Continuous Automated External Reporting and Audit of KPIs

By Gregory Shields, CPA, CA

Greg is a member of the board of directors of the University of Waterloo Centre for Information Integrity and Information Systems Assurance (UWCISA). Before retiring, he was CPA Canada Director, Auditing and Assurance Standards. He has since undertaken numerous projects to develop non-authoritative auditing guidance on various topics, such as data analytics and audit of accounting estimates. Earlier in his career, he provided technical support to the CICA/AICPA continuous auditing study group, and drafted the research report.

To remain relevant, auditors need to provide assurance on entity data delivered at interim dates and ultimately continuously. [1] This assertion by auditing visionaries led the CICA (a predecessor of CPA Canada) and the AICPA to develop their 1999 research report *Continuous Auditing*. Decades later, auditors still focus primarily on examining annual historical financial statements. However, remarkable advances in IT, including cloud computing, Robotic Process Automation (RPA) and AI have overcome technical barriers to continuous reporting and auditing. Key Performance Indicators (KPIs) reported and audited continuously would provide external stakeholders with more credible, timely insights into how well an entity is being managed. Some public accounting firms seem ready, willing and able to perform the audit work. The only big barrier remaining seems to be convincing management that the potential added value would significantly outweigh related costs.

How Continuous Automated Reporting and Audit of KPIS Might Work

Consistent with the concept described in the CICA/AICPA research report, continuous reporting and audit of KPIs would occur when:

- An entity continuously reports KPIs simultaneously with, or very soon after, the occurrence of underlying events or change in circumstances or conditions affecting those KPIs.
- The auditor issues an auditor's report simultaneously with the reporting of the entity's continuous KPI report, based on having continuously obtained sufficient appropriate audit evidence to support the auditor's opinion.[2]

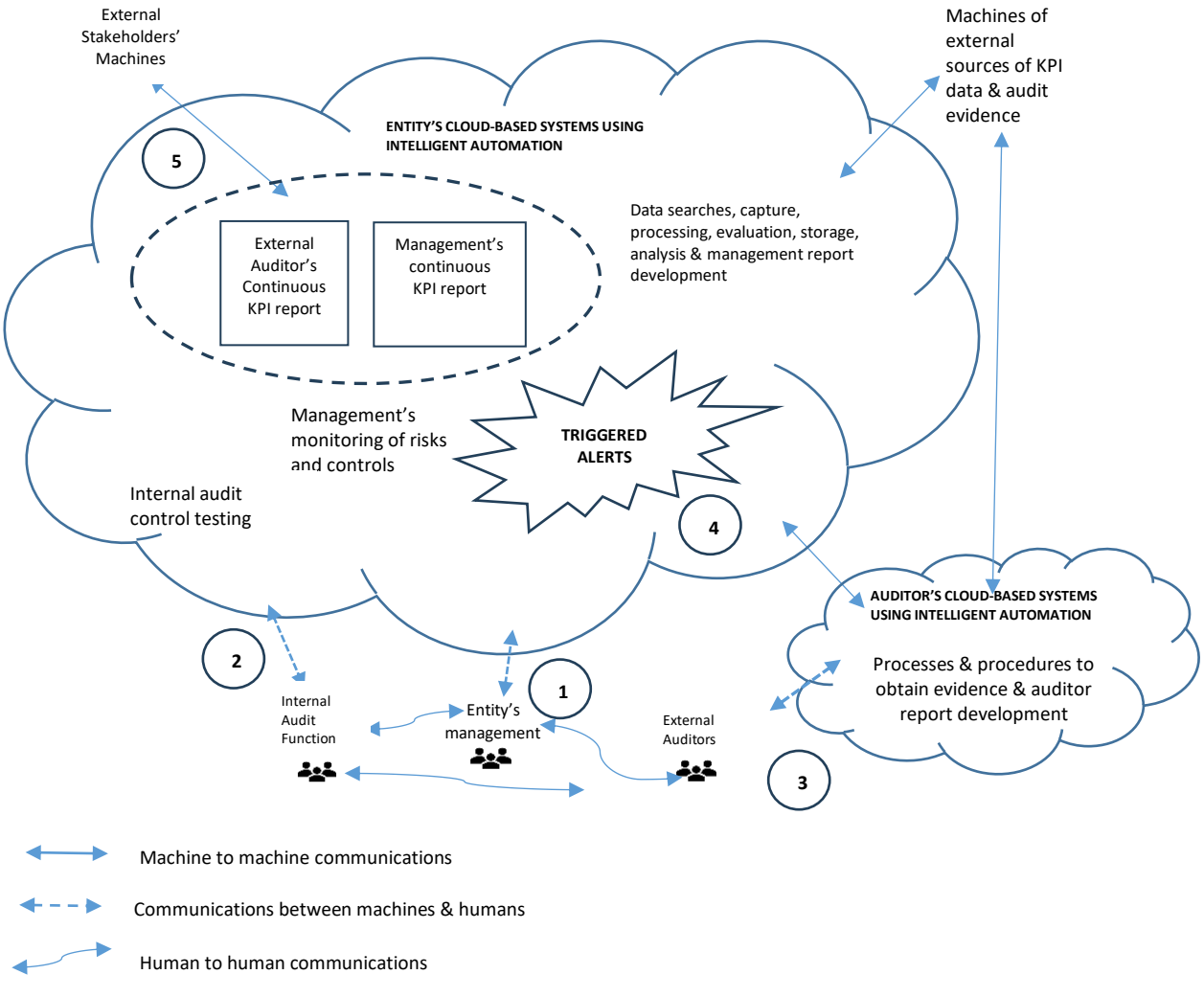
Figure 1 provides a high-level conceptual overview of how continuous reporting and audit of KPIs might work.

