Agenda Item 1-B

Disruptive Technologies Roundtable Key Takeaways and Initial Views on Possible Action Items

INTRODUCTION

Technology continues to be at the forefront of global hot topics, and the IAASB is committed to adapt as a global standard-setter to technological developments. Therefore, the IAASB is surveying the landscape of innovation activity focused on audit and assurance for potentially disruptive technologies. With that knowledge, the IAASB is considering how these developments affect the audit and assurance ecosystem, and how standards may need to evolve to address this change.

In 2020, IAASB leadership and staff conducted research with the assistance of Founders Intelligence[1] to identify the leading disruptive technologies that could impact audit and assurance. The research provided examples of who was innovating in these spaces and suggesting some next steps for the IAASB. In November 2020, the team held an initial roundtable to discuss how some of these technologies may affect the audit and assurance ecosystem. Innovators and practitioners (see Appendix 1) were invited to present and discuss their experience with the topics highlighted from the research undertaken. Discussions covered four broad areas where technologies may impact audit and assurance:

- **Accessing information or data** – auditors obtaining information or data from different sources (i.e., from the entity or from external sources).

- **Verifying information** – evaluating whether information is reliable, including procedures about the accuracy and completeness of information.

- **Protecting information** – maintaining confidentiality and following cross-border data protection laws.

- **Assessing internal controls** – auditors obtaining an understanding of the entity's internal control for purposes of performing risk assessment procedures (i.e., evaluating the design and implementation of controls) or further audit procedures on the operating effectiveness of controls.

Certain technologies may impact audit or assurance engagements to different degrees and, while some can be used in the profession imminently, others are years away. There is significant variation on the impact and adoption of these technologies, and we heard from innovators representing technologies across the spectrum of impact and imminence. Technology has the ability to improve audit quality but may also exacerbate resource gaps between firms of different sizes and between countries with different levels of development. Base on the research undertaken, the team concluded that there are four common themes about how technology is, and will continue to, disrupt the audit and assurance profession (these themes were discussed in **Agenda Item 1-A** as part of the material that was provided to the Disruptive Technologies roundtable participants):

1. Audits and assurance procedures performed on a more **continuous and real time basis.**

2. An audit or assurance engagement that is increasingly **analytics based**, including making use of artificial intelligence and machine learning in performing analytics.

3. An audit and assurance engagement that is increasingly **performed remotely**.

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[1] https://foundersintelligence.co/

4.   Audit and assurance becoming a **more technology-enabled profession**, where more professionals are able to understand, use and leverage advancements in technology in their day-to-day work.

From the research and the roundtable discussions, the IAASB staff team has identified a number of possible action items to prepare for these disruptions. These action items can be found at the conclusion of this paper.

KEY TAKEAWAYS

This section summarizes key themes and insights from the roundtable discussions.

Accessing Information or Data

Many participants touched on accessing information or data which is a key element of an audit. We heard from the creators of a data standardization tool and practitioners implementing technology in their own audit engagements. Innovation in this space has the potential to bring greater efficiency and quality to the audit, but may require significant change in the industry.

There is a significant and growing component of audit work associated with accessing digital data

- The proportion of audit time spent on preparatory data work can be significant. This is primarily caused by a proliferation of available data sources – a trend that is expected to continue.

- There are also potential advantages to an audit process in directly accessing new and expanded third-party data sources, further expanding the universe of data to be incorporated.

- A common feature of accessing data for audit purposes is integration with Enterprise Resource Planning (ERP) software. Accessing complex entity data in practice often involves 'connecting' audit firm data parameters and analytics tools to these software installations via a 'mapping' process.

- This mapping process is by default repeated by different audit firms for each different engagement.

Existing and emerging technology solutions have the potential to reduce the time burden of this audit work

- A Common Data Model (CDM) reduces the amount of cross-engagement 'mapping' work by acting as an intermediary platform, shared between audit firms (data inputs) and entities (data sources), bringing its own data standardization to participants in the ecosystem.

- The core time saving advantage comes from providing consistent structure and a single source of entity data to auditors.

- Recent advances may increase the value of a new CDM compared to previously explored versions, whilst still delivering the core advantage.

The various incentives around this technology and the need for alignment across multiple stakeholders suggests that adoption may be challenging but would help improve audit quality.

- Entities are already familiar with sharing details of their data and ERP systems with auditors; however there is some hesitance amongst entities with the potential that this creates to move away from a sampling process to a full population review. This may raise scalability concerns, for example, there may be an increase in total audit time initially, and it may not be feasible for management to answer for every anomaly detected in a population.

