The Alignment of INTOSAI and Romanian Public External Audit Standards, Guidelines and Institutional Focus to the Data Driven Context

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Abstract

Disruptive technologies are shaping our world in a wide range of manners, from targeted advertising to self-driving cars. Their impact becomes more complex in highly-regulated, judgment-intensive fields, such as public external audit. While auditees operate in an increasingly data-intensive environment, sometimes employing cutting-edge data analysis and automation tools, stakeholders expect the audit profession to step up its game and adapt to some of the better-developed IT technologies, such as robotic process automation or machine learning. While such initiatives begin to crop up, they must adhere to the stern normative framework of public external audit, stemming from INTOSAI and national authoritative audit standards, procedures and guidelines. Our research aims to shed light on the current degree of INTOSAI and Romanian standards and guidance readiness to facilitate the use of some of the latest and potentially beneficial IT concepts, as well as the results of INTOSAI collaborative initiatives on IT matters.

Key words: external audit, data analytics, SAI, audit standards, INTOSAI
J.E.L. classification: H83, M48

1. Introduction

Current software solutions are cloud integrated, connected to the Internet of Things and external data sources such as sensors, social networking platforms, audio and video feeds, GPS data etc. Many organizations harness the potential of this structured and unstructured data for their own development, improving their decision-making processes by using technological advances to reduce latency (increasing processing speed and interconnectivity), using automatic text, speech, or facial recognition. According to Davenport and Harris (2007, p.7), business analytics is "*the use of data, information technology, statistical analysis, quantitative methods and mathematical or computer-based models to help managers gain improved insight about their operations, and make better, fact-based decisions"*. Companies have significantly changed their approach to data. In a recent KPMG study (2014, p.7) study, 99% of the respondents see business analytics as somewhat important to their business strategy, while 85% of the respondents think that one of their main challenges is identifying broader and more significant use cases for the collected data.

These new technologies and management avenues create new opportunities, but also push the audit profession into adopting more advanced data analysis techniques. In a Big data environment, the audit has the potential to leap from descriptive procedures to predictive, and ultimately, to

prescriptive procedures. The traditional retrospective audit approach, constructed on the restrictions of manual data analysis, can thus be replaced by real-time audits that detect risks and prevent errors.

External audit is, through its nature, an extensively regulated profession and the requirement to gather sufficient adequate audit evidence to support the audit opinion radiates throughout the normative framework. No matter how the data and information are analyzed, either in their physical form, all the way to Big data analytics, the audit assertions that need to be evaluated remained unchanged, while the adaptation to the digital age refers only to the tests used to obtain assurance that the financial statements are free from material misstatement.

Each audit assignment must ensure a balance between obtaining sufficient adequate audit evidence using *substantive testing* – resource intensive but offering the most reliable result and using *analytical procedures* that are time savers but harness less insurance, and the optimal recipe for each assignment is trusted to the auditor's professional judgment. There are also notable legislative requirements influencing this balanced approach to audit. In the United States of America, for example, the Corporate and Auditing Accountability, Responsibility, and Transparency Act, also known as the Sarbanes–Oxley Act (2002, p.760), was enforced by Congress in response to the resounding financial scandals of the era (Enron or WorldCom) and requires the auditors to check for the accuracy of information and audit evidence that form the base for the audit opinion on the financial statements, an approach which tends to confer a wider use for substantive testing.

The Lima Declaration of Guidelines on Auditing Precepts (INTOSAI, 1977, p.12), endorsed in 1977 at the Ninth Congress of the International Organization of Supreme Audit Institutions, currently classified as INTOSAI-P1, is considered to be the *Magna Charta* of public external audit and defines the prerequisites for SAI's independent and effective functioning. Starting with this overarching declaration, it has been established that SAI audit procedures will seldom be applied to the whole population, and as such, a sampling approach should be employed, allowing for sufficiently large samples, selected based on a given model, in order to express proper judgment on the quality and regularity of financial management. Furthermore, INTOSAI-P1 underscores the necessity of audit standards' adaptation to the "*progress of the sciences and techniques relating to financial management*".

The disruptive nature that technological progress has on the audit profession is embedded in the current, republished form INTOSAI-P1, that hosts a section on auditing electronic data processing facilities, providing guidance regarding planning the technical necessities, the economical use of equipment, personnel expertise, prevention of improper use and the usefulness of the information provided. While casting a wide net over the specific audit objectives, the INTOSAI-P1 section referenced does little to contribute to the actual revamping of SAI audit standards and procedures.

