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BLOCKCHAIN AND INTERNAL CONTROL: THE COSO PERSPECTIVE: AN INTRODUCTION AND BRIEF REVIEW

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Abstract. As the title says this is an introduction and brief review of a long and rather complex study of issues related to internal controls over financial reporting (ICFR) and auditing the new distributed ledger technology known as Blockchain Ledgers. The report points out many of the control issues related to Blockchain Ledgers (BC), including potentially advantageous characteristics such as immutability and shared ledgers. It also addresses the new risks and needs for additional controls for which the search for solutions continues. Audit procedures have always followed technology advances, but they will never impede the innovation and related creative destruction that come with advancing business models. Much more work lies ahead, nevertheless, this COSO report is an excellent summary that will inform discussions about new control methods and methodologies. The COSO report has value for all readers including GRC professionals as well as C-suite and board members. However, the primary beneficiaries will be in tech support to the CFO and Chief Audit Executives, BC developers in company operations, and BC specialists in public accounting firms. This summary should inform all readers.

This is an introduction to a very timely report; **Blockchain and Internal Control: The COSO Perspective** (hereafter, the "BC-IC' report). This important report contributes positively to the evolution of GRCs deliberations to address the issue of internal controls over and auditing of the new distributed ledger technology known as Blockchain Ledgers (BC). BC offers great potential for business process improvement which eventually can lead to audit process improvement utilizing new technology.

The Report is a comprehensive summary of 30 pages including 3 excellent appendices. There is a link to the full report here and below and we trust that this background will encourage interested parties to read the full report and help guide them.[1]

https://www.coso.org/Documents/Blockchain-and-Internal-Control-The-COSO-Perspective-Guidance.pdf

My early career took a leap, as a Chief Audit Executive (CAE) with expertise in internal control systems and technology, after the passage of the Foreign Corrupt Act in 1977. This new law, which among other things, required systems of internal control for public companies, led to the Treadway Commission. The deliberations were directed towards defining just what a system of internal control is and led to the formation of The Committee of Sponsoring Organizations of the Treadway Commission (COSO) in 1985. Later, I was privileged to join the COSO Board representing

Financial Executives International (FEI) so I have a deep appreciation for COSO's influential frameworks and reports.

Subsequently, COSO has been a significant source for internal control systems methodology and frameworks. This BC-IC Report therefore is much coveted guidance for these evolutionary distributed ledgers know as Blockchain Ledgers. At the very outset, the BC-IC report recognizes Blockchain Ledgers' potential: "As a foundational technology, blockchain has the potential to radically change the global digital business landscape that would, in turn, have significant impact on almost everything else."

The authors acknowledge that "the distinctive capabilities of blockchain can be leveraged to create more robust controls for organizations". More importantly, they also recognized "blockchain-enhanced tools have the potential to promote operational efficiency and effectiveness, improve reliability and responsiveness of financial and other reporting, and improve compliance with laws and regulations."

Justifiably there is widespread momentum for the implementation of this new ledger technology. However, as the COSO BC-IC Report also acknowledges; "At the same time, blockchain creates new risks and the need for new controls." It is these new risks and the related need for controls, some of which are completely new that the Report addresses.

I must emphasize that blockchain ledgers are still in early stages, continue to evolve, and are fairly complex. The BC-IC Report is guided by the widely used, in the USA, 2013 internal control framework COSO Internal Control — Integrated Framework which provides an effective and efficient approach that can be leveraged to design and implement controls to address the unique risks associated with blockchain.

The Report summarizes a comprehensive list of control issues and adds good sections on mitigation of the identified BC risks. I know this is a challenging task, having spent a good deal of time looking at required BC controls, for a recently published article: Blockchain Auditing – Accelerating the Need for Automated Audits: EDPACS 2019 Cangemi & Brennan.[2]

Consequently, I see this Report as a major contribution to the professional literature for those who have a good tech background and focus. This will include some at the C level and Board level, but the primarily audience should include the tech support to the CFO and CAEs, BC developers in company operations and specialists in the public accounting firms.

For background on blockchain ledger, there is an excellent summary in Appendix 1 of the COSO BC-IC Report. Some readers may want to start with this section. It begins with a "Short History of Blockchain" and an excellent table of Key Concepts Associated with Blockchain.

