Data Analytics Working Group

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

IAASB International Auditing and Assurance Standards Board

About the IAASB

This document has been prepared by the International Auditing and Assurance Standards Board's Data Analytics Working Group. It does not constitute an authoritative pronouncement of the IAASB, nor does it amend, extend or override the International Standards on Auditing.

The objective of the IAASB is to serve the public interest by setting high-quality auditing, assurance, and other related standards and by facilitating the convergence of international and national auditing and assurance standards, thereby enhancing the quality and consistency of practice throughout the world and strengthening public confidence in the global auditing and assurance profession.

The IAASB develops auditing and assurance standards and guidance for use by all professional accountants under a shared standard-setting process involving the Public Interest Oversight Board, which oversees the activities of the IAASB, and the IAASB Consultative Advisory Group, which provides public interest input into the development of the standards and guidance. The structures and processes that support the operations of the IAASB are facilitated by the International Federation of Accountants (IFAC).

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IAASB — International Auditing and Assurance Standards Board

EXPLORING THE GROWING USE OF TECHNOLOGY IN THE AUDIT, WITH A FOCUS ON DATA ANALYTICS

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The IAASB's Data Analytics Working Group and the Purpose of this Publication

The IAASB established the Data Analytics Working Group (DAWG) to inform the Board as to how and when to respond to developments in technology most effectively in the public interest. Since its inception in mid-2015, the DAWG has performed outreach with various stakeholders, including accounting firms, National Auditing Standard Setters (NSS), audit regulators and oversight authorities, International Federation of Accountants (IFAC) member bodies and representatives of the IFAC Small and Medium Practices Committee. The DAWG has also benefited from the insights gained from the robust discussions and debate on the topic of data analytics at the IAASB's June 2015, September 2015, March 2016 and June 2016 meetings, as well as the IAASB Consultative Advisory Group (CAG) September 2015 and March 2016 meetings.[1] The DAWG's activities have also included monitoring and gathering information on the various applications of data analytics and the relationship to the financial statement audit (such as the effect on risk assessments, testing approaches, analytical procedures and other audit evidence).

This publication provides insights into the opportunities and challenges with the use of data analytics in the audit and outlines the insights gained from the DAWG's activities to date. The purpose of this publication is to:

(a)   Inform stakeholders about the IAASB's ongoing work to explore effective and appropriate use of technology, with a focus on data analytics, in the audit of financial statements; and

(b)   Obtain stakeholder input and perspectives on whether all of the considerations relevant to the use of data analytics in a financial statement audit have been identified. Please see questions requesting stakeholder input on page 5.

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[1]   Agenda material for the IAASB and IAASB CAG meetings is available at www.iaasb.org/projects/data-analytics.

Request for Stakeholder Input

The DAWG's work in this area is not done and the IAASB has an open mind as to the way forward. In addition to the matters addressed in this publication, the IAASB and the DAWG are requesting your input on the following questions.

(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?

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

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

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

(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?

(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:

   (i)   Focusing attention on revisions, where appropriate, to ISAs affected by the IAASB's current projects.

   (ii)   Exploring revisions to ISA 520.[2]

   (iii)   Hosting one or more conferences with interested stakeholders to collectively explore issues and possible solutions to the identified challenges.

   (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.

The IAASB and the DAWG are interested in views that readers may have on these questions or any others that we have not yet considered in relation to the use of data analytics in a financial statement audit. Please submit written responses through the IAASB's website. Written responses are requested by **February 15, 2017**, to help the IAASB determine the way forward for the data analytics project. The IAASB also intends to form a project advisory panel to further explore these key questions.

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[2]   ISA 520, *Analytical Procedures*

Why Are We Taking Notice of the Growing Use of Data Analytics and Related Technology Advancements in the Audit?

1. Auditors play a key role in contributing to the credibility of the financial statements on which they are reporting. High-quality audits support financial stability. As the global auditing standard setter, the IAASB has a public interest responsibility to develop standards and guidance for auditors to facilitate high-quality audits being achieved. This in turn builds public trust and confidence in financial statements and corporate financial reporting more broadly.

2. In the history of the audit profession, there have been shifts in how the audit is executed. These shifts have been a result of transformations in the environment in which companies operate, and in which audits are performed. Prior to the current risk-based audit approach, companies operated in a far less complex environment. As a result, the audit was carried out in a largely manual way with a relatively high proportion of the financial information underlying the financial statements being tested without any significant emphasis on the nature and extent of the risks of material misstatement.

3. Over time, the risk-based audit approach has evolved—due to (i) higher transaction volumes such that auditors were not able to test all transactions underlying the financial statements; (ii) increased complexity; (iii) regulation stimulated by highly public failures of companies; and (iv) technology limitations. A risk-based audit focuses on the nature and extent of risks of material misstatement for the particular engagement, with greater emphasis on obtaining an understanding of internal control established by an entity and, where appropriate, obtaining audit evidence from the auditor's testing of the effectiveness of such internal control.

4. Technological change is occurring at a rapid pace, ushering in the capability to capture and communicate data digitally, on an unprecedented scale and almost instantaneously. This has resulted in an increasing focus on data, whether structured or unstructured, and whether generated internally or externally to the entity. Comprehensive and powerful digital information systems are increasingly capable of handling, analyzing, communicating and responding to these data-related changes. Companies are rapidly changing their business models in innovative ways in response to these developments.

