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International Federation of Accountants (IFAC)
International Auditing and Assurance Standards Board
529 Fifth Avenue
New York, NY 10017

To members of IFAC's International Auditing and Assurance Board, Data Analytics Working Group:

The Technology Solutions and Practices (TSP) Committee of the Institute of Management Accountants (IMA) is writing to share its views on IFAC's International Auditing and Assurance Standards Board's (IAASB) Exposure Draft, *Exploring the Growing Use of Technology in the Audit, with a Focus on Data Analytics*.

The IMA is a global association representing over 80,000 accountants and finance team professionals and is a member of IFAC. Our members work inside organizations of various sizes, industries and types, including manufacturing and services, public and private enterprises, not-for-profit organizations, academic institutions, government entities and multinational corporations. Through education, research and advocacy, the TSP Committee promotes existing and emerging technology solutions and practices in a vendor-independent manner to enable accountants and financial professionals in business and their organizations to be more effective and efficient. Areas of focus include financial planning and analysis, risk management and internal controls, business reporting (including non-financial and sustainability reporting) and analysis, and business process improvement. Additional information on the TSP Committee can be found at [IMA TSP Committee](#) (under "Advocacy" in "About "MA" and www.imanet.org).

Executive Summary - Key Recommendations

- Consider client-side as well as investor concerns in standard setting for data analytics in the audit by explaining its value beyond audit quality.
- Leverage better practices in the application of data analytics in business by incorporating them in the audit and reflecting them in corresponding standards. The audit profession needs to learn from and leverage best practices in business data analytics: Prescriptive and predictive analytics, business intelligence (BI), data mining, and data visualization.
- Address and help close the data analytics competency gap in the audit, driven in part by absence from the university curriculum and the current auditing body of knowledge.
- Provide guidance on overcoming typical data analytics implementation challenges stemming from the characteristics of data due to volume, structural and governance issues, as well as other cultural challenges to an integrated end-to-end process from data acquisition, reporting, analysis and attestation.

General Comments on the Growing Use of Technology in the Audit, with a Focus on Data Analytics

Standard setting regarding the use of technology in data analytics around the audit process will have its challenges; however, the potential benefits of technology standards will have greater value for stakeholders. Several observations support our perspective:

- The focus of the IMA TSP Committee is more heavily weighted toward practical application of technology to core business processes (e.g., accounting, advanced analytics, reporting/disclosure), and less on auditing standards. However, the TSP Committee has professional and certified members with both experience and expertise in auditing. Some of the feedback in our comment letter speaks to challenges and solutions in successfully implementing technology for advanced data analytics more generally; however, much of this feedback also applies to audit functions and processes.

- Advanced data analytics is a critical business process that has grown in importance across the entire accounting and operations supply/value chains. Because of the heightened interest in “Big Data” as well as the prevalence of newer technologies to gather, validate, analyze and communicate information for decision making, higher quality results have led to fewer material weaknesses or significant deficiencies in financial reporting and internal controls. The CFO team is becoming increasingly responsible for data analytics competency, governance, security and, per an IBM study, “one version of the truth.” For audits, enabling technologies powering advanced data analytics are being used to assess large amounts of data faster and more reliably than ever before. Rather than testing a *small* data set relative to the total population of a high-volume data transactions (e.g., journal entries), auditors will be able to view the *full* data set and gather deeper, more meaningful insight into information relationships and anomalies. This transparency can lead to lower audit risk, higher levels of stakeholder comfort, and higher quality audits.

- While many companies are migrating toward more automated business processes (thereby increasing the need for automated data analytics), there are also many companies that continue to rely on manual processes, including those surrounding the audit. Therefore, mandatory requirements to use data analytics for auditing would be challenging; at the very least, adoption of technology standards for audit data analytics could be hindered by current dependence on manual legacy processes and resistance to change among corporates.

- “Spreadsheet hell” has become a growing epidemic as a manual workout in processes with large amounts of data (e.g., consolidations) – but it lacks automation, scalability or proper controls. The use of data analytics technologies (as well as recommended best practices or standards around technology in audit data analytics) may be able to displace these and other high-risk manual practices.

- A real-time enterprise system is the end-game for businesses where everything is calculated dynamically as transactions are processed and any unusual activity is flagged for further review. This is simple to do right now - it is called anomaly detection and used frequently in manufacturing and financial institution threat detection (e.g., credit card potential fraud alerts). Real-time systems will impact expectations for automation of audit analytics by their high level of sophistication and timeliness. In the preliminary phase of increasing data analytics in the audit, the need for dynamic results will not be perceived or of great interest, partly since the learning curve and the rigor of applying standards to the techniques will slow implementation and absorb many of the available resources.