Principle 4 of the Mexico Declaration – INTOSAI-P10 (INTOSAI, 2007, p. 11) offers SAIs unrestricted access to information, in a timely, unfettered, direct, and free manner. Public external auditors have the right and the legal obligation to analyze all the information pertinent to their engagement in order to properly discharge of their statutory responsibilities. This, of course, entails access to and analysis of the databases created and used in conjunction with the relevant audited activities. But how exactly is this objective achieved?

While in the Big data world, concerning oneself with the quantity of potential audit evidence is a thing of the past, the quality of the available digital information is a growing concern for auditors, since there are significant distinctions to be made between the risks and challenges specific to data presented in physical format and those available in digital format. Predictably, the first comparison is on data integrity, considering that data types, volumes and formats have become so diverse that is becoming increasingly difficult to identify data elements or datasets that have been modified, hidden, deleted, or entirely destroyed, either by human or system errors, unauthorized access, errors in storage, query or reporting. A SAI-specific research conclusion is offered by Sanda and Trincu-Drăgușin (2022, p.9), which illustrates the incipient SAI adoption of an "open by design and by default" approach to publishing Open data, with the majority of EU SAIs not even enrolled in their national Open data portals, while the ones that registered offer only a marginal contribution, with an average footprint 0.159% of the total Open datasets published.

External audit's immersion in Big data and the use of increasingly advanced data analysis techniques generate a series of normative concerns but also leads to a shift in the entire external audit field. The International Auditing and Assurance Standards Board formed in 2015 the Data Analytics

Working Group, to monitor changes brought to the audit profession by the extended use of advanced data analysis procedures, as well as to connect to different stakeholders, such as the external audit companies and the national audit bodies.

The International Organization of Supreme Audit Institutions (abb. INTOSAI) contributed by forming, in 2017, the Big Data Working Group (INTOSAI, 2022), as well as The Working Group on IT Audit (INTOSAI WGITA, 2022) that published in 2019 the first edition of the Data analytics Guideline (WGITA, 2019, p.1).

Furthermore, the leading private external audit companies have invested hundreds of millions of dollars in audit technological advances in order to future-proof their activities (Deloitte 2016, p.4, Ernst & Young 2017, p.1, PricewaterhouseCoopers 2017, p.1, KPMG 2016, p.6). This sweeping trend, coupled with the large-scale use of business analytics by the auditees have created competitive pressure in the external audit field, to employ evermore sweeping data analysis techniques and seems to reorient some audit activities from providing assurance to offering consultancy. The answer offered by a manager in Eilifsen *et al*. (2020, p.27) research is telling in this matter: "*when we have written about data analytics all over the place in the audit tender and promised to use it in the presentations - well, then you just have to use it when you have won the audit*".

2. Literature review

Gartner (2013, p.1) defines Big data as "*high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation*". Therefore, we can conclude that the Big data concept does not incorporate only static information, generated and stored in a physical environment or in the cloud, but also the innovative and efficient processing and analysis techniques required to provide added value for the organization.

Stewart (2015, p.95) defines audit data analytics as "*the analysis of data underlying financial statements, together with related financial or non-financial information, to identify potential misstatements or risks of material misstatement*" and proposes dividing them into exploratory procedures, employed in the planning and risk analysis stage, followed by confirmatory procedures during the substantive testing and reporting stages.

These analytical procedures vary from the simplest test to complex predictive techniques, that require a high degree of professional judgment. Auditors must determine which types of analysis techniques are best fitted in relation to the audit objectives, the assessed risks and the available data.

AICPA (2014, p.5) defines data analytics in audit as „*the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit*".

Earley (2015, p. 494) describes the resemblance between Big data analytics and academic research techniques: both data analytics and academic research handle significant data volumes which are collected and tested in order to satisfy the sufficiency criterion regarding a research hypothesis and are subsequently analyzed using dedicated statistical software to identify patterns and relationships. Both researchers and external auditors require a high degree of expertise to analyze and interpret results generated by the statistical software, therefore advocating for the supremacy of the human factor as opposed to any form of automation in this critical stage of both research and external audit.

Alles and Gray (2016, p. 2) further clarify the notion of Big data in audit, by separating the volume and diversity characteristics: Big data in audit is not about more volumes of the same kind of data, but rather entails incorporating new data sources, both financial and non-financial, structured or non-structured, in the audit process, even those provided by third parties. The research is based on the premise that the true value of Big data in auditing stems not from itself, as a novelty subject, but from the added value that can be obtained using analytical procedures applied to various datasets.

