

Supplement 2 to Agenda Item 7

This paper presents the mapping of key aspects, as identified by the AEWG, resulting from the academic research papers to the audit evidence issues included in **Appendix 4 of Agenda Item 7**. This paper is **for reference only**.

Mapping Key Aspects of Academic Research Papers to Audit Evidence Issues

Key Aspects of Academic Research Papers that Impact Audit Evidence	Issue(s) in Appendix 4 of Issues Paper
<p>Sufficient Appropriate Audit Evidence: The Use of External Information (Big Data) in an Audit of Financial Statements (Including Possible Under-Reliance on Technology)</p> <ul style="list-style-type: none"> <p>Research Paper 1</p> <p>Auditing standards should address the unique situation posed by Big Data: external evidence in the form of external Big Data may not be reliable unless secure data provenance of that data has been recorded.</p> <p>Research Paper 2</p> <p>The entire suite of audit evidence standards may need to be reassessed and subsequently revised in this age of electronic and big data evidence. Electronic and big data evidence often raise issues opposite of those assumed by the standards for paper-based documentation. As business processes are very infrequently paper-driven, the standards on reliable audit evidence, which are derived from quality evidence of sufficient amount, may need to be revised to provide a more quantitative measure of quality vs. quantity in an IT audit.</p> <p>Research Paper 4</p> <p>Based on extant standards, the determination of 'sufficient appropriate audit evidence' is based on the auditor's judgment. This poses a challenge to the use of technology in the audit, and in particular Big Data' as it relates to relevancy and trustworthiness. The challenge for the auditing profession is how to derive value from Big Data to ensure that audit judgments and decisions based on quality information that is relevant and trustworthy.</p> <p>Research Paper 5</p> <p>Audit standards largely provide guidance related to the traditional forms of audit evidence [e.g., evidence generated by the entity or external documents] and evidence considerations in an electronic environment [e.g., information transmitted, processed, maintained, or accessed electronically]. However, these standards do not sufficiently address the nature of evidential matter that will be necessary in the more complex and advanced technological environment. Auditing standards require auditors to gather audit evidence that is sufficient, competent and reliable</p> 	5, 6(b), 6(c), 6(d)

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<p>to support their audit opinion; but the characteristics used to define sufficient, competent and reliable audit evidence may not be adequate. It is important to evaluate how technology can be utilized to ensure that the attributes defined in the standards are met.</p> <ul style="list-style-type: none"> <p>Research Paper 7</p> <p>Big Data will play an important role in auditing because it may complement traditional evidence. Big Data can be quite reliable because it is often externally generated and acquired by auditors directly. On the other hand, the noise in Big Data may cause an overload of false positives, leading to lower reliability.</p> <p>Research Paper 8</p> <p>Existing audit standards do not seem to constrain auditors in their use of Big Data for either financial reporting or internal control over financial reporting (ICFR) purposes. These standards as a whole take a very expansive view of what constitutes audit evidence and are not be written in a way that constrains what data auditors may use. But that very lack of constraints also raises the question the extent to which auditors have fully exploited the freedom that the standards give them to be expansive in their use of audit data.</p> <p>Research Paper 9</p> <p>Although there are advantages, the application of Big Data in auditing is less straightforward than it is in the other fields, such as marketing and medical research. Big Data and advanced data analytics are disruptive technologies and, as such, would require, among other issues, significant changes to current audit standards, for example:</p> <ul style="list-style-type: none"> - Unprecedented access to proprietary and sensitive client data that are outside traditional data requested during an audit; and - A significantly higher reliance on non-financial data, which auditors have been reluctant to use in the past because it's not clear how to validate this non-generally accepted accounting principles data. <p>Research Paper 10</p> <p>There are several issues that the auditing profession will need to address related to Big Data analytics, including:</p> <ul style="list-style-type: none"> - Making successful use of Big Data requires a paradigm shift. Instead of using some data in small clean datasets and focusing on causation (plausible relationships in International Standards on Auditing (ISA) terms), the auditor using Big Data will tend to use “all” the data in large relatively messy datasets and will focus more on correlation than causation. The degree to which this approach is implemented in an audit will vary according to the stage of an audit: using messy data is more tolerable for planning and risk assessment 	