- Many ERP systems have decision rules and workflows that flag errors, such as IT systems controls that improve data quality. These edit checks should be acknowledged and strengthened, since their existence and effectiveness impact data quality and audit analytics that rely on that data.

- Only after accounting systems become more open - and accountants, finance professionals, and internal/external auditors become comfortable using applications and newer technologies (and as database administrators allow them to access data) - will the market start to see the necessary cultural shifts of organizational enablement that allow automated data analytics to be implemented in more business, accounting and audit related processes.
- The migration toward automated data analytics usage in an audit is similar to the migration we see in corporate finance toward digital controllership - leveraging applications to do the mundane, manual, straightforward work. This shift frees up the auditor or corporate finance resource to perform higher-level, analytical, value-added activities. However, we agree that data analytics does *not* replace professional skepticism and professional judgement.

These points provide context around the IMA TSP Committee's perspective on the role of technology in business, accounting and auditing processes. Appendix A includes our responses to the questions in the IAASB request for stakeholder input that are most relevant to our perspective.

On behalf of the IMA TSP Committee, I would be pleased to discuss our comments with IFAC's International Auditing and Assurance Standards Board at your convenience.

Sincerely,



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Appendix A

(a) Have we considered all circumstances and factors that exist in the current business environment that impact the use of data analytics in a financial statement audit?

i. It would seem necessary that any data analytics tools and techniques used by auditors would need to be disclosed by the auditors since reliance is being placed on tools and techniques to render an audit opinion.

ii. In the event deficiencies are found in an audit using data analytics tools and techniques, follow up discussions between auditors and management will need to take place, and documentation of the deficiencies will need to be acquired from auditees for additional review and understanding by auditors. This process may require more time from the client and auditors, resulting in higher audit fees. The question lies in what is the value added between extrapolating deficiencies to determine materiality and following up on all discrepancies. (Refer to page 14 (g) in the Request for Input.)

iii. The RFI focuses on the role of technology in the use of data analytics on financial statement controls. It would be important as well to shed light on business process and information technology controls. Process mining logs can be used to perform analytical procedures to test internal controls to ensure compliance. SAP software is used in the following paper to perform this log analysis. (See Jans, M., Alles, M. G., & Vasarhelyi, M. A. (2014). A Field Study on the Use of Process Mining of Event Logs as an Analytical Procedure in Auditing. *Accounting Review*, 89(5), 1751-1773. doi:10.2308/accr-50807.) These areas have a major impact on financial results and reporting. A related and underserved but growing area of needed controls is in the area of non-financial information, reporting, and assurance. Standards for the use of data analytics in financial statement audits should pave the way for standards in integrated/sustainability reports and other non-financial reports.

iv. ISACA's COBIT V Framework can be used to set up embedded IT Internal Controls. (See <http://www.isaca.org/COBIT/Pages/FAQs.aspx>.)

v. There is progress being made to help companies move towards greater automation of a real-time or near-real-time audit system, as evidenced by the work of Dr. Miklos Vasarhelyi, KPMG Distinguished Professor of Accounting Information Systems and Director of the Rutgers Accounting Research Center and Continuous Auditing & Reporting Lab ([CAR Lab](#)). Professor Vasarhelyi's pioneering work around continuous monitoring and controls and data analytics for the past two decades has led the way for companies to see how technology plays a critical role in the audit. More recent discussions around new technologies such as Blockchain and distributed ledgers also indicate possible use in automating the audit. As mentioned in a publication by Deloitte in March, 2016, "Blockchain technology has the potential to shapeshift the nature of today's accounting. It may constitute a way to vastly automate accounting processes in compliance with the regulatory requirements." XBRL (www.xbrl.org) is a standard for digitizing business information, is already widely used around the world by securities commissions, stock exchanges and other regulators to enhance the quality of digital structured information to make it more easily discoverable, reliable, and usable in data analytics. As these technologies converge, the path to automated auditing and embedded analytics will become clearer.

vi. The audit may become less of a Finance/Accounting activity and increasingly a collaborative effort with IT in order to deliver the provided-by-client or PBCs requested by auditors. (see [One Team or Two? Implications for Audit Team Identity and the Audit Process](#))

(b) Is our list of standard-setting challenges accurate and complete?