5. Stakeholder expectations regarding the use of technology in the financial statement audit are evolving. Developments in technology, both within the financial reporting systems used to initiate, process, record and store data representing the information in the financial statements, and the tools and techniques available to analyze that data, are resulting in questions from stakeholders regarding how data analytics fits into the current risk based audit model. In a number of jurisdictions, particularly where proposals and re-proposals for audit are now more common, entities are inquiring of the auditor's data analytics capabilities and in some cases, expecting the auditor to perform an audit that includes the increased use of technology, particularly data analytics.

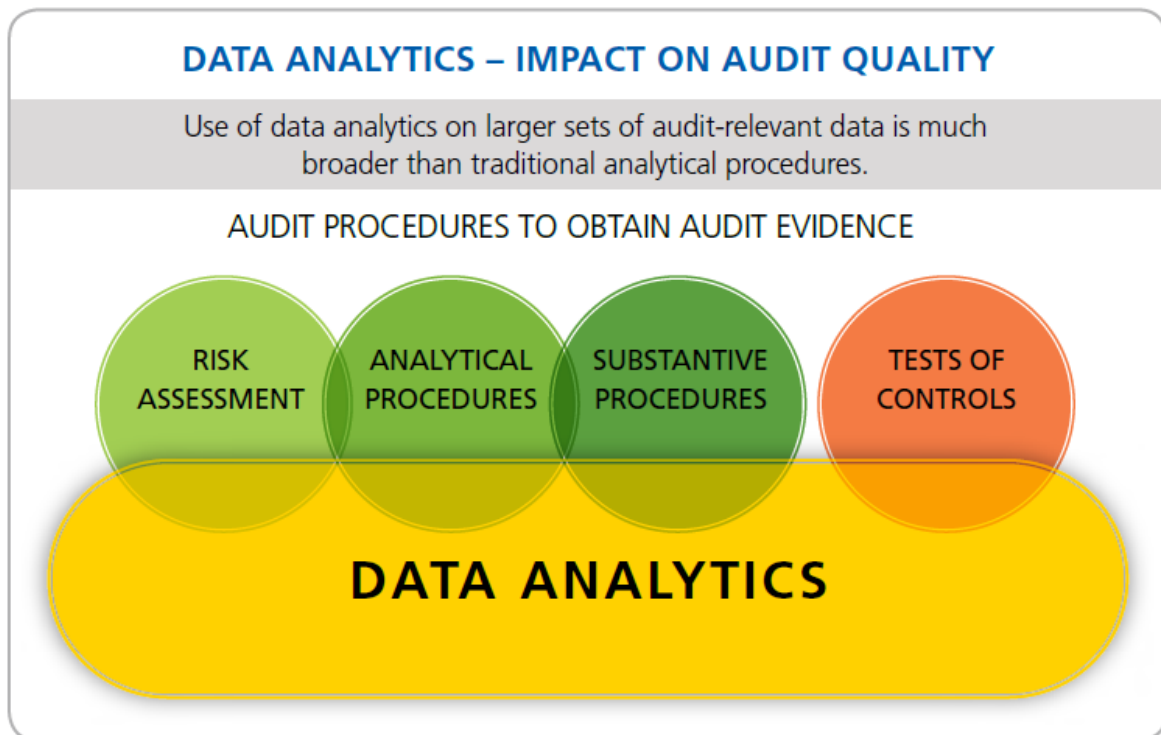**Data Analytics and the Financial Statement Audit**

6. The quality of a financial statement audit can be enhanced by the use of data analytics. Data analytics, when used to obtain audit evidence in a financial statement audit, is the science and art of discovering and analyzing patterns, deviations and inconsistencies, and extracting other useful information in the 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.[3]

In an increasingly complex and high-volume data environment, the use of technology and data analytics offers opportunities for the auditor to obtain a more effective and robust understanding of the entity and its environment, enhancing the quality of the auditor's risk assessment and response.

7. The application of professional skepticism and professional judgment is improved when the auditor has a robust understanding of the entity and its environment. In an increasingly complex and high-volume data environment, the use of technology and data analytics offers opportunities for the auditor to obtain a more effective and robust understanding of the entity and its environment, enhancing the quality of the auditor's risk assessment and response. Other benefits of the use of data analytics include:

   (a) Enhancing the auditor's ability to gather audit evidence from the analysis of larger populations, including enabling better risk-based selections from those populations for further testing by the auditor.

   (b) Broader and deeper auditor insight of the entity and its environment, which provides the entity being audited with additional valuable information to inform its own risk assessment and business operations.

DATA ANALYTICS – IMPACT ON AUDIT QUALITY

Use of data analytics on larger sets of audit-relevant data is much broader than traditional analytical procedures.

AUDIT PROCEDURES TO OBTAIN AUDIT EVIDENCE

RISK ASSESSMENT · ANALYTICAL PROCEDURES · SUBSTANTIVE PROCEDURES · TESTS OF CONTROLS

DATA ANALYTICS

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3   This definition of data analytics is based largely on a definition used in an American Institute of Certified Public Accountants (AICPA) publication titled *Audit Analytics and Continuous Audit, Looking Toward the Future*.

8. While the benefits are clear, there are also limitations auditors need to be aware of in using data analytics. For example:

   (a) Auditors need to have a clear understanding of the data they are analyzing, particularly the relevance of the data to the audit. Analysis of data that is not relevant to the audit, is not well-controlled, is unreliable or the source of which (internal or external) is not well-understood could have negative consequences to audit quality. While the analysis of relevant and reliable data provides valuable insights to the auditor, it will not provide everything the auditor needs to know.

   Being able to test 100% of a population does not imply that the auditor is able to provide something more than a reasonable assurance opinion or that the meaning of "reasonable assurance" changes.