1. An entity's management (under board oversight) decides what KPIs (with desirable characteristics) will be continuously reported and audited. Management designs and implements a system to capture, process, store, analyze relevant data and report the resulting information. Management also designs and implements relevant controls, as well as risk management and control monitoring processes. All of these are based on use of cloud technology, and intelligent automation (Robotic Process Automation (RPA) and AI.
2. Internal audit designs and implements automated procedures to test controls over continuous reporting of KPIs.
3. External auditors design and implement automated audit procedures to obtain sufficient appropriate audit evidence to support their continuous audit report on the entity's

continuously reported KPIs. Most evidence will be obtained from the entity's processes and data, but some may be obtained from external sources. The external auditors use their own cloud computing infrastructure, platform and applications, including the use of RPA and AI. They also use the work of internal audit, as appropriate.

4. An automated system of alerts advises management, internal audit or external auditors (or all three, as appropriate) to deviations from controls and other matters indicating possible misstatements of the KPIs. Alert levels depend on predefined materiality and risk factors related to the nature and urgency of matters detected. Most alerts are addressed automatically using AI. A few will, however, require human attention, resulting in the need for communications among management, internal auditors and external auditors.
5. A portal in the entity's cloud service provides external stakeholders access to the continuous KPI reports by management and the auditors.

Figure 1 – Conceptual Overview of Continuous Automated KPI Reporting and Auditing



Characteristics of KPIs Affecting Their Likelihood of Being Continuously Reported and Audited

A number of accounting bodies have suggested that, to be useful to stakeholders, KPIs reported quarterly and annually should be relevant, reliable, unbiased, complete, consistent, comparable (to those of other entities in the same industry) and transparent. These characteristics are consistent with suitable criteria required for KPIs to be audited.[3] KPIs reported quarterly and annually are the most likely candidates for continuous reporting, since management is already comfortable disclosing them to outsiders.

Continuously reported KPIs would supplement and compliment, not replace, historical financial reporting.