Audit Standard Element Challenges

- i. While data analytics and assessing 100% populations does not fit “into the current audit evidence model within the ISAs,” this trend would, in theory, place more use of judgement and professional skepticism on the auditors to determine appropriateness based on materiality and risk of material misstatements. Standard deficiencies are extrapolated to fit the total population to determine severity. Therefore, the data analytics approach would need to create more comfort on impact to materiality thresholds. (Refer to page 14 (g).)
- ii. The audit opinion letter template would need to change in order to delineate among companies in which audits have been performed using data analytics (and in what areas) versus traditional audits (Refer to page 17 (34)).
- iii. Page 19 (item 40) in the RFI on ethics is critical. Having large volumes of data is difficult to manage and a security risk for the client. Sensitive business customer confidentiality and employee privacy must be considered.

Client/Corporate Culture Challenges

- iv. There are client challenges to be considered (as noted in (a)): (1) will the audit be more expensive (even though it would cover more insight and data), and (2) will the audit reveal more insight that could put downward pressure on investor contributions (e.g., stock prices may fluctuate more).
- v. Auditors are increasingly asking for more and increasingly detailed information sourced from multiple ERP and other reporting systems. Their requests are no longer limited to financial information; requests today typically include operational, non-financial/ESG (Environmental, Social and Governance) and/or other volume data. It is often difficult for corporate clients to appreciate the requests because there is often little context behind the requests. They are often asked “Why are you asking for this information? What are you doing with it?” and they usually do not see the resulting output. This challenge is an opportunity for the auditors to educate the clients on what they are doing using automated data analytics tools and techniques to help clients appreciate the added assurance, controls reliance, and other benefits derived from doing this analysis.
- vi. Increasing collaboration with IT is resulting in more upfront work (on behalf of the client team educating both finance and IT), more coordination, and more time consumed. Are educational efforts by audit firms and universities adequate to increase understanding by the affected parties to cut down on the time required to manage the collaboration?
- vii. Regarding the perceived value of such systems: For a business to adopt any new technology, they must see overall value. Unfortunately, some businesses would see full transparency as more risk than benefit. The challenge is how to address this lack of understanding of the value of automated, advanced analytics by highlighting the intended purpose of technology implementation to improve the benefits to public stakeholders and investors through improved audit quality.
- viii. Powerful data analytics technology exists but may not be as widely implemented as its benefits and added value may suggest. Apart from the general lack of stakeholder interest, these solutions may be perceived by users to have high implementation costs. We may not know all

the reasons for lower than expected implementation rates that impact adoption of sophisticated analytics techniques in the audit, but this issue needs to be examined and better understood.

ix. The math and code are not the most difficult challenge to implementing data analytics in auditing. If audit data were available, a well-trained analyst could perform a lot of the audit analytics procedures in a short time. In our experience, technological implementation barriers are much more cultural than they are educational.

x. Another corporate culture challenge may occur from the tone of proposed audit standards. An encouraging position by standard setters may go a long way toward more use of automated data analytics tools and techniques in audits; more of a principles-based framework than a system of strict requirements. Minimum levels of quality and behavior will need to be embedded in the standards, but if a new technology enabled technique can be shown to improve audit quality, it should be recommended as a best practice in guidance materials.

xi. Accountants, including auditors often do not trust data they cannot “see” - accountants want to see data in a spreadsheet before they start working on it. This mentality creates friction between database administrators and audit-related users. Experience will show that accessing data programmatically is actually more accurate than using user-developed applications such as spreadsheets, as several studies have shown (see *R. Panko*, <http://panko.shidler.hawaii.edu/ssr/Myppapers/whatknow.htm>, 2008; *Protiviti*, <https://www.proformative.com/articles/spreadsheet-risk-management>, 2012). The challenge for auditors is having the tools and knowledge to acquire and test data with tools other than Excel.

xii. There are few standards regulating risks and controls in user-developed applications (such as Excel workbooks used in financial models as a subset of analytics), although there are some requirements found in Federal regulations of financial institutions regarding the need to inventory high risk spreadsheets (in the financial statement supply chain) and a few other risk assessment requirements. See Federal Reserve Board FR-11 mandate: “User-developed applications, such as spreadsheets or ad hoc database applications used to generate quantitative estimates are particularly prone to model risk.” (SR-Letter 11-7). Common internal controls such as input and output controls should be part of any standard. The analytic results incorporated into audit findings are only as good as the quality of the data and the transformations and calculations based on that data.