Computer-assisted audit techniques have been referred to since the '70s and can be broadly defined, according to Braun and Davis (2003, p. 726), as any use of technology supporting an audit assignment. The broad definition would include *"automated working papers and traditional word processing applications*".

Concurrently, we have to take into consideration the audit profession's strive to maintain legitimacy by adapting to the developments of auditees and society as a whole. As per Deephouse *et al.* (2017, p.9), organizational legitimacy is "*the perceived appropriateness of an organization to a social system in terms of rules, values, norms and definitions*". Salienji *et al.* (2018, p. 5) underline that the extensive use of data analytics in auditing must be viewed in light of the constant preoccupation to restore and preserve the legitimacy of the audit function. Indeed, the interviews conducted by Eilifsen *et al*. (2020, p. 29) with the management of external audit companies confirm the perception of external pressure conducive to favoring data analytics to the detriment of classic audit tools. Salijeni *et al.* (2018, p. 2) confirm this hypothesis, concluding that the changes made to the audit profession, firstly by introducing statistical sampling methods, audit and entity risk models and lately through implementing data analytics, were made in response to the public preoccupation with the quality of the audit work and the relevance of the audit function, thus seeking to present the audit process as an objective one, reliant on almost scientifically-based evidence gathering process.

According to Appelbaum *et al.* (2017, p. 3), external audit lags behind internal audit with regard to adapting to data analytics, with un-updated sampling guidelines, although many auditees collect and analyze data through automation. The authors illustrate their conclusion with the case of complex data analytics employed by some external audit companies, such as regression, although the audit standards make no reference to it, but rather do not prohibit its use. Appelbaum *et al.* underscore the necessity to delve into the specifics of each data analysis technique, to establish its applicability in different contexts, their cumulative effect and whether they can be formalized and classified.

However, each external audit actor has a different approach to data analytics. While some entities have adopted an expectative approach, others are fully invested in reforming their audit process, by centralizing data analytics operations and committing resources to facilitate their use.

In one of the most complete studies in data analytics in audit, Appelbaum *et al.* (2010, p. 24) reviewed 301 relevant research papers and reached less than encouraging results, concluding on the existence of numerous gaps in the available research, especially concerning predictive or prescriptive procedures, with the majority of research being focused on descriptive procedures (using key performance indicators, visualization platforms etc.). Similar to Eilifsen *et al*.'s results, the authors concluded that the majority of data analytics is employed in the substantive testing phase, including decisions on sampling, benchmarking, or expectation models.

The last decade introduced several advanced data analysis techniques to the audit field, such as Process mining, Robotic Process Automation, Machine Learning and Deep Learning. These tools are promising developments for increasing audit efficiency through automation, as well as reducing or eliminating some of the classic tests. Furthermore, audit assurance can be augmented by expanding the scope of the innovative procedures, while increased transparency and generating more actionable information for the client can be considered audit digitalization's byproducts.

3. Research methodology

We analyzed 38 INTOSAI standards and Guidelines regarding SAI activities and audit performance, aiming to gain perspective on the existence of INTOSAI norms related to 11 specific terms and emerging technologies: big data, data science, data analytics, open data, artificial intelligence (abbrev. AI), blockchain, data visualization, natural language processing (abbrev. NLP), data mining, process mining (abbrev. PM), robotic process automation (abbrev. RPA). Where found, we analyzed the context – either broad or specific regulations related to one audit activity and we determined whether definitions, external references, or explanatory materials are provided for each concept.

The second dimension of our research was aimed at ascertaining the level to which Romanian public external audit standards and regulations are adapted to the technological progress of the last decade, following the same evaluation method described for the INTOSAI standards and guidance. In order to ensure reaching adequate conclusions, analysis of the coined English expressions was doubled by their native alternatives.

Furthermore, we set out to analyze the subsequent internal norms and regulations, in the form of Romanian Court of Accounts' (abbrev. RCoA) bylaws, audit manuals and subsequent audit guidance on specific fields.

Concurrently, we aimed to evaluate the impact of the INTOSAI cooperation efforts to update the external audit profession to the latest impactful digital trends, by analyzing the membership representation of the established working groups in comparison to relevant criteria such as economic contribution to global GDP and also by reviewing their published work and their impact on the external audit world.