- Entities also have the advantage of greater control over their source data, and potentially an improved ability to use it in internal audit.

- In the absence of a widely adopted CDM, some large audit firms have developed their own approaches, investing significantly to address the data access challenge. This may contribute to a gap in data access capabilities between large and small firms that continues to grow.

- An incentive for auditors to adopt a CDM is the ability to consistently and efficiently deal with the complexity of the varying ERP systems used by clients (bringing potential time savings and efficiency increases).

- Expected changes to ERP providers' business models may also play into the appetite for a CDM.

- There are already examples from outside of audit where regulators have been given direct access to entity finance systems to assist with examination, suggesting that the kind of ongoing data connection is possible.

Verifying Information

The topic of verifying information – the procedures performed to confirm the accuracy and completeness of an entity's data – was addressed on several occasions. The key point addressed was how sophisticated technologies like AI can be used successfully in various ways to support the completeness of data.

New sophisticated solutions using AI, ML and advanced analytics can empower a more thorough investigation of data to help verify its accuracy and completeness

- In addition to enabling more comprehensive collection of data from new and current sources, these technologies can help verify if all data has been recorded and analyzed.

- Use cases for these technologies could be in verifying that all emails have been analyzed as part of the communication monitoring process, or searching for unrecorded liabilities.

Protecting Information

The sensitive nature of the information examined in an audit means that data protection is a key concern, with a variety of approaches and rules currently in place to ensure this. We heard from one entrepreneur who is bringing to market an advanced encryption tool that could open up entirely new opportunities for remote audit analysis. In this session, this novel form of encryption was explained and the potential use-cases were explored.

New technologies have emerged to enable previously impossible data collaboration whilst preserving confidentiality, thereby creating new opportunities for audit analysis

- Standard encryption is a mature technology that is widely deployed to protect data that is digitally 'at rest' (being stored) and 'in transit' (being sent between parties). However, it does not protect data that is 'in use' for analysis purposes.

- A more recently developed technology called Homomorphic Encryption (HE) makes it possible to protect data 'in use'.

- HE analysis is performed 'in aggregate' on the encrypted data sets, so that insights can be drawn from data but the underlying individual data entries are not exposed.

- The audit requirement of understanding the accuracy and completeness of data would be addressed either through this aggregate analysis or with the introduction of checks prior to the initial encryption.

- HE enables secure collaboration between parties where, for various reasons, the specific details of the data (i.e., the individual numbers or entries, should remain secret). Information between the parties about the nature (format, structure, type etc.) of the data must still be shared. Because of this requirement, HE is not suitable for use in adversarial relationships.

- HE promises a higher level of encryption data protection with the expected advent of powerful quantum cryptographic encryption breaking methods.

These techniques present a novel challenge to the existing explicitly defined and implicitly adopted approaches to data confidentiality

- Group audits are a particular scenario that can benefit from this technology, as it addresses inherent confidentiality issues, making it possible to conduct cross-border data analysis that is compliant with international privacy and sensitive data regulations. Assessing the accuracy and completeness of the data would still require sending an auditor to the local site.

- The challenge of training AI models on data that is otherwise not available for use outside of an audit by rules and ethical guidelines can be mitigated by using HE.

- Industry benchmarking is another potential beneficial use case of HE that is currently heavily constrained by fundamental confidentiality restrictions that prevent the use of data from multiple entities outside of an audit.

- Positive encouragement of the adoption of HE has come from financial crime regulators, who recognize its utility for privacy-preserving information sharing towards anti-money laundering (AML) and fraud prevention.

- As well as positive feedback on HE from regulators, legal experts have also endorsed the technology, stating that it is compliant with or has no bearing on privacy laws given that the data itself is not exposed.

Assessing Internal Controls

We heard from two innovators on the topic of helping auditors to obtain an understanding of and evaluating an entity's internal control. Both solutions, in the areas of AI-powered simulations and AI-powered communication and conduct monitoring, offer the potential to support decision making with the use of more data-driven approaches.

Simulations could be used to model an entity's activities and predict the impact of bad actors or changes in policies. This could help auditors to better understand an entity's internal controls

- AI-powered simulations can realistically simulate the dynamic behavior of participants (e.g. people or corporations) in artificial but realistic environments.

- This technology can be used to support decision making by simulating thousands of 'what-if' scenarios to analyze the interactions between participants and the impact of changes to those interactions.

- Simulation technology has been used for many years in natural sciences, and is increasingly being used in corporate environments, particularly in financial services.

- There is potential for this technology to be employed by entities or auditors to create simulations of an entity's internal controls and analyze their effectiveness in thousands of different scenarios, such as by changing specific policies, the introduction of bad actors or different external factors.