   (b) Due to the need for the auditor to exercise professional judgments in relation to accounting and auditing, as well as issues related to data completeness and validity, being able to test 100% of a population does not imply that the auditor is able to provide something more than a reasonable assurance opinion or that the meaning of "reasonable assurance" changes.

   (c) In the financial statements of the majority of entities, there are significant amounts and disclosures that are accounting estimates (or that are based on accounting estimates) or that contain qualitative information. Professional judgment is necessary to assess the reasonableness of the entity's estimated value and disclosures of those items. While the data analytics technology of today is able to unlock valuable insights for the auditor to consider, its use in a financial statement audit will not replace the need for professional judgement and professional skepticism.

   (d) The effective use of technology can support the auditor in obtaining sufficient and appropriate audit evidence. However, caution should be exercised regarding the auditor's and stakeholders' potential "overconfidence" in technology, in which auditors lacking a clear understanding of the uses and limitations of technology falsely believe the results to be infallible (i.e., the output must be 100% accurate because a software program produced it).

Technology and the ISAs—The Present and the Possibilities

9. The ISAs do not prohibit, nor stimulate, the use of data analytics. Technological advancements and the increasing relevance and use by businesses of data analysis in decision making are causing the IAASB and its stakeholders to evaluate whether the ISAs will continue to meet the needs of those who rely on the auditor's report in a fast-paced digital world. The ISAs acknowledge the use of technology by the auditor in

   The ISAs do not prohibit, nor stimulate, the use of data analytics.

   executing the audit, through use of Computer Assisted Audit Techniques (CAATs). However, the reference to CAATs in the ISAs was created in a completely different technological era and CAATs have evolved significantly into what is now being referred to as data analytics.

10. The ISAs need to continue to be robust and relevant in a fast-developing environment. At the same time, the ISAs need to be capable of being applied to drive appropriate auditor performance regardless of the circumstances (i.e., keeping to principles rather than specifics tied to current practice). Of particular relevance to an audit are technological developments resulting in more powerful data analysis tools and techniques that can be used in procedures to obtain audit evidence. These data analysis tools and techniques provide the auditor, in an environment of

increasing complexity and large populations of audit relevant data, with enhanced capabilities to more effectively and efficiently understand the entity and its environment.

11. Data analytics provide an opportunity to maximize the effectiveness of the human element. For example, technology solutions can reduce the amount of time dedicated to manual analysis, allowing more time to be spent by the auditor on the more judgmental aspects of an analysis. Because data analytics is able to provide the auditor with different and more informative insights, the use of data analytics improves the auditor's ability to identify relationships and inconsistencies, enhancing the auditor's judgments and ability to be appropriately skeptical. However, auditors have indicated that they find challenges in fitting the audit evidence derived from data anal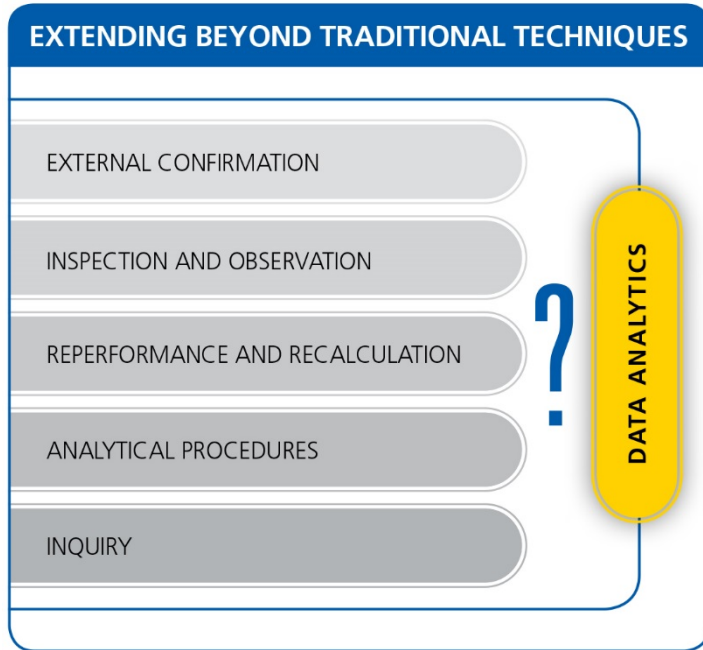ytics into the current audit evidence model within the ISAs. Auditors are considering the implications of analysis of the entity's data across 100% of a population, for example:

Auditors have indicated that they find challenges in fitting the audit evidence derived from data analytics into the current audit evidence model within the ISAs.

(a) How doing so informs the auditor's identification and assessment of the risks of material misstatement.

(b) Whether, in addition to supporting risk assessment, data analytics can be used to provide substantive audit evidence, and whether that evidence arises from what are classified in the ISAs as tests of controls, tests of detail or substantive analytical procedures.

(c) Whether the use of data analytics has an effect on evidence required from performance of other substantive audit procedures or tests of controls.

Why All the Discussion? Why Not Just Move Forward with Making Changes to the ISAs?

12. Technological advancements and developments in data analytics challenge everyone and giving serious consideration to the possibilities requires vision. The ISAs were written in a completely different technological era. While the ISAs are not that old, there have been rapid changes in technological advancements in recent years, the breadth and scale of which was not and probably could not have been reasonably anticipated at the time that many of the ISAs were developed or revised. Some hold the view that the current environment of fast-paced change and the expectation of ongoing evolution create a compelling platform for revisiting fundamental questions such as what the audit could or should be, including exploring whether there is a need to possibly start with a blank sheet of paper as attempting to retrofit data analytics into the ISAs today is likely not an effective approach.