Data Architecture Challenges

xiii. Financial and non-financial data today are typically housed in disparate systems, each using different schemas. This data architecture is often due to the use of proprietary data systems recommended by software vendors that lock corporations into particular solutions (often called “vendor lock-in”), inhibiting the creation of a more integrated data environment. These challenges need to be overcome in order to facilitate a more integrated approach to automated data analytics.

Cross-Functional Skills Challenges

xiv. Data access and internal acquisition is definitely a huge challenge. Access to large data sets from disparate systems requires either significant lead time and partnership with IT in order to extract the requested information or an adept user to obtain this data in a self-service model. Skill sets in interpreting data requests, identifying what fields to extract from which system, validating completeness and accuracy of extracts to reported financials, and similar process skills are lacking within today's corporate finance teams; it is a rare find to have a

resource fluent in both finance and IT. This challenge is magnified in the search for relevant non-financial data sets. If the skills are lacking among corporate accountants, will they be present among external auditors?

Data Bias Challenges

xv. According to the experienced members on our committee, some companies already struggle with producing the voluminous transaction level detail for auditors. Additionally, auditees have challenges finding a secure way to transmit such large amounts of information, all while ensuring confidentiality. Training on biases such as confirmation bias and selection bias and how to handle outliers will be important for auditors and their clients when sourcing requests for data as well as when analyzing requests for data. Often the same information can be pulled from several systems and may impose a slightly different perspective from each. It will be important for auditors to understand how systems work together and how the data differs between systems if they are going to rely on data generated out of the system for audit testing.

(c) To assist the DAWG in its ongoing work, what are your views on possible solutions to the standard-setting challenges?

Guidance

i. There is a need for guidance from PCAOB regarding (1) when to use data analytics, (2) when is it acceptable not to use data analytics, (3) what is required to document why it was/was not performed, and (4) what is required to gain comfort on approach, tools, and techniques.

ii. Future standards will need to indicate what type of evidence analytics provides and in addition what data formats are acceptable. Analytics from a third party will have to be evaluated for reliance in the audit. Outsourcing data analytics might be a consideration for small and medium practices that may lack financial and human capital to do their own work.

iii. Requiring documentation of data analytic techniques employed in an audit will be essential in any standards. Compliance will allow evaluation of algorithms used to collect and make data usable. These algorithms could lead to machine-generated professional skepticism and professional judgment conclusions.

iv. Any implementation of controls on data analytics will also benefit by reference to COSO's ongoing internal controls framework project, as well as COBIT's latest guidance for data governance implications.

Phase-In

v. Auditors need to show audit clients the cost/benefits of data analytics. It would also be helpful to convince clients through case studies focusing on audits performed using standard risk-approach and audits using data analytics, for example.

vi. While auditors are experimenting with the use of data analytics in many different areas, it may help to take a phased approach so all can navigate the change together and understand the implications. For example, consider whether there is a specific area in which it makes sense to use data analytics that could be made a requirement in the standards. This pilot or targeted approach would help corporates better understand how the process works, and auditors could broaden the scope gradually, accelerating each step along the way.

vii. The IAASB is proactive in gathering as much information as they can from stakeholders and taking the time to “get it right” and avoid any unintended consequences. They also must develop an *iterative and agile process* for the development of future standards. With no end in sight for the rapid pace of innovation, it is imperative that the IAASB be able to keep pace with technology, innovation and the market overall. As an example, it should already be considering the potential role of Blockchain or Distributed Ledger Technology and their potential impact on audit and analytics automation.

Education/Skills

viii. There is a major skills gap in this area. IFAC needs to specifically address this issue in the IAESB’s International Accounting Education Standards. Qualifications, training, and certifications necessary to perform audit data analytics needs to be defined. Boards of Directors need to step up their own competency levels to enhance or set the tone for the enterprise.

ix. Accounting firms will either need to acquire analytics talent or train their current employees. Programs could be put into place, including a certification program, to build this skillset.

x. Training will be key on both sides of the audit, there are new skill sets that all involved will need to learn to be able to navigate a data analytics driven audit.

xi. There is an opportunity as we move toward using data analytics for the auditors to educate the clients on what they are doing and help us appreciate the added assurance, controls reliance, etc., that they are deriving from doing this incremental or new testing we have not seen before.

Data Management

xii. Data confidentiality and privacy concerns must be addressed between the client and the accounting firm regarding cloud-based secure data storage.

xiii. Shipping data to a data warehouse and translating it to an audit data standard (‘cleansing’) could be used to overcome the problem of financial and non-financial data’s disaggregated nature.

xiv. Industry standards may be referenced for consistent and better controlled spreadsheets that are part of any analysis. (See Spreadsheet Standards Review Board (SSRB), for example.)

xv. Another option that leverages existing data structure efforts is the use of internal XBRL (also know as XBRL Global Ledger or XBRL GL) for some analytics processes.