- As a result, simulations could be used by auditors to support a more rigorous, evidence-based approach for their decisions, professional skepticism and enhance the auditor's ability to challenge management assumptions on internal controls and elsewhere.

- Similarly, entities could run simulations to stress test their own controls and management assumptions, and the details and outcomes of this could be provided to external auditors as evidence in their evaluation of the internal controls or in testing items involving such assumptions and management judgment.

- Further consideration is needed to determine the real-world applicability of AI-powered simulations for audit purposes.

Technology enables more thorough assessment of the conduct of individuals, which could be useful in predicting and preventing fraudulent behavior and other breaches of internal controls

- As workplaces and communication has become more and more digital, accelerated by the COVID-19 pandemic, it is increasingly possible to comprehensively aggregate and monitor employee communications.

- While some industries are more digital than others, the trend is for more and more employee conduct and communication to be available in digital formats.

- Advances in AI and behavioral analytics enable increasingly sophisticated monitoring and analysis of this digital conduct and communication data. As a result, these solutions can help identify conduct and communication that was previously hidden or difficult to find.

- Since conduct and communication can be a leading indicator of fraudulent behavior, AI-powered conduct monitoring tools could be used as a way to detect and predict the occurrence of fraudulent activity, or other breaches of internal controls, in an organization.

- Details and results of an entity using these solutions could be provided to external auditors as evidence in their evaluation or testing of the entity's internal controls.

- More broadly, communication and conduct monitoring could also be leveraged for assurance on Environmental, Social, and Corporate Governance (ESG) information, in particular the social and corporate governance aspects. These solutions could highlight, for instance, cases of workplace harassment or when management conduct differs from their promises.

As simulation technologies and communication monitoring solutions become increasingly capable and available, entities may begin to implement these system. Accordingly, auditors may be able to leverage the entity's use of this technology in designing and performing audit procedures.

- With simulations and communication monitoring becoming increasingly available, affordable and capable, there are more suggestions that auditors ought to request evidence discovered from these types of solutions in designing and performing audit procedures.

- Nevertheless, there are concerns about the applicability of these solutions to entities of different sizes and complexity, as well as the affordability of such sophisticated tools. While conduct and communication analysis is increasingly powerful with AI & ML, there could still be value for entities to be performing and providing evidence of more systematic communication and conduct monitoring, even if it is not driven by such advanced technology.

- There are also significant concerns about privacy that may impact the adoption of the technology.

- Another significant consideration is over the role of external audits, and whether this level of evidence is needed for an appropriate understanding of an entity's internal controls and, if applicable, testing of internal controls, in accordance with auditing standards.

- Further consideration is needed to assess when, and to what extent, entities could be encouraged by auditors or regulators to run simulations or conduct and communication monitoring on employees to help detect and predict fraudulent behavior or other breaches of controls.

Other Matters

- Standard setters have to remain mindful of the diversity of firms and entities which, respectively, use audit and assurance standards, and whose information is subject to audit or assurance, and that the adoption rate of different technologies may vary across firms and jurisdictions. In addition, the focus should continue to be on setting principle-based standards that do not create an imbalanced playing field, that recognize that auditors'/practitioners' objectives may be achieved in different ways, and that supports different and evolving tools and techniques.

- There can be multiple secondary benefits to auditors from technology adoption, including more rewarding work for auditors by focusing on higher impact work as well as potential time savings (i.e., focusing on what really matters, appropriately spending less effort on low risk areas and more effort on high risk areas).

- Firms should anticipate that some technologies they may adopt can lead to a sudden increase in the quantity of entity data, including data from outside the traditional accounting system. This will lead to a need for more data that needs to be considered with respect to relevance and reliability.

- Technology adoption in audit procedures, from both entities and auditors, is more likely in some geographies and industries than others, presenting challenges in the context of global standards setting. There may also be resource constraints for less complex entities and their auditors and in less developed countries.

- Auditors can be hesitant to adopt new technologies where they are not confident that the new approach it enables will be accepted by regulators and the public as a replacement to traditional approaches rather than being seen as only additive.

- Across the industry, there remain substantial gains in audit quality to be made from applying well established technology, before considering more recent technological developments. Standard setters should therefore consider what balance of technology adoption they should encourage the profession to pursue.

- While technology innovations bring upon numerous benefits to auditors, these innovations may also bring on additional risks and additional considerations for auditors. For example, technology innovations create more avenues for believable fraudulent activities to be perpetrated. As such, it is important for the audit and assurance ecosystem to understand technological developments in this space.