EXTENDING BEYOND TRADITIONAL TECHNIQUES

- EXTERNAL CONFIRMATION
- INSPECTION AND OBSERVATION
- REPERFORMANCE AND RECALCULATION
- ANALYTICAL PROCEDURES
- INQUIRY

? DATA ANALYTICS

13. The ISAs do not prohibit the use of data analytics techniques. However, the lack of reference to data analytics beyond mention of traditional CAATs in the ISAs may be viewed as a barrier to their adoption more broadly.

14. This lack of reference to data analytics in the ISAs also results in some being of the view that gathering information from the use of data analytics does not necessarily reduce the procedures required by the ISAs today, even if those required procedures now appear redundant as a result of the information gained from the use of data analytics.

15. Should the ISAs specifically acknowledge the possibility of obtaining audit evidence from data analytics? In a regulatory environment where auditors are being innovative with the use of developments in technology to enhance audit quality and the effectiveness and efficiency[4] of their audits, they are having to be courageous in new ways of auditing without the support of the auditing literature. In some jurisdictions, increased use of technology and data in the audit are being demanded by the marketplace. Investors too have noted that, while the auditing standards are not broken, they need to reflect current practices and developments in order to remain relevant and meet investor expectations of the effective use of technology by the auditor to deliver high-quality audits. There is a risk associated with the use of new and innovative techniques for which there is not a strong framework within the standards. Challenges result for audit oversight authorities when performing audit inspections. Auditors are faced with the increased risk of getting second guessed on inspection and not having a clear basis in the auditing standards to substantiate the judgments made and procedures performed. This may deter auditors from using and experimenting with data analytics. There is also a risk that views of audit oversight authorities might evolve in an inconsistent manner—within and between jurisdictions.

16. Auditors, audit oversight authorities, standard setters and other stakeholders need to work together in exploring how developments occurring in technology could support enhanced audit quality.

17. There are very likely opportunities for the ISAs to be revised to address technological advancements and data analytics. Auditors and audit oversight authorities are looking to standard setters, such as the IAASB, to act in this area. Auditing standards should foster enhanced audit quality. At the same time, auditing standards should also be able to accommodate developments (such as technology advancements) that occur in the future, without

Auditors, audit oversight authorities, standard setters and other stakeholders need to work together in exploring how developments occurring in technology could support enhanced audit quality.

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4   Improving the efficiency of the audit allows the auditor to shift time away from lower risk areas of the audit to the higher risk (and more judgmental) areas of the audit.

needing to be in a continual state of change. While significant technological developments have occurred to date, including in the area of data analytics, further development and analysis (such as academic research) is anticipated in the near future.

Optimism—But There Are Still Unanswered Questions

Challenges Posed by Environmental Factors and Circumstances in the Business Environment

18. There are a number of circumstances and factors that exist that impact the use of data analytics in a financial statement audit. These circumstances and factors include:

(a) **Data acquisition** – including challenges with access to the large data sets that are needed to effectively execute certain types of data analytics. In most instances, the entity's data needs to be transferred to the auditor and, in addition to concerns related to data security and privacy, having sufficient infrastructure to store and then process the data can be challenging due to the size and volume of data.

(b) **Conceptual challenges** – when performing an audit that involves data analytics, the engagement team may be requesting data from the entity and asking questions about that data that have not been asked in the past. The approach to certain areas of the audit where data analytics is utilized is also quite different to what the entity may be used to seeing, and the entity may be hesitant to provide all of the data being requested.

(c) **Legal and regulatory challenges** – these include concerns regarding data security and privacy, but also jurisdictional law and regulation that, in some cases, prohibits data from leaving the jurisdiction within which the entity is located. This can be particularly challenging when the auditor needs to transfer the data to information technology (IT) facilities that may be located outside of the jurisdiction of the entity.

(d) **Resource availability** – a model that may be used by auditors utilizing data analytics in the audit may require skilled centralized resources supporting engagement teams. These skilled centralized resources are often data scientists and, as the extent of use of data analytics in the audit grows, strain is put on the resources currently available.

(e) **How regulators and audit oversight authorities maintain oversight** in a rapidly changing area when the audit oversight authorities have little experience themselves of inspecting audits where the auditor has made use of data analytics and other technology innovations.

(f) **The investment in re-training and re-skilling auditors** that over time have acquired knowledge, skills and experience in traditional ways of auditing that have been around for a long time is a challenge for the profession. From the most experienced to the least experienced auditor, and from the largest accounting firms to the smallest, changing the auditor's mindset to gathering audit evidence from the use of data analytics compared to traditional techniques will require time and investment in training.

Challenges Encountered by Auditors that May Affect Audit Standard Setting

19. In the context of the environmental factors and circumstances noted above, the following are challenges encountered by auditors when making use of data analytics in a financial statement audit that may be considered as affecting audit standard setting:

(a)   **General IT controls**. Data analysis triggers more questions regarding general IT controls and application controls, particularly:

    (i)   What is the minimum level of general IT controls testing, and the impact of the results of that testing, when the auditor is using data analytics in the audit; and

    (ii)   The impact of any deficiencies in general IT controls and application controls upon which the auditor intends to rely in order to conclude that the data from the IT system is sufficiently reliable for the auditor's purpose.

(b)   Audit procedures when the majority of data utilized is **information produced by the entity**. The ISAs require the auditor to evaluate whether the information is sufficiently reliable for the auditor's purposes, which includes, as necessary in the circumstances:

    (i)   Obtaining audit evidence about the accuracy and completeness of the information; and

    (ii)   Evaluating whether the information is sufficiently precise and detailed for the auditor's purposes.