The relevance characteristic perhaps warrants explanation. A KPI is relevant when it can be linked to one or more significant risks an entity faces and the strategies implemented by management to address those risks. Table 1 shows a few examples of risks, areas of strategic focus and related KPIs often disclosed by major hotel chains. With the design and implementation of effective controls, these KPIs could also have the other desired characteristics that would make them likely candidates for continuous reporting and audit.

Table 1 – Examples of Hotel Chain KPIs More Likely To Be Continuously Reported and Audited

RISKS	Strategic Focus	KPIs
Inability to effectively compete	• Room pricing and occupancy • Revenue optimization by property type	• Average Daily Rate (ADR) • Average Rate Index (ARI) (the hotel chain's ADR compared with that of set of competitors with the same target market) • Occupancy Rate (OR) • Market penetration index (MPI) • Loyalty program membership growth rate
	• Cost control	• Cost Per Occupied Room (CPOR) • Average length of stay (LOS)
	• Sustainability strategy	• Water and power usage rates • Food wastage rate

Table 2 shows examples of KPIs that seem less likely to be continuously reported and audited. For example, customer ratings from various sources are relevant, but likely to be biased and unreliable. Bad reviews (often emotional, unprompted and meant to warn others against negative experiences) outnumber good reviews.[4] Also, the sources of the reviews may be difficult to identify, and be open to manipulation. On the other hand, a hotel chain could use AI to search and analyze vast quantities of unstructured data directly or indirectly relating to customer satisfaction, including to identify specific reasons for ratings and typical characteristics of those providing ratings. The results obtained could be reported to help refute false information coming from various online sites negatively affecting the chain's reputation.

Arguably, the hotel's process and results would not be auditable, and therefore might not be trusted.

Also, it seems unlikely that management would externally report KPIs used internally to evaluate how its various systems are performing. For example, management would use KPIs to measure how well its tactics, techniques and procedures are working to prevent and detect cyber attacks. Disclosure of these KPIs would be too granular to be useful to most outsiders, and might, for example, attract more or stronger cyber attacks.

Table 2 – Examples of Hotel Chains Less Likely to Be Continuously Reported and Audited

RISKS	Strategic Focus	KPIs
Deterioration of reputation/brands due to: • Problems re accessibility, timeliness and accuracy of reservation system • Unauthorized access to customer data, including private information • Health and safety incidents involving customers • Poor sustainability reputation	• High service quality from time of booking request to time of check out, including use of up-to-date technology • Customer retention, growth	• Post-stay customer ratings (survey-based) • On-line review ratings (hotel site) • On-line review ratings (third party sites) • IT systems KPIs (e.g., systems breach statistics; system downtime; bug fix rate) • Earnings before interest, taxes depreciation and amortization (EBITDA) • KPIs related to an entity's ability to continue as a going concern (e.g., key financial ratios; timing of payments to creditors)

In addition, it is unlikely that non-GAAP financial KPIs, such as EBITDA, would be continuously reported and audited. Concerns have been raised that such KPIs have the potential to be misleading. Also, it would not be practicable, at least in the near term, to reliably calculate and audit earnings on a continuous basis because of the breadth and depth of data, assumptions, calculation methods and judgments (potentially biased) involved. Human intervention would almost certainly be required that would greatly hinder the process. That could change if (perhaps when) AI eventually takes over the determination and reporting of earnings and other elements of historical financial statements. Then, continuous reporting of most types of information, regardless of complexity, may become practicable.

For external auditors, any alerts relating to their reports (such as unauthorized changes) would require urgent human action.

Finally, KPIs related to an entity's ability to continue as a going concern would be highly relevant to outsiders, who have often expressed dismay at the inability of both management and auditors to provide earlier warnings of an entity's potential collapse. But for reasons similar to those noted above for earnings-related KPIs, it often could be difficult, at present, to reliably determine going concern KPIs on a continuous basis, although that could change with advances in AI.[5] In addition, there are many counterbalancing factors that may affect an entity's ability to continue as a going concern. Therefore, it may be difficult to identify which performance indicators are truly "key" and explain continuous changes in their interrelationships.