4. Findings

The International Organization of Supreme Audit Institutions Framework for Professional Pronouncements (abbrev. IFPP, 2022) has a three-layer approach to audit standardization:

- *INTOSAI Principles*, coded INTOSAI-P are divided into the *founding principles* related to SAI role and functions, aimed to guide parliaments and governments in defining SAI mandate and respectively, the *core principles* that detail the SAI founding principles and clarify their role in society as well as offering high-level prerequisites for their proper functioning and professional conduct;
- *International Standards of Supreme Audit Institutions*, coded ISSAI, aimed to define the types of audit engagements and their specifics, ensure audit quality, strengthen user credibility for the audit reports, enhance the transparency of the audit process and clarify the auditor's third-party responsibility;
- *The INTOSAI Guidance,* coded GUID, which helps auditors apply ISSAIs in financial, performance or compliance audits or other types of audit engagements, or to understand a specific subject matter and the application of the relevant ISSAIs.

Although not mandatory given the specific national attributes of each SAI, INTOSAI encourages Supreme Audit Institutions to implement its standards in a manner concurrent with their national mandate and circumstances, except for ISSAI 100 which contains universally applicable professional standards and aims to safeguard SAI independence.

According to ISSAI 100 (INTOSAI, 2019, p. 6), the INTOSAI Standards can be used to establish national authoritative audit standards in one of three ways, classified in accordance to their proximity with ISSAIs:

- adopting the ISSAIs as national authoritative standards;
- adopting national standards based on ISSAI, in which case the standards should respect all the fundamental principles of ISSAI 100 and the relevant principles of financial, performance and compliance audit;
- adopting national standards consistent with ISSAI 100 and the relevant principles of financial, performance and compliance audit;

Our research allowed us to conclude that the INTOSAI principles and standards do not refer to any of the analyzed concepts. According to its governing law (1992, p.1), the RCoA audits abide by its own audit standards, set up in accordance with generally accepted international audit standards. However, the website section referring to RCoA's audit standards hosts the translated version of the ISSAI standards, which allows us to draw identical research conclusions on their readiness regarding a data analytics approach.

As per specific Guidance issued by INTOSAI, research results illustrate a 45% presence among the analyzed concepts, since 5 out of 11 concepts were mentioned in at least one Guidance material, as Table 1 illustrates. Most abundant in novel IT concepts were the performance audit guidance documents (GUID 3910), that host 3 out of 5 identified concepts, while 3 other uses were found to pertain to specific areas of audit – either environmental audit or key national indicators audit (GUID 5290). Out of the 11 concepts, only data visualization was found in 2 different Guidance materials (GUID 3910 & GUID 5290), while six other concepts were not identified in any of the researched standards & guidance (big data, AI, blockchain, NLP, PM and RPA).

It is noteworthy that none of the 5 IT concepts identified received sufficient attention in terms of providing definitions, external references or explanatory materials to allow auditors a better understanding.

In terms of the national guidance researched, none of the 11 concepts analyzed were identified, with one of them (robotic process automation) being identified contextually, with regard to software automated controls and the need for the auditor to understand and test them properly.

As with the international guidance analyzed, no definitions, references or explanatory material are provided.

Table no. 1. The presence of Big data concepts and technologies in INTOSAI & Romanian standards & guidance

No.	Analyzed concept	Standards containing the concept	Guidance containing the concept		Broad/specific context		Definition/ References/ Explanatory material	
			INTOSAI	RCoA	INTOSAI	RCoA	INTOSAI	RCoA
1	Big data	0	0	0	n/a		n/a	n/a
2	Data science	0	1	0	Specific field (KNI)		No	n/a
3	Data analytics	0	1	0	Broad context (PA)		No	n/a
4	Open data	0	1	0	Specific field (environment)		No	n/a
5	Artificial intelligence	0	0	0	n/a		n/a	n/a
6	Blockchain	0	0	0	n/a		n/a	n/a
7	Data visualization	0	2	0	Broad (PA) and Specific fields (environment)		No	n/a
8	Natural language processing	0	0	0	n/a		n/a	n/a
9	Data mining	0	1	0	Broad context (PA)		No	n/a
10	Process mining	0	0	0	n/a		n/a	n/a
11	Robotic process automation	0	0	3*	n/a	Broad context (CA, purchases, IT audit)	n/a	No