In an audit using data analytics, where much or the majority of the data utilized is produced by the entity, what procedures should the auditor be expected to perform to satisfy the requirements in the ISAs noted above? Considering the nature of the data being utilized, the ISAs could be expanded to provide greater specificity and guidance to auditors.

(c)   **Considering the relevance and reliability of external data**. The auditor cannot assume that data from third-party sources is complete and accurate. External data obtained from third-party data providers may only be an aggregation of data obtained from multiple sources and may not have been subject to procedures to validate completeness, accuracy and reliability of data that is needed in an external audit context. The question for standard setters becomes what procedures does the auditor need to perform to meet the existing requirements in the ISAs to consider the relevance and reliability of the information to be used as audit evidence? How is this different from the premise in the extant ISAs that the reliability of audit evidence is increased when it is obtained from independent sources outside of the entity?

(d) **What is the nature of the audit evidence** obtained via data analytics when initially used as a **risk assessment** procedure (keeping in mind that the ISAs currently state that audit evidence from risk assessment procedures by themselves do not provide sufficient appropriate audit evidence on which to base the opinion)? When using data analytics for purposes of informing the auditor's risk assessment, the auditor does not develop an expectation of results. Audit evidence obtained from using data analytics for risk assessment could also be useful in other respects–but under the current requirements in the ISAs, this would not be considered audit evidence from a substantive analytical procedure as the auditor did not establish an expectation of the results at the outset of executing the analysis). Should the ISAs address when audit evidence obtained from data analytics alone would be considered sufficient appropriate audit evidence?
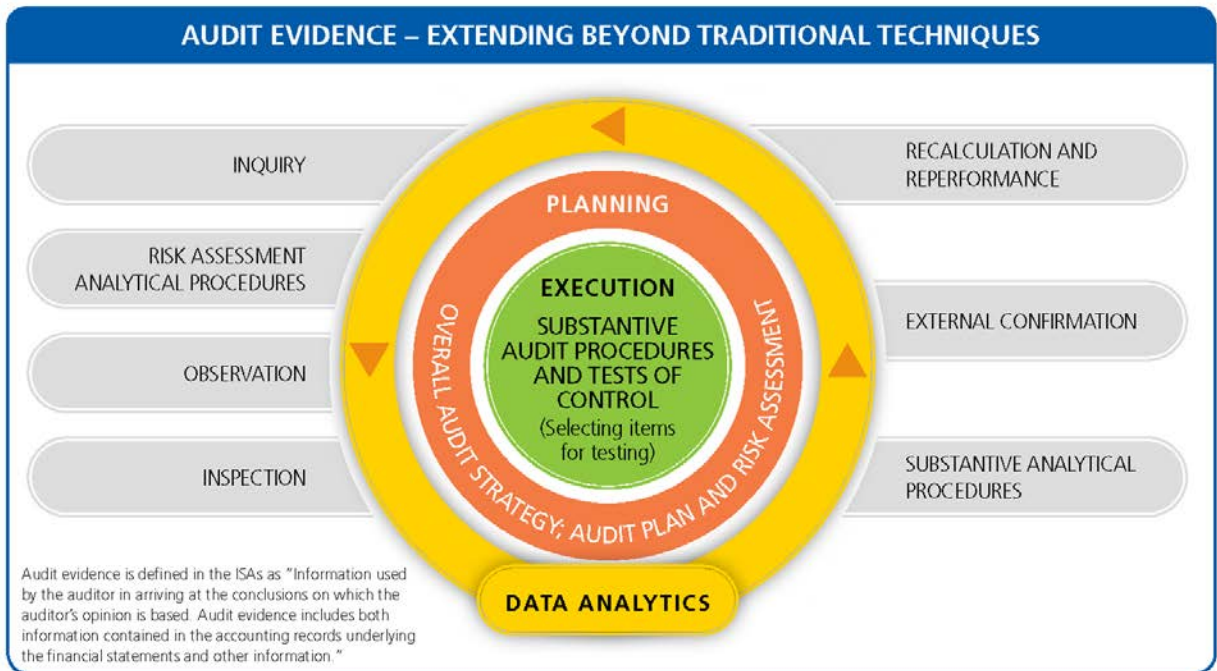
(e) **In the current risk and response nature of the ISAs**, how does an engagement team classify the audit evidence provided by data analytics? Is the difference between risk assessment procedures, tests of controls and substantive procedures relevant in an audit using data analytics, or should the ISAs be clear into which of those categories data analytics fits? What is the role of controls testing when auditors analyze 100% of the transactions in a particular area of the audit? Should the sometimes iterative nature of data analytics be reflected in the ISAs? Or is there perhaps another category of audit evidence generated from data analytics?

(f) **What is the nature of the audit evidence** obtained via data analytics in **responding to risks** identified? The structure of the ISAs requires an identification of risk of material misstatement and a response to the assessed risks. The use of data analytics does not negate that model but changes the way it is implemented—such that risk identification and response occurs in one step rather than a specific outcome of two separate activities. How

does the auditor document how the objectives of the ISAs were met based on the current ISA requirements?

(g) **What is an appropriate level of work effort for exceptions identified**? Under the current risk-based audit approach, exceptions identified from sampling populations for testing are extrapolated to estimate the impact on the financial statements as a whole. With data analytics, when the auditor has the ability to cover a significantly larger portion of the population (in some cases 100% of the population) and to more accurately estimate the magnitude of the error (in some cases determine the worst possible case of the error), there is uncertainty regarding the extent of the auditor's work effort on outliers identified to determine whether they are in fact exceptions. There may be a high number of outliers identified from the auditor's data analytic procedure, so does the auditor need to test each outlier to confirm whether it is in fact an exception, or can the auditor perform tests of detail on a sample of the outliers and project the extent of the error based on the results of the auditor's testing of that sample? Or, should the auditor be required to perform tests of detail on each of the identified outliers until the unconfirmed amount of outliers is reduced to an amount that would not be considered quantitatively material? In addition, questions remain regarding the level of work effort to substantiate that the auditor has sufficient appropriate audit evidence with respect to the portion of the population where no exceptions were identified.