Form and Content of Management's Report

Management's continuous report of KPIs should be designed to make the KPIs transparent to stakeholders. The form and content could be as follows:

- A section showing the KPIs. The information in this section would change, for example, daily, weekly, or monthly, depending on the reporting period(s) chosen by management. Comparative information would also be shown covering an appropriate number of previous periods and, if appropriate and available, industry averages for comparative purposes.
- Another section (linked to that above) containing semi-permanent information. This would include:
  - *Management's methods of preparing the KPIs disclosed*. This would show, for each KPI, the nature, extent and sources of data used, how the KPIs were calculated, and, when applicable, underlying assumptions and estimates.
  - *Management's rationale in choosing each KPI reported.* There would be a description of the desirable characteristics of each KPI.

The report would describe any material changes, such as ways in which KPIs have been developed, or the use of new KPIs, and the reasons for the changes. If practicable, management would consider making conforming changes to comparative amounts for affected KPIs.

This approach to continuous KPI disclosure is consistent with that required by regulators for KPIs contained in quarterly and annual reports.[6] The annual and quarterly values of continuously reported KPIs, and related analysis, would be included in, or linked to, management's discussion of risks and strategies, and to appropriate elements of the historical financial statements when appropriate. Continuously reported KPIs would therefore supplement and compliment, not replace, historical financial reporting.

Continuously reported and audited KPIs would clearly provide more timely, reliable and useful insights to stakeholders about decisions made by management and the possible future direction of an entity.

Management might consider putting more information in its continuous KPI reports than suggested above. That could be a mistake. For example, research done by Smith and van der Heijden showed that financial analysts did not see value in management providing explicit forecasts on KPIs because of the many factors beyond management's control that could result in targets not being achieved.[7] Also while analysts would like to be provided with KPIs showing more disaggregated information (such as changes in prices and sales volumes by entity location), they also recognize the risk that this detail could result in revealing sensitive information to competitors.[8] Further, some analysts do not want KPIs to be standardized by some authorized body because each company has some unique features, and analysts feel they add value to the marketplace by recalculating KPIs using their own standards.[9]

Form And Content of Auditor's Report

The auditor's report would contain an opinion on whether the KPIs were prepared, in all material respects, in accordance with management's method of preparation as disclosed in its report. This method of preparation would need to have the characteristics of suitable criteria referred to earlier, for the KPIs to be auditable. In addition to the auditor's opinion, the report

would refer to all matters required by applicable assurance standards.[10] Except for the period covered, the form and content of the auditor's report would not change over time, unless management makes changes to the KPIs reported. Qualified audit opinions would not likely be issued: matters would be resolved or the entity would decide not to report.

The auditor's opinion would not likely extend to management's description of its rationales in choosing each KPI reported. The various factors considered by management would be highly subjective (reflecting management's mindset) and, therefore, not be readily verifiable. The auditor would, however, read management's descriptions to identify and address any material inconsistencies with reported KPIs or any other misstatement of fact of which the auditor becomes aware.[11]

Use of Cloud Technology, RPA And AI

Cloud computing, combined with intelligent automation (AI and RPA), can enable continuous reporting and audit of KPIs, with minimal human involvement. This is particularly important for the use of automated alert triggers when problems are detected.

Automated alert triggers have been around a long time. The1999 research report refers to alerts (alarms) and related concepts that would still apply today. For example, automated alerts would have varying levels of urgency from low to high. These levels would be predefined by management, using parameters such as materiality (significance) and levels and type of risk associated with various occurrences and conditions.[12] For example, a hotel chain's occupancy rate (OC) KPI for the latest reporting period (day, week, month) may be misstated because of missing data for one or more hotels, errors in dates used for the reporting period, use of definitions of "rooms available for occupancy" that do not comply with the chain's standard definitions, or more significant deficiencies in relevant controls or override of controls by a hotel manager.