(d) Is the DAWG’s planned involvement in the IAASB projects currently underway appropriate?

i. Yes, it is important to integrate technology, including technology-enabled data analytics tools and techniques, into audits as a means of providing additional assurance measures. There is also a need to update the standards to be more applicable to current accounting system technologies as well as audit technology tools.

ii. DAWG’s perspective and involvement is essential for all current and future IAASB projects.

(e) Beyond those initiatives noted in the Additional Resources section of this publication, are there other initiatives of which we are not currently aware of that could further inform the DAWG's work?

- i. The Center For Audit Quality (AICPA) AICPA's Assurance Services Executive Committee's (ASEC's) Emerging Assurance Technologies Task Force has joined with the Auditing Standards Board to produce a new Audit Data Analytics Guide for the AICPA.
- ii. The Rutgers AICPA Data Analytics Research Initiative, led by Miklos Vasarhelyi, KPMG Distinguished Professor of Accounting Information Systems and Director of Rutgers Accounting Research Center and Continuous Auditing & Reporting Lab, is researching the use of data analytics in the audit.
- iii. A discussion of the attributes of data analytics enabled audit software.
- iv. The AICPA developed Audit Data Standards (ADS) ([AICPA Audit Data Standards](#)) including Base, General Ledger, and Subsidiary Ledgers (Order to Cash and Procure to Pay Standards), and is developing an Inventory Ledger Standard. The standards provide a standardized flat text file or XBRL format for ledger data that can be used for assurance testing and analysis. The standardized format of ADS facilitates leveraging technology audits and audit data analytics.
- v. The ISO (International Standards Organization) launched an Audit Data Collection Project (ISO/PC 295) in August 2015 to develop an international standard that will define how auditors can obtain accounting data. Under the leadership of China, the group is working to identify format and content requirements for accounting data elements and data interface output files. This standard leverages technology to perform audits using standard data elements and files. The committee is represented by countries from around the world.
See: [ISO/PC 295](#)
- vi. The IMA's CMA certification in management accounting and others managed by other accounting associations have an accompanying body of knowledge that includes data analytics topics such as simulation, scenario planning and sensitivity analysis. Collaboration with certifying bodies on basic competencies would help firms prepare for audits and better prepare auditors who have dual certifications in public and management accounting.

(f) In your view, what should the IAASB's and DAWG's next steps be? For example, actions the IAASB and DAWG are currently considering include:

- Case studies to show the difference between different audits and the value added benefit for automated data analytics tools and techniques.
- A phased approach that allows less tech savvy companies and auditors – as well as those who are change-resistant – to begin to leverage technology enabled analytics. Targeted educational programs are necessary to provide the “how-to” but are perhaps best left to third parties.
- Add an ISA addressing General IT Controls because the reliability of the General IT Controls is critical for performing data analytics for audits.
- Add an ISA addressing data security of ERP systems.
- Focus on updating the ISAs for digital auditing as applicable.

- For next best steps we prefer options (iii) and (iv).
- (i) Focusing attention on revisions, where appropriate, to ISAs affected by the IAASB's current projects.
- Yes, it is important to update the standards to be more applicable to today's environment (at a minimum).
- (ii) Exploring revisions to ISA 520.2
- It would go beyond just ISA 520.2 but this is the starting point since it is a solid standard on Analytical Procedures. Append the standard to specifically discuss how data analytics can be applied. Also, implementation guidance for data analytics applications could be issued.
- (iii) Hosting one or more conferences with interested stakeholders to collectively explore issues and possible solutions to the identified challenges.
- Yes, we recommend this activity and suggest IAASB consider doing them regionally, including North America. This activity is critical to learn how stakeholders are leveraging technology for audits and data analytics. An educational component could be used during these conferences to educate stakeholders about opportunities to apply technology solutions in their organizations. There must be a continuing dialogue with the stakeholders. A stakeholder working group could be formed.
- (iv) Continuing with outreach and exploration of issues associated with the use of data analytics in a financial statement audit, with a view towards a formal Discussion Paper consultation in advance of any formal standard-setting activities.
- We agree. There should be a look at the perspective and thoughts from the client side too in order to get both external auditor and management reaction.
- Conduct a survey of IAASB stakeholders.