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<p>as opposed to substantive procedures. It will certainly require significant new guidance and education and may even require auditing standards themselves to be modified.</p> <ul style="list-style-type: none"> - Access to or privacy of information is a potential concern when Big Data is used. The usage of such sensitive information in Big Data applications presents a challenge, although this concern is not specific to auditing. For example, the European Union is scrutinizing Google over a raft of antitrust and privacy concerns related to its use of Big Data. 	
<p>The Use of Analytics in an Audit of Financial Statements:</p> <ul style="list-style-type: none"> • Research Paper 2 The paper questions the lack of detailed recommendations regarding which analytical procedures to undertake in the external audit engagement. • Research Paper 6 Certain audit standards impede the application of continuous auditing principles and could be revised to promote the use of technology in an audit. The reality is that the current audit model does not accurately address data analytics, which falls in between analytical review procedures and tests of details. This is not surprising, considering the fact that the standard on analytical procedures was issued a quarter of a century ago, long before the emergence of business intelligence, online analytical processing, Big Data, and other technological advances. • Research Paper 12 There are numerous challenges to widespread implementation of data analytics on audits. The challenges fall into two broad categories: <ul style="list-style-type: none"> - Data availability, relevance, and integrity; - Expectations of the regulators and financial statement users. Over the years, the auditing profession has dealt with many expectations gaps, such as users believing that auditors are providing 100% assurance that financial statements are fairly stated, when in reality, auditors are only providing a reasonable level of assurance—which, due to sampling of transactions on a test basis, is somewhat less than 100%. Given the potential to audit 100% of transactions, it is possible that data analytics could exacerbate the expectations gap issue. 	12(a), 12(c)

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<p>ISA 501¹ – Using Drones in a Physical Inventory Counting</p> <ul style="list-style-type: none"> Research Paper 3 <p>The audit profession manually conducts observations, inventories, and valuations when many industries are turning to automation and drones for these tasks. Drones may extend the auditor’s abilities in observation, inspection, evaluation, and performance. This means that they can provide evidence about the existence and valuation assertions in certain circumstances.</p>	15(a)
<p>The Possible Use of Specific Technologies in the Audit Environment (Data mining, Artificial intelligence, Machine learning)</p> <ul style="list-style-type: none"> Research Paper 13 <p>Although the application of data mining has not yet been fully tested with auditors, data mining specialists, or software and services providers, the increasing value thereof as a financial statement auditing tool is due to the convergence of several factors:</p> <ul style="list-style-type: none"> - Increasing emphasis on fraud detection in audits by regulators and standard setters, which provides motivation to identify and use tools to increase auditor productivity; - Growing use of data mining tools as a forensic tool within accounting firms, which means there is a growing population of people within the firms with data mining experience as well as a general data mining awareness; and - The evolution of more robust and easier to use data mining tools. <ul style="list-style-type: none"> Research Paper 14 <p>Increased use of intelligent software is gradually replacing humans in the workforce and therefore certain practices will become obsolete. Entities run analytical models more frequently, if not continuously, to decrease probability of fraud, manipulations and misstatements. As a result, entities may gain a competitive advantage over external auditors (access to more information). In order to counterbalance, auditors may need to be more involved with entity’s systems – possibly negatively impacting auditor independence. Alternatively, the auditor would have to resort to sampling methodologies, but gain access to less information. This creates a difficult question for standard setters – should we compromise independence but create a position to provide ‘better’ assurance? Also, artificial intelligence requires different skill sets which may require the accounting curricula to be adapted and firms need to recruit data scientists or invest in training courses to take advantage of artificial intelligence more efficiently & effectively.</p>	12(a) – 12(e)

¹ ISA 501, *Audit Evidence, Specific Considerations for Selected Items*

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<ul style="list-style-type: none"> Research Paper 15 Process mining allows the auditor to have a more effective way of implementing the audit risk model by providing effective ways of conducting the required walkthroughs of processes and conducting analytic procedures. Process mining expands the evidential domain for analytic procedures by allowing the auditor to examine the business process that give rise to transactions and not just the outcome of those processes. Using process mining embeds tests of details in the analytical procedures, complementing tests of controls. Research Paper 16 Machine learning and deep learning neural networks are often “black boxes” that are difficult or impossible to understand and interpret, even for technical experts. Until such technologies are made more transparent, it may be difficult for regulatory bodies and accounting firms to use these technologies. 	
<p>Over / Under Reliance on Technology (Auditor Bias)</p> <ul style="list-style-type: none"> Research Paper 7 In educating auditors and accounting students, the curriculum should reflect changing audit evidence sources and ensure more content on advanced data analytics.² Research Paper 11 The paper highlights the human tendency to prefer and rely more on information when it comes from a human source rather than when it comes from a computer source. Specifically, research has shown that attributes that can sway an individual that one perspective is correct / reasonable, will have a greater persuasive influence on judgments when the opposing perspective / information is an algorithm or system (i.e. not human). Accordingly, persuasive attributes of management evidence, will influence auditor judgments more strongly, when the firm’s contradictory evidence comes from a specialized system. 	<p>6(c)</p> <p>14(b)</p>

² The research ‘finding’ is not explicitly included in the scope of the IAASB’s Audit Evidence Information Gathering Activities. However, it does point toward a lack of appropriate expertise in technology and has therefore been linked to 6(c)