Key Performance Indicators (KPIs) reported and audited continuously would provide external stakeholders with more credible, timely insights into how well an entity is being managed.

The 1999 research reported contemplated that most alerts would require human intervention. The role and seniority of the persons responsible for responding to an alert, the nature of the actions required and their timing, would depend on the level urgency of the alerts. Those responses could be relatively slow, and the continuous process might often have to stop to allow time to investigate the root cause of an alert, decide on appropriate actions to take and then take them.[13]

In today's world, however, RPA is being used to automate controls and improve precision, while AI is allowing organizations to continuously monitor and visualize enterprise risks in real time and propose actions.[14] As a result of constantly improving AI algorithms, a lot of IT-related work may be completed without the direct involvement of a human.[15] For example, one AI-based data security service alerts organizations to indications that sensitive customer data in a cloud is being accessed or moved in an unusual fashion, with the alert being sent for automated remediation and tracking in the customer's security ticketing system.[16] And, AI-powered

security solutions can help businesses stay ahead of emerging threats by detecting and responding to attacks in real-time.

When might human involvement be needed? Examples would include instances of deliberate misstatement of OC rates by management of a hotel, warranting disciplinary action. Control deviations relating to sensitive client or operating data would require urgent human communications to stakeholders about significant consequences of the occurrence, and oversight of remediation. For external auditors, any alerts relating to their reports (such as unauthorized changes) would require urgent human action. And, overall, the function of AI would need some human monitoring to avoid overreliance on AI, especially in the early stages of its use.

Fewer Threats to External Auditor Objectivity

The 1999 research report referred to the external auditor's use of tools such as embedded audit modules and digital agents. These would be highly integrated with the entity's systems and could not be implemented without extensive assistance from internal audit and management. The external auditor's objectivity could therefore be impaired, in fact or perception, because it would be difficult to clearly distinguish between the entity's internal control processes and performance of the external audit. This concern was identified as a topic for future research. [17]

Now, through use of cloud technology, auditors can readily obtain continuous authorized access to the client's data without interfering with the entity's processes and internal controls. Websites for the big four firms describe how they already make use of cloud technology, combined with RPA and AI, in performing financial statement audits. Also, suppliers of cloud-based audit technology refer to it being used to efficiently obtain client data down to the transactional level, store it securely in the cloud, and apply analytics against the data to identify risks, including potential fraud risk. Auditors can also more easily benchmark their clients' business metrics against other similar businesses, and provide key insights to help clients run their businesses more effectively.[18]

In addition, it may often be efficient for external auditors to use the work of internal auditors when performing continuous audits. This would not impair external auditor objectivity provided the relevant requirements in assurance standards regarding such use are met.[19] Many internal auditors have embraced continuous performance of tests of controls. The Rutgers University Continuous Auditing and Reporting Symposia (CARS) website provides references to years of research and presentations, much of which relates to internal audit.[20]

Management's Decision on Whether To Continuously Report KPIs

Management would likely decide to continuously report KPIs to external stakeholders if it perceives that significant benefits in doing so would exceed related costs. This decision would fall within the realm of Voluntary Disclosure Theory (VDT), based on elements of signalling theory and agency theory, with many complex factors coming into play.[21] These factors may relate, for example, to the entity's disclosure position, external norms and opportunities,

disclosure structures and other internal and external mediators such as consultants and auditors.[22]

Strong stakeholder demand for more continuous information would be a signal that it has high value. A survey in 2020 by McKinsey showed that corporate management is under increasing pressure to prioritize more effective engagement with external stakeholders, because growing evidence shows that addressing societal issues and stakeholders' priorities creates long-term value.[23] And, timely communication seems more important than ever. As noted by the Institute of Chartered Accountants of Scotland (ICAS), disruptive technologies and 24/7 communication are among the factors challenging external perceptions and expectations of the role of business in the 21st century and how success should be measured.[24]