(h) **Risk measurement** – Using data analytics, the auditor can more effectively and efficiently analyze larger populations of data to inform the auditor's risk assessment. What does the implication of being able to measure the risk for a particular assertion or portion thereof more precisely have on the audit? When the auditor has been able to analyze all transactions in a particular area of the audit for the entire period under audit, what does the auditor need to do to demonstrate or corroborate that unexpected transactions have been adequately addressed in the audit?

(i) **Challenges in applying the documentation requirements when applying data analytics.** The ISAs do not currently require the auditor to retain all of the information used in selecting items to test, but require the auditor to document the identifying characteristics of the specific items or matter tested. The documentation requirements need not be any different when making use of data analytics. However, there are challenges in how the documentation requirements are applied, including those related to direction, supervision, performance and review, when using data analytics based on the iterative nature of the process to reach a conclusion. Does the engagement team need to include in the audit documentation all of the data and details of all of the routines that have been executed? What is the auditor's responsibility to retain data that was used in the performance of data analytics but that is not directly audit evidence on which the auditor has based conclusions?

(j) **The importance of auditors establishing quality control processes** over the development of data analytics technology and tools used in an audit and related audit methodology— whether this is at the accounting firm level for firm-wide techniques or at the engagement level for custom built analysis. If an auditor makes use of third-party developed data analytics technology and tools, should the auditor be expected to assess the reliability of the technology and tools utilized and, if so, to what extent must this be done?

Considerations Specific to Auditors who Perform Audits of Small- and Medium-Sized Entities (SMEs)

20. Developments in higher-end technology solutions, which previously may have been out of reach for SMEs, are now more attainable when the technological expertise is maintained by a reputable third-party service provider (for instance, in cloud computing environments). SMEs that are using advanced technology to operate their businesses and record their financial transactions may have an expectation that their auditor would be making effective use of technology as well.

21. In many respects, there are likely to be some advantages for those auditors that audit SMEs over auditors that audit large entities in using data analytics in the audit. SMEs are more likely to be able to make use of standard / off the shelf financial reporting applications that make access to data easier and potentially provides information of higher quality in relation to the size of the entity.

Considerations Specific to Small and Medium Practices (SMPs)

22. Data analytics may be an area where many SMPs currently have limited knowledge or experience, but it has the potential to transform the existing audit model. Auditors who are unaware of the developments will be disadvantaged if they are not considering how data analytics could enhance audit quality and improve efficiency.

23. There may be perceived technology and investment barriers for SMPs—smaller accounting firms may not be able to make the financial and human capital investment necessary to develop these tools in-house in the same manner as larger accounting firms. However, there are vendors in the marketplace today offering data analytics solutions that SMPs can make effective use of, in some cases as an extension of using software from external providers as a basis for their audit methodologies.

Considerations Specific to Auditors who Perform Audits of Public Sector Entities

24. In public sector entity environments, where the existence of homegrown systems are more prevalent based on the specific nature of the role of these entities, data capture could prove to be challenging and limiting with respect to applying data analytics in the financial statement audit.

25. Audits of public sector entities include the audit of the financial statements, but there are numerous other types of audits performed (such as performance audits) that may lend themselves well to data analytics.

The Standard–Setting Path Ahead

26. The use of data analytics in the audit of financial statements is at an early stage, with auditors exploring how the use of data analytics can be expanded. While audit regulators and oversight bodies are engaging in proactive discussions with auditors on the topic of data analytics, they are just beginning to see its use in the audit through inspection activity. Academic studies of the role that data analytics can play in enhancing audit quality are also underway. Without more information, including solutions to the challenges noted throughout this document, wholesale change to the ISAs in the near term may have unintended consequences (such as inhibiting innovation), due to the fast-paced nature of the developments with data analytics in the audit of financial statements.

27. The IAASB currently has a number of ongoing projects and initiatives, as detailed in its *Work Plan for 2015–2016*. The DAWG anticipates active involvement in some of these ongoing projects to contribute to their further progress, including identifying potential opportunities for the standards likely to be impacted by those projects to make reference to or include language related to data analytics. Such involvement would include sharing the DAWG's findings with the other task forces and working groups. The following are the projects under review by the IAASB where data analytics will have a role.

Professional Skepticism

28. Adopting and applying a skeptical mindset is a personal and professional responsibility for every auditor. The application of professional skepticism is influenced by personal traits, including fortitude (i.e., the strength of mind that enables the auditor to deal with matters arising during the course of the audit with courage) and the auditor's competence (e.g., knowledge, skills and experience).

29. The use of data analytics in an audit of financial statements will not replace the need for the auditor to exercise appropriate professional judgement and professional skepticism. Strong views have been expressed by the IAASB CAG and at IAASB roundtables[5] about the importance of the auditor having a thorough understanding of the entity and its environment in order to facilitate a high-quality audit in which professional skepticism is appropriately applied.

