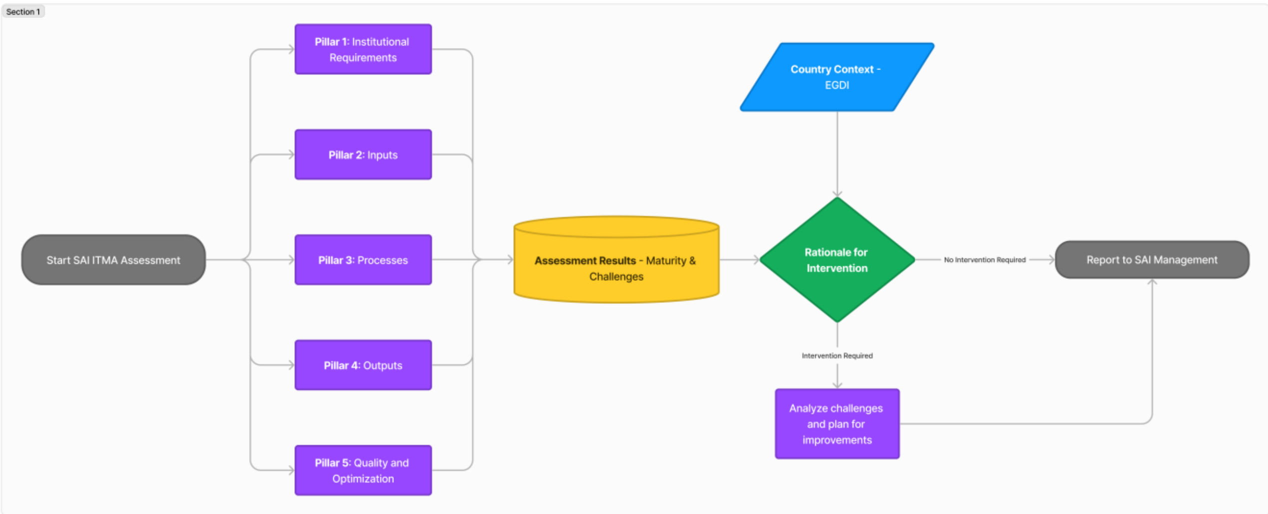

Figure 2 - SAI ITMA methodological flowchart

In turn, each pillar includes a series of requirements grouped into five levels that cover both the administrative elements of information systems and the capacity for auditing information technologies.

The assessment is made by responding to each of the requirements (or criteria) for each maturity level. All must be answered with the appropriate values – i.e. YES when they are met and NO when they are not fully met. There is no intermediate score, as the objective is to verify full compliance with the criterion.

After the process that involves the analysis and assessment of the five pillars shown above (Figure 3), the process of obtaining the maturity level of the SAI continues. In this regard, it is worth mentioning the Electronic Government Development Index (EGDI), as it is a measure of the use of information systems by central government institutions in the provision of public services.

In the SAI ITMA conceptual model, EGDI serves as a reference value, and it is relevant because it reflects the national context in which SAIs operate. The comparison of the EGDI with the value obtained in each pillar serves as a guideline to know which SAI capacities need to be enhanced.

Pillar 1 - Institutional Requirements

Includes the fundamental requirements that support the institutional capacity of the SAI on the technology adoption, such as the audit mandate and knowledge of the administrative and auditing needs of information systems.

Pillar 2 - Inputs

Includes all available inputs and resources that the SAI may possess or use to meet its informaiton systems needs, such as strategies, manuals, investments, sufficient and suitanle staff, staff skills/capacities, information systems audit tools, software and hardware.

Pillar 3 - Processes

Refers to the procedures that the SAI must be able to perform at each maturity level. These include organizational and managerial processes such as service desk and incident management, dissemination of informaiton systems audit experience within the SI and risk based information systems auditing.

Pillar 4 - Outputs

It includes the requirements related to the SAI's information systems, such as the publication and access to the information systems audit reports, the audit of specific areas of informaiton systems and the security of the information systems of the SAI.

Pillar 5 - Quality and Optimization

It focuses on the quality control systems of information systems, such as performace monitoring on the use of informaiton systems and the quality assurance of information systems audits.

Figure 3: SAI ITMA pillars

The reference to the national context provided by EGDI can also serve as guidance for DPs, on the direction of their support when it comes to the digital modernization of the SAI.

It should be noted that the application of SAI ITMA allows the identification and analysis of the challenges that caused non-satisfaction of requirements when applying the tool during the five-pillar assessment. The model recognizes 5 main challenges, namely:

- Organizational Structure
- Processes
- People, Skills and Competences
- Principles, Policies, Procedures
- Services, Infrastructure and Applications

The step-by-step explanation of the use or operation of the SAI ITMA tool, under the Microsoft Excel-based application, is developed in the document called "SAI ITMA User Guide (*Handbook*)," which includes illustrations and how to operate or apply it in detail.