Not all stakeholder groups will necessarily agree, however, on what they want or need, so the value versus cost proposition to management may not be clear. For example, when the US Securities and Exchange Commission (SEC) issued its proposed climate risk disclosure rules in March 2022, environmentalists said they did not go far enough. On the other hand, companies kicked and screamed that the SEC proposals went too far and were too expensive to comply with, and investors cheered that position.[25]

The arguments for continuous disclosure of KPIs seem more persuasive than most. As shown by the hotel chain examples noted earlier, KPIs are continuously used by management (hourly, daily, monthly) in making decisions that affect many important aspects of an entity's business. They can provide clear and concise means of reducing information asymmetry between management and outsiders. Only a few stakeholders would likely have the time, competencies and money to convert more detailed and voluminous continuous disclosures into usable knowledge.[26] On the cost side, management has already implemented systems to search for, capture, process, store and analyze relevant data, and report KPIs used internally. Added costs to incurred to enable some KPIs to be reported externally might not be onerous, although that is not certain.

Management's Decision on Whether To Have Continuously Reported KPIs Audited

Accounting bodies and firms have provided sound reasons for why audits of KPIs in annual financial and sustainability reports would be a good idea. These would also apply to audits of continuously reported KPIs:

- Management needs to question how accurate the KPIs are that their organization and stakeholders, including key customers, business partners and, importantly, investors rely on. Decisions are being based on unassured data that has not been through the rigor of traditional financial reporting processes. The traditional financial reporting model is no longer all that investors need. The world has changed and assurance needs to respond.[27]

- The more that non-financial information becomes integrated into companies' decision-making processes, and their external reporting, the greater the need for users to place trust in these KPIs when making informed decisions, and the greater the likelihood that the level of comfort obtained by management over them might be questioned.[28]
- Management does not fully appreciate the lack of trust in unaudited information that corporations provide. For example, a 2022 Deloitte survey shows that 57% of Canadian consumers do not believe most green claims brands make, suspecting greenwashing. Consumers are confused and frustrated by the proliferation of sustainability claims, while business leaders think the public has a significant (71%) or moderate level of trust in the authenticity of those claims.[29]
- Corporations are increasingly subject to false information attacks. These may include misinformation (unintentional mistakes), disinformation (intentionally fabricated misleading information) or malinformation (e.g., publication of private information or deliberate changes of context, date or time of genuine information).[30] The increased trust in reported KPIs that an audit would provide could help counter, to some extent, false claims about a corporation's performance.

Efforts to have KPIs in annual reports audited have largely failed. So, even if management were to decide to continuously report KPIs, they might still not choose to have them audited. Although stakeholders would be the beneficiaries of such audits, there does not yet appear to be any groundswell of demand that might persuade management to go in that direction.

Conclusion

Technology roadblocks to continuous automated external reporting and audit of KPIs that once existed are gone. We are in an age when much more rapid communication has become the norm. Continuously reported and audited KPIs would clearly provide more timely, reliable and useful insights to stakeholders about decisions made by management and the possible future direction of an entity. Auditors are ready to do the work. Yet, the key ingredient, widespread demand among stakeholders, seems to be missing. Therefore, management will not be easily persuaded that the value of continuous external reporting and auditing of KPIs would outweigh related costs. The traditional approach of quarterly and annual reporting will continue.

Visionaries have long advocated continuous external reporting and audit of information. It seems inevitable that, particularly with advances in use of AI, these will eventually become the norm. But, "between the wish and the thing, the world lies waiting."[31]

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1 CICA/AICPA, *Continuous Auditing*, The Canadian Institute of Chartered Accountants, 1999, pg. 2, para. 3.