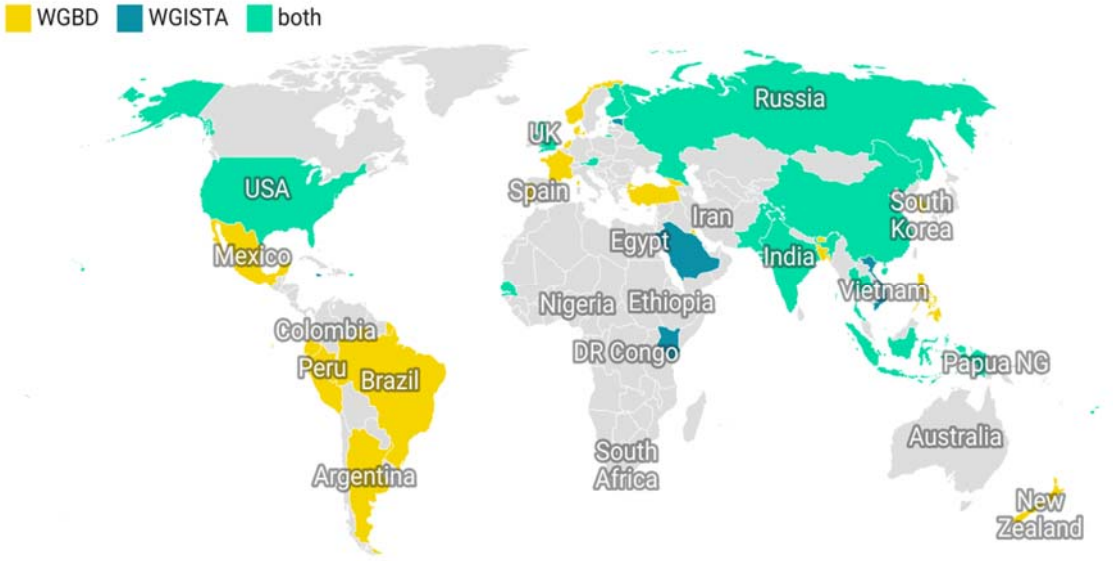
* identified contextually

Source: own representation

Aside from its contribution to the field of IT audit, aimed at developing SAI knowledge and skills in the use and audit of information technology through the Working Group on IT Audit (abbrev. WGITA), INTOSAI also set up two other relevant working groups (INTOSAI, 2022, p. 1): the *Working Group on Big Data* (abbrev. WGBD), chaired by the Chinese and American SAIs and composed of a total of 30 members and the *Working Group on Impact of Science and Technology on Auditing* (abbrev. WGISTA), chaired by United Arab Emirates and American SAIs, comprised of 18 national SAIs. Twelve of the SAIs participating are common among the two working groups, as the mapping in figure 1 shows.

While WGBD is attended by three of the G7 member states (France, United Kingdom and the United States), WGISTA hosts only 2 G7 member states (United Kingdom and the United States). The G20 participation is slightly better, with 11 members joining WGBD and 7 members contributing to WGISTA. Although a promising start, we can conclude that the INTOSAI working groups on IT matters are not sufficiently representative for the entire SAI population – 18.2% of the INTOSAI members and affiliate members, but also for the developed and developing nations that enjoy the largest economies and the majority of global GDP.

Figure no. 1 INTOSAI WGBD and WGISTA Member SAIs



Source: Own representation based on INOSAI (2022)

The INTOSAI WGBD was set up by INTOSAI in December 2016, aiming to examine the challenges and opportunities SAIs face regarding Big data, to aid the proliferation of Big data good practices and strengthen relevant SAI cooperation.

The WGBD webpage (INTOSAI, 2022) indicated on INTOSAI's website is not updated since 2018 and its latest news refers to the second WGBD meeting in April 2018. No documents are offered to the public regarding its current or past work. However, the Chinese National Audit Office, as chair of the working group, hosts a secondary webpage for WGBD on its website, although not officially referenced by INTOSAI. Since its formation in 2016, at the proposal of the Knowledge Sharing Committee, WGBD has met 6 times, mostly online, meetings that have not produced any actionable materials. Furthermore, although WGBD aims to summarize the know-how, experiences and good practices concerning big data audit, and to develop guidelines supporting capacity-building activities in big data audit, no such publications were issued.

WGISTA was established in 2019 (INTOSAI, 2022) by INTOSAI at the International Congress of Supreme Audit Institutions (INCOSAI), aiming to support SAIs in understanding the strategic direction of the auditing profession faced with disruptive technologies and developments in science and technology, such as Blockchain, Artificial Intelligence, machine learning, data analytics, quantum computing and 5G.

At the time our research was conducted, WGISTA had met only once since its inaugural meeting in 2020. No documents were released to the public as of yet on its official website.