> *The use of data analytics in an audit of financial statements will not replace the need for the auditor to exercise appropriate professional judgement and professional skepticism.*

30. The ability of the auditor to analyze data underlying the financial information represented in the financial statements may enable the auditor to have a deeper understanding of what has actually occurred in the financial reporting system—which will be beneficial to the auditor in making inquiries of entity personnel. This may provide the auditor with more granular information to assess the nature of the response to inquiries of entity personnel and have a more robust basis against which to assess the response and, if necessary, challenge the response.

31. While there are circumstances in which it is appropriate for the auditor to refine their expected outcome, it is important to avoid confirmation bias when performing data analytics. Confirmation bias is the tendency to search for, interpret, favor, and recall information in a way that confirms beliefs, while giving disproportionately less attention to contradictory information. When appropriately exercising professional skepticism, the auditor should take care not to disregard the results of the data analytic merely because they do not appear as the auditor would expect based on the auditor's understanding of the entity's business or the population. Instead, the auditor should use professional judgment and professional skepticism to consider whether the results of the data analytic represent inconsistent or contradictory evidence for which further investigation is necessary.

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[5] IAASB roundtables conducted in connection with the IAASB's Invitation to Comment—*Enhancing Audit Quality in the Public Interest: A Focus on Professional Skepticism, Quality Control and Group Audits*

ISA 315 (Revised)[6]

32. Risk assessment, including the identification of the risks of material misstatement, is fundamental to the performance of an audit in accordance with the ISAs. Data analytics enables auditors to improve the risk assessment process. The ability to analyze large populations can enable the auditor to determine and assess the areas of audit risk earlier in the audit process. Early in 2016, the IAASB established a separate working group to conduct the initial work related to possible revisions to ISA 315 (Revised). The DAWG will continue to coordinate and be directly involved with the activities of that working group, which is expected to set out a standard-setting project proposal for the IAASB's consideration in the near term.

Quality Control

33. The IAASB's quality control project is exploring—among other matters—the potential effects that accounting firms' changing business models and structures have on audit quality. In conducting audits, some auditors use Audit Delivery Models (ADMs) that are different to the traditional engagement team structures. These ADMs are affecting the traditional audit staffing model, with certain specialized expertize being centralized and supporting numerous audit teams. Auditors will need to consider the increased use of technology in executing the audit and how the specialized resources needed in the ADM to enable these techniques are supervised and interact with the engagement teams they support.

The developments in the area of data analytics have benefited from the developments in technology more broadly.

34. The developments in the area of data analytics have benefited from the developments in technology more broadly. When using data analytics techniques in an audit, auditors will need to have appropriate controls and processes in place to be sure that the tool is doing what it is supposed to do and developments and changes to the tools are performed in a controlled manner. Accounting firms have made use of technology to enhance the quality and efficiency of documentation, but now with tools to enable the performance of audit procedures to obtain audit evidence, the integrity of any software or application utilized in data analytics becomes increasingly important.

Group Audits

35. Many audits today are audits of group financial statements (group audits). Group audits generally involve participation of component auditors[7] who perform work on financial information related to components that comprise the group. Audit risk in a group audit encompasses the possibility that a misstatement at the component level, or across components, is not detected, which might result in the group financial statements being materially misstated.

36. Data analytics can help in the following areas of a group audit:

   (a) Scoping of the group audit—the ability of the group auditor to analyze data from parts of or from the whole group at a more granular level during the audit scoping, planning and risk

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6   ISA 315 (Revised), *Identifying and Assessing the Risks of Material Misstatement Through Understanding the Entity and Its Environment*

7   A component auditor is an auditor who, at the request of the group engagement team, performs work on the financial information related to a component for the purpose of a group audit.

assessment phase of the audit, improving the quality and timeliness of information available to the group auditor for decisions about scoping the group audit.

(b)   For components that are not significant components—data analytics enables more effective analytical and other audit procedures to be performed by the auditor in obtaining sufficient appropriate audit evidence.

(c)   In some group audit environments, more of the audit procedures can be centralized and performed by the group auditor, the extent of which will be dependent on how the entity is structured (e.g., the use of integrated technology systems and/or shared service centers facilitates effective use of data analytics).

ISA 540[8]

37.   In December 2015, the IAASB approved the commencement of a standard-setting project to revise ISA 540.[9] Part of the ISA 540 project involves modernizing the standard to better address the audit of complex, system-generated accounting estimates that may be common, for example, in the banking and insurance industries. Often, these estimates are influenced by large volumes of data, and the ISAs currently require the understanding of the estimate and the controls surrounding the systems that provide the data to develop the accounting estimate. For example:

(a)   Paragraph 8(c) of ISA 540 requires the auditor to obtain an understanding of how management makes the accounting estimates, and an understanding of the data on which they are based.

(b)   Paragraph 8(c)(ii) of ISA 540 requires the auditor to obtain an understanding of the relevant controls around the accounting estimate.

(c)   IAPN 1000[10] notes that controls are needed to ensure that data is completely and accurately extracted from external sources and from the entity's records and is not tampered with before or during the entity's use of such data.

38.   Due to the large volumes of data that feed into information systems that are used in models to develop some accounting estimates, use of new data analytics tools may be valuable in addressing audit risks associated with these data sources.

Education—with Linkages to the International Accounting Education Standards Board

39.   The effective use of data analytics in the audit requires the participation of individuals with skillsets different from what the traditional auditor has at their disposal. Data analytics were not contemplated in the education curriculums of many of today's auditors. In the not too distant future, a re-skilling of a relatively

> *Data analytics were not contemplated in the education curriculums of many of today's auditors.*

large proportion of today's accountants and auditors will be necessary to realize the potential on a broad scale. Today, auditors are incorporating the needed skills into the engagement team by adding the use of data capture specialists and data scientists to support the engagement teams.