WAY FORWARD

IAASB staff have considered the insights from the roundtable together with the findings from the research undertaken to identify the below possible action items, which are categorized into three broad categories and further divided by action items for the IAASB and action items for others (these categories are aligned to those identified in **Agenda Item 1-A**, page 6, "Getting Future Ready: Areas for Action"):

- Facilitate industry innovation.

- Act on standard setting considerations (both short and long term).

- Build board and staff capacity.

Please note, these are preliminary and are subject to updating as we continue our outreach and information gathering activities to determine possible further actions for the IAASB.

POSSIBLE ACTION ITEMS FOR IAASB	POSSIBLE ACTION ITEMS FOR OTHERS
FACILITATE INDUSTRY INNOVATION	
- Maintain an inventory of technology innovation trends and potentially disruptive technologies. - Include technology innovation in the outreach program. - Hold regular (e.g., annual) technology and innovation roundtables to share observations and learn about innovations taking place.	- Upskilling of auditors, particularly small- and medium-sized practices, and enhancing education and training programs - Users and those charged with governance clarifying information needs (including services other than audits of financial statements) - Role of regulators, NSS and other standard setters related to other assurance services - Ensure accountancy education integrates sufficient data and technology related topics for a future-ready profession
ACT ON STANDARD SETTING CONSIDERATIONS (SHORT AND LONG TERM)	
- Continue to monitor technology developments in the audit and assurance space to drive possible further actions. For example, modernization of standards related to the effects of technology and sources of information - Establishing an approach to ensure that technology-related issues continue to be appropriately addressed within the standards, including that the standards support different and evolving tools and techniques that are able to meet the requirements. - Providing suitable guidance on technology-related issues that could be addressed other than through standard-setting (including when a more timely response may be indicated in the circumstances) - Being alert to needs of small- and medium-sized practices in terms of	- Consider the role of the profession in data standardization and data governance - Development of implementation materials and tools for small- and medium-sized firms - Enable wider availability of remote-working audit tools - Regulators and investors to consider their expectations for the auditor when using technology in completing an audit (for example, to be physically present during an audit)

adapting to new technology (in relation to standard-setting or other activities undertaken)	
BUILD BOARD AND STAFF CAPACITY	
• Continue to monitor technology developments in the audit and assurance space to drive possible further actions. • Establish a skills matrix for IAASB staff, including a diverse technological background. • Upskill IAASB staff on technology innovations. • Establish a staffing model in relation to technology that involves a combination of IAASB staff and secondees or contractors with experience in technology innovations in practice. • Consider whether an external innovation advisory group may be appropriate. • Provide regular education sessions to the IAASB Board and staff in regards to technology innovations.	• Consider appropriate skills matrix for IAASB members incorporating technology topics

Appendix 1

Disruptive Technologies Roundtable Presenters List

INNOVATOR / PRACTITIONER	PRESENTER(S)	OVERVIEW
Engine B	**Shamus Rae** *(Co-Founder and CEO)* **Franki Hackett** *(Audit Data Analytics Consultant)*	Engine B brings together open-source data models for audit, tax, and other professional services as well as a data exchange and access platform, plus the foundations of a professional services marketplace. The data models can be installed with clients to capture and house client information in an intelligent data access platform. Client data can then be interrogated and analyzed through dynamic knowledge graphs (a programmatic way to model information) that are amenable to graph-computing techniques and algorithms.
Duality	**Rina Shainski** *(Co-Founder and Chairwoman)*	Duality's innovative technologies empower Secure Digital Collaboration. With Duality's technology, enterprises can securely collaborate applying advanced analyses and Artificial Intelligence to data while it is encrypted, generating insights without ever exposing the raw data
Simudyne	**Justin Lyon** *(Founder and CEO)*	Simudyne helps financial organizations to understand their world and make the best possible decisions. Simudyne is a simulation technology company that offers organizations a new way to more effectively harness the power of agent-based modelling, AI and machine learning to test-drive their decisions and drive growth. Simudyne's clients include global banks, regulators and exchanges.
Behavox	**Erkin Adylov** *(Founder and CEO)*	Behavox is an enterprise people analytics software company that provides holistic employee supervision solutions to financial services companies. This innovator aggregates communications across numerous data types and uses AI to identify negative behaviors (for numerous purposes such as regulatory compliance, conduct monitoring etc.).
Grant Thornton US	**Brian Wolohan** *(National Partner-in-Charge, Audit Innovation)* **Jim Burton** *(National Partner-in-Charge, Audit Methodology and Standards)*	Grant Thornton is one of the world's largest professional services networks of independent accounting and consulting member firms which provide assurance, tax and advisory services