The INTOSAI Working Group on IT Audit (abbrev. WGITA) is the most venerable INTOSAI IT-related collaborative forum, formed in 1989 and currently comprised of 54 SAIs (INTOSAI WGITA, 2022), as illustrated in Figure 2.

Apart from enjoying the best representation of the three related IT working groups, it is attended by 5 G7 members and 15 G20 members.

Moreover, WGITA enjoys standard-setting attributes, its mission aiming to develop SAIs knowledge and skills in the use of IT-related audits, through the development of standards and guidance on the subject matter and by providing information and facilities for the exchange of experiences.

WGITA has met regularly over the course of its existence, the latest and 31st meeting was hosted online on May 23rd, 2022, setting forward the agenda for 2023-2025 (INTOSAI WGITA, 2022, p. 5), which includes developing guidelines on topics such as cloud computing, big data, smart city initiatives, use & review of AI solutions, blockchain solutions and use of IT for forensic audit.

Figure no. 2 INTOSAI WGITA Member SAIs

Source: Own representation based on INOSAI (2022)

Since its creation in 1989, the IT landscape that WGITA was born of changed dramatically, giving rise to the need for further clarification to the field. The creation of WGBD and WGISTA is illustrative of this conclusion, although their work is still not materialized into actionable materials. Furthermore, the 3-year roadmap proposed at the May 2022 meeting, which contains several of our researched concepts, allows us to conclude that WGITA's efforts to support SAIs in using and auditing Information Technology are lagging behind the rhythm of development and use of novel technologies.

5. Conclusions

In our view, the introduction of data analytics to the audit field is still in an incipient stage, although analytical procedures are a longstanding requirement of the audit standards and are used throughout the audit mission. Computer-assisted audit techniques were introduced beginning with the '60s, starting with statistical sampling. Four decades ago, software producers began offering standardized data analysis platforms - Interactive Data Extraction and Analysis developed by Caseware (IDEA, presently one of the widely used audit software) or Audit Command Language (ACL) developed by Galvanize. These software solutions reflected the strive to maintain audit's legitimacy during a booming development of ERP solutions, that empowered companies to create, store and process large amounts of data and, indirectly, paved the way for a revolution in auditing.

Our research allowed us to conclude that the INTOSAI principles and standards do not refer to any of the analyzed concepts. Since the Romanian Court of Accounts has adopted ISSAI as its own authoritative standards, our research results extend to the Romanian national standards as well.

Only 5 concepts were present in at least one Guidance material, while six other concepts were not identified in any of the researched standards & guidance (big data, AI, blockchain, NLP, PM and RPA). The concepts that were mentioned did not penetrate the broad financial and compliance audit activities, but only the performance audit and specific fields such as environmental audit and KNI audit.

Furthermore, none of the 5 IT concepts were provided with definitions, external references or explanatory material.

In terms of the national guidance material analyzed, none of the 11 concepts analyzed were identified, with one of them (robotic process automation) being identified contextually, with regard to software application automated controls and the need for the auditor to understand and test them properly.

Concerning the INTOSAI working groups on the IT agenda, we can safely conclude that the collaborative framework set forth by INTOSAI is not yet conducive to adapting the public audit profession to the ever-growing challenges of digitalization, both in the audited entities and also concerning the audit procedures and workflows themselves. Apart from the fact that WGBD and WGISTA have no standard-setting orientation, their work has not yet materialized into actionable documents - manuals, guidelines etc., needed to prepare the Supreme audit institutions' audit process to adapt to the present digital landscape.

Although a promising start, we can conclude that the INTOSAI working groups on IT matters – both WGISTA and WGBD are not sufficiently representative for the entire SAI population – 18.2% of the INTOSAI members and affiliate members, but also for the developed and developing nations that enjoy the largest economies and the majority of global GDP.

Furthermore, WGITA's 3-year roadmap proposed at the May 2022 meeting, which contains several of our researched concepts, allows us to conclude that WGITA's efforts to support SAIs in using auditing of Information Technology are lagging behind the rhythm of development and use of novel technologies.

6. Research limits and future developments

Further research is needed to exclude the potential overlap between the focus of INTOSAI working groups on IT matters. Although the mission of WGBD and WGISTA are clearly stated, the initially formed INTOSAI Work Group on IT Audit (WGITA) handled a broader portfolio than auditing IT systems.

Furthermore, since ISSAIs are complemented with ISAs, further consideration needs to be given to the AICPA materials on data analytics and their impact on the public audit environment.

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