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8   ISA 540, *Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures*

9   *Project proposal: Revision of ISA 540*

10   International Auditing Practice Note (IAPN) 1000, *Special Considerations in Auditing Financial Instruments*

Ethics—with Linkages to the International Ethics Standards Board for Accountants (IESBA)

40. The effective use of data analytics in the audit requires the auditor to have access to and, in many cases physically store large volumes of client-sensitive data. While the IESBA's *Code of Ethics for Professional Accountants* addresses confidentiality and independence, there may be a need for interaction with IESBA in these areas.

Other Areas of Impact to Be Assessed by the DAWG

41. In addition to the areas noted above that are affected by the use of data analytics in the audit, as the DAWG's outreach continues and the use of data analytics in practice expands, the DAWG expects that there will be other areas of the ISAs impacted. These may include impacts to ISA 240,[11] ISA 320,[12] ISA 330,[13] ISA 500,[14] ISA 520 and ISA 530.[15] Specifically with respect to ISA 520, the DAWG is planning to perform an analysis of that standard and how data analytics might be incorporated into that standard.

Next Steps

42. This journey is evolutionary rather than revolutionary; however, the pace of the evolution is key. The ISAs need to better address increasing complexity, taking into account the rapidly changing technological developments in both the business and audit environment. The IAASB's stakeholders and the public at large have high expectations of audit quality, and the role of auditors—and are looking for the IAASB to take action. However, the IAASB must be careful not to prematurely commence standard-setting activities related to data analytics, especially if doing so could have unintended consequences—such as restricting innovation.

> *The IAASB must be careful not to prematurely commence standard-setting activities related to data analytics, especially if doing so could have unintended consequences—such as restricting innovation.*

43. The responsibility for performing quality audits of financial statements rests with auditors. However, audit quality is best achieved in an environment where there is support from, and appropriate interactions among, participants in the financial reporting supply chain. The IAASB is not the only organization that can influence audit quality. As the global auditing standard setter, we encourage cooperation and debate among regulators, policymakers, national auditing standard setters and other stakeholders.

44. The IAASB and the DAWG are interested in the stakeholder feedback to the request for input questions on page 1. In the interim, the DAWG will continue:

- To explore and understand how the use of technology and more specifically, data analytics, is able to enhance audit quality and clearly articulate this for stakeholders (retaining the audit's place in the financial reporting chain by enhancing the reliability of the audit in an increasingly technology driven environment).

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[11] ISA 240, *The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements*

[12] ISA 320, *Materiality in Planning and Performing An Audit*

[13] ISA 330, *The Auditor's Procedures in Response to Assessed Risks*

[14] ISA 500, *Audit Evidence*

[15] ISA 520, *Audit Sampling*

- Its dialogue with accounting firms of all sizes, regulators and audit oversight authorities, preparers, investors, those charged with governance, national auditing standard setters and other relevant stakeholders in the external reporting supply chain to further understand relevant issues and to leverage the work that has been done by others. This dialogue will also help the IAASB to understand how auditors are innovating to meet emerging stakeholder expectations of enhancing audit quality in the public interest. In this regard, the IAASB intends to form a project advisory panel to help it consider feedback to this Request for Input and keep the Board informed about developments in this important area.

45. The DAWG will be actively involved in the IAASB's current projects (specifically professional skepticism, ISA 315 (Revised), quality control, group audits and ISA 540) to contribute to the further progress of those projects, including where the standards addressed by those projects might make reference to or include language related to data analytics.

Appendix

Additional Resources

Based on its outreach performed to date, the following initiatives have been identified relevant to the DAWG's work. In addition to the specific initiatives below, the DAWG is aware that other NSS, including the U.S. Public Company Accounting Oversight Board, are monitoring developments in practice in their respective jurisdictions.

Rutgers[16] AICPA Data Analytics Research Initiative

Established in December 2015, the Rutgers AICPA Data Analytics Research Initiative will undertake research projects that will focus on the potential for further integration of analytics into the audit process at a foundational level, in an effort to enhance audit quality. The scope of the research will encompass the testing of theory and methodology to inform the development of professional guidance on the application of audit data analytics.

Institute of Chartered Accountants of England and Wales (ICAEW)

Initially through a series of articles, the ICAEW is engaging in a dialogue with its members regarding the topic of data analytics. The first publication in a series of expected publications is titled "Data Analytics: International Auditing Perspectives", and explores data analytics in the audit, covering topics such as:

- What data analytics can do and how they contribute to audit quality.

- Routines, tools and solutions: technical challenges.

- Work in progress and looking forward.

The ICAEW's objectives through this series of papers is to facilitate a dialogue among auditors and audit regulators and generally raise the level of awareness (particularly with audit committee members) with respect to the use of data analytics in the audit.

Chartered Professional Accountants of Canada (CPA Canada)

CPA Canada has an Audit Data Analytics Committee focused on conducting research, delivering quality thought leadership and non-authoritative audit guidance in regard to the use of data analytics in the audit of the financial statements. The Committee's membership comprises professionals with expertise, experience and an interest in data analytics as it affects the public accounting profession, including members from accounting firms, private and public sector, and academia.

CPA Canada has just published its first Audit Data Analytics Alert—Keeping up with the Pace of Change, which explores data analytics and the drivers, opportunities and hurdles to overcome in integrating more extensive use of data analytics into the audit of financial statements (available in English and French). CPA Canada is currently working on two publications and is conducting a research study about audit practitioner's use of data analytics in the audit of the financial statements. More information is available on the CPA Canada website.

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[16]   Rutgers Business School, New Jersey, USA