2 This definition is based on that CICA/AICPA *ibid*., pg. 5.

3 See, for example, Institute of Chartered Accountants of Scotland (ICAS), *Assurance on KPIs: A Practical Guide for Audit Committees and Boards*, June, 2015 Towards-Transparency.pdf (icas.com); CPA Canada CPA Canada KPI Tool; and Institute of Chartered Accountants in England and Wales (ICAEW) ICAEW KPI Assurance. Suitable criteria required for an auditor to provide assurance on a subject matter are described in ISAE/CSAE 3000, *Attestation Engagements Other Than Audits or Reviews of Historical Financial Information,* para. 24 (b)ii.

[4] Lubag, J., *Why are Bad Reviews More Likely Online*?, Rize, February 2, 2023, Rize, On line reviews.

[5] ISA/CAS 570, *Going Concern*, para. A3 provides a useful list of events and conditions that may cast doubt on an entity's ability to continue as a going concern. These could provide the basis for determining useful KPIs.

[6] Moss Adams*, SEC Issues Guidance on Key Performance Indicators and Metrics,* March 4, 2020. Moss Adams - SEC disclosures.

[7] Smith, S. and van der Heijden, H., *Analysts' Evaluation of KPI Usefulness, Standardization and Assurance*, *Journal of Applied Accounting Research*, February, 2017, pg. 14. Smith et al.

[8] Smith et al. *ibid*. pg. 10.

[9] Smith et al. *ibid*., pg. 41.

[10] ISAE/CSAE 3000, para. 69 sets out the minimum basic elements to be included in an auditor's report.

[11] ISAE/CSAE 3000, para. 62.

[12] *Ibid*, CICA/AICPA, pgs. 31-35.

[13] *Ibid*, CICA/AICPA, pgs. 31-32.

[14] PWC, *Reinventing Internal Controls in the Digital Age*, April, 2019, pg. 6. PWC Digital Ag.

[15] Eliacik, E., "The Ultimate Combination of Success: AI and IT," *Dataconomy*, August 22 2022, Dataconomy AI and IT.

[16] Ibid. PWC, pg. 13.

[17] CICA/AICPA *ibid*, pgs.53-58.

[18] Thomson Reuters blog, "Harnessing the Power of Audit Automation," January 12, 2023. thomsonreuters.com.

[19] CSAE/ISAE 3000, para. 55.

[20] Professor Miklos Vasarhelyi at Rutgers has long been the guru of continuous auditing and reporting. References sources can be found at http://raw.rutgers.edu/wcars.html and linked sites.

[21] Smith et al ibid., pg. 4.

[22] Gibbins, M, Richardson A. and Waterhouse, J., "The Management of Corporate Financial Disclosure: Opportunism, Ritualism, Policies, and Processes," *Journal of Accounting Research*, Vol. 28, No. 1 (Spring, 1990), Gibbons et al.

[23] McKinsey, "The Pivotal Factors for Effective External Engagement," May 26, 2020, [23] https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/the-pivotal-factors-for-effective-external-engagement.

[24] ICAS *ibid*. pg. 1. ICAS Assurance on KPIs.

[25] Michelson, J., "Pushback on the SEC's Proposed Climate Risk Disclosure Rules is a Good Sign**,"** *Forbes*, Feb. 8, 2023. Michelson, SEC disclosure pushback.

[26] Farvaque, E., Refait-Alexandre, Saidane, D., "Corporate Disclosure: A Review of its (Direct and Indirect) Benefits and Costs, Economie Internationale," 2011, No. 128. Farvaque, Disclosure Benefits & Costs.

[27] Bradley, L, *Assurance over Key Performance Indicators*, KPMG, June 12, 2016 KPMG KPI assurance.

[28] ICAS, *Ibid*, pg.3.

[29] Deloitte Press Release, *While brands think they have consumer trust, most Canadians are skeptical about sustainability claims, Toronto June 22, 2023.*

[30] PwC, *Disinformation Attacks Have Arrived in the Corporate Sector. Are You Ready?,* February 9, 2021, PwC Disinformation Attacks.

[31] McCarthy, Cormac, *All the Pretty Horses,* Alfred A. Knopf, 1992.