AUTHORS, HISTORY AND ACADEMIC RESEARCH

As is typical of recent COSO publications this Report is authored by a professional firm, in this case, Deloitte & Touche LLP's Partners Jennifer Burns and Amy Steele. The project was conceived, proposed, and supported by two extraordinary

Contributing Authors; Dr. Sri Ramamoorti, Associate Professor of Accounting, University of Dayton and Eric E. Cohen of Cohen Computer Consulting.

I have worked closely with Dr. Ramamoorti at FEI's Committee on Finance & Technology, including co-authoring a Financial Executives Research Foundation Report on continuous monitoring, and Mr. Cohen at the Rutgers University Continuous Auditing and Reporting (CAR) Lab. Their work on advancing technology for financial reporting, audit and assurance is highly regarded, progressive and reliable. The comprehensiveness of the report is a testament to the caliber of these authors.

Even the most Blockchain novice readers may know or have heard of the seminal Satoshi Nakamoto paper: "Bitcoin: A Peer-to-Peer Electronic Cash System" (2008).[3] However, for example, I found enlightening the inclusion of a prior academic work from the 1990s called "The proto-blockchain". This "proto-blockchain" paper suggested using math and cryptography to prove documents integrity by linking to an existing append-only chain with time stamping and digital signatures to ensure integrity.

KEY TAKEAWAYS

My key takeaways from the Report include the following:

- It is critically important to find companies and teams who have devoted years to the emerging subjects of Blockchain ledgers and digital assets.

Under Mitigating New Threats and Risks Associated with Blockchain Implementation (Page 13) the report offers good advice:

"Engage appropriate IT and blockchain specialists with knowledge of the entity's existing systems to assess how blockchain will be integrated into and operate as a part of the entity's existing IT infrastructure, prior to its implementation."

- Blockchain ledgers involve many other entities which adds to complexities and risks.

"The greater challenge relates to the intertwining of an entity with other entities or persons participating in a blockchain and how to manage the control environment as a result."

Consequently, the demand for some form of Service Organization Controls (SOC) reporting in these environments will likely increase. (Page 5 side bar and page 6)

Consider: "there may be no singular external entity that can be held accountable for achieving the control objectives or held responsible when there are problems. This lack of accountability poses a serious challenge. Without centralized management, there may be no simple or easy way to engage a SOC auditor and, absent SOC reports, enterprises must consider alternatives".

- The report clearly points out we are in the early stage of regulations.

"The regulatory environment surrounding blockchain, smart contracts, and digital assets continues to evolve and may vary across jurisdictions, leading to uncertainty around the regulatory

requirements (including tax, data privacy, and protection, reporting, or other regulatory requirements). (Page 12)

Again, I know firsthand how important and difficult it is to follow compliance standards that exist now, while also trying to anticipate new regulations and compliance frameworks for the evolving blockchain ledger technology. I have been serving on the Lukka Tech Audit Advisory Board since 2017. Lukka, has built custom software and data for managing crypto assets on infrastructure made for the complexities of blockchain data. Lukka has a policy of engaging with regulators early and we have continually followed and met with key regulators.[4]

Consequently, I can attest to regulators' interest in the evolving BC technology space and know that they are moving with prudence to understand and assess risks. However, this is a work in progress. As part of Lukka's focus on blockchain ledgers and digital assets, they are one of the few companies to have achieved annual SOC certifications of Lukka systems and are an example of the type of partner recommended by this COSO Report.

BC BOOKS AND ARTICLE ABOUND, AS DO BC ASSURANCE WORKS

I read my first article on BC in 2015 How Technology Behind Bitcoin Could Transform Accounting As We Know It; by Ryan Lazanis. Since then, much has been written about how BC improves controls - sparking some writers to say it eliminated the need for audit. Soon after, while serving on the EY Alumni Council, I asked if they were beginning to focus on the BC ledgers. A managing partner replied – and I paraphrase: "I get calls every day asking if the BC will eliminate the need for audits." These early misconceptions have clearly been debunked and a more sophisticated understanding of BC has emerged.

In recent years, there has been a plethora of audit-related reports on BC. In 2017, there were excellent initial reports issued by the AICPA and ISACA.

- Blockchain Fundamentals: An Inside Look at the Technology With the Potential to Impact Everything, ISACA 2017 29 pages
- Blockchain Technology and Its Potential Impact on the Audit and Assurance Profession; AICPA, CPA Canada and University of Waterloo CISA, 2017 28 pages

In 2020, in addition to this COSO Report, the following were published:

- Blockchain Framework and Guidance; 2020 ISACA 114 pages
- Blockchain – An Executive Review; 2020 ISACA 15 pages
- Implications of the Use of Blockchain in SOC for Service Organization Examinations; 2020 AICPA 25 pages

This is clear evidence of progress. Is BC an example of "creative destruction" as defined by Joseph Schumpeter? Mr. Schumpeter believes that innovation sustains growth by destroying old business models.[5] Is BC that revolutionary? Will it destroy current business models?

I do believe BC ledgers will be transformative. I also believe this COSO BC-IC report is a well-written comprehensive summary which points out many of the control issues related to Blockchain Ledgers – but it also demonstrates we do not yet have all the control solutions. Many of today's BC ledgers are used for digital assets. Beyond crypto BC ledgers are most times subledgers and most, if not all, are not yet material to their organizations.

It is clear that the BC ledger is continuing to gain acceptance and new implementations are coming online all the time. According to the COSO Chairman Paul Sobel, in a Wall Street Journal interview about COSO BC-IC said: "This is going to be the future of transacting and, ultimately, certain aspects of financial reporting" and he added "But there are new risks."[6]

This COSO BC-IC Report along with all the studies on how to control and audit will lead to new assurance processes. When we have material BCs to audit, commonly accepted audit and control policies and procedures will emerge. Audit procedures have always followed technology advances, but they will never impede the innovation and related creative destruction necessary to advance business models. Business process improvement leads to audit process improvement.

Notes

1. Link to COSO BC Report: https://www.coso.org/Documents/Blockchain-and-Internal-Control-The-COSO-Perspective-Guidance.pdf
2. Michael P. Cangemi & Gerard (Rod) Brennan (2019) BLOCKCHAIN AUDITING – ACCELERATING THE NEED FOR AUTOMATED AUDITS!, EDPACS, 59:4, 1-11Link to this article: https://doi.org/10.1080/07366981.2019.1615176
3. Satoshi Nakamoto "Bitcoin: A Peer-to-Peer Electronic Cash System" 2008. https://bitcoin.org/bitcoin.pdf
4. Software for the complexities of blockchain data with AICPA SOC certification. https://www.lukka.tech/
5. Joseph Schumpeter's creative destruction: Link https://en.wikipedia.org/wiki/Creative_destruction
6. Wall Street Journal August 4, 2020 Companies Should Bolster Blockchain Controls, Risk Advisory Group Says - WSJ https://www.wsj.com/articles/companies-should-bolster-blockchain-controls-risk-advisory-group-says-11596588158

Michael P. *Cangemi is an author and board member. A former public accounting partner and director of audit technology, he went on to a wide-ranging business career having served as a CAE, CIO, CFO, and then in two CEO positions, as well as, on Boards and as AC Chair. Mr. Cangemi now has a significant focus on Fintech and specifically Continuous Monitoring, Analytics and Blockchain DLs for GRC, Finance, and Business Process Improvement.*

He has served on the boards of COSO, ISACA, and the IIA, as well as, the advisory boards of the FASB and IASB. He is a long serving member of FEI's CFIT Fintech Committee; a Senior Fellow at and serves on the Rutgers Continuous Auditing and Reporting Lab - Advisory Board; a Senior Advisor to CaseWare Analytics (CA & CM Analytics); he an investor in and serves on the Lukka Tech Advisory Board (Distributed Ledgers/Blockchain); and he is an investor in and periodic advisor to Solink Corp (Video & Contextual Analytics).

His experiences as a CAE were published in his second successful book, Managing the Audit Function. The book, now in a third edition, was featured in the business section of the Sunday New York Times in August 2002 and translated into Chinese in 2005 and Serbian in 2013. He has also published research papers, numerous articles, and blogs.