

Technology is a double-edged sword with both opportunities and challenges for the accountancy profession

PAPER 2

The second in a four part series discussing ethical leadership in an era of complexity and digital change.

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ABOUT CPA CANADA

Chartered Professional Accountants of Canada (CPA Canada) works collaboratively with the provincial, territorial and Bermudian CPA bodies, as it represents the Canadian accounting profession, both nationally and internationally. This collaboration allows the Canadian profession to champion best practices that benefit business and society, as well as prepare its members for an ever-evolving operating environment featuring unprecedented change. Representing more than 220,000 members, CPA Canada is one of the largest national accounting bodies worldwide. cpacanada.ca

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IFAC (the International Federation of Accountants) is the global organization for the accountancy profession dedicated to serving the public interest by strengthening the profession and contributing to the development of strong international economies. Comprised of 180 members and associates in more than 130 countries and jurisdictions, IFAC represents more than 3 million accountants in public practice, education, government service, industry and commerce.

Over four decades, IFAC has represented the global profession and supported the development, adoption, and implementation of international standards that underpin the contributions of today's global accountancy profession. IFAC has maintained a long-term approach to building and strengthening a global accountancy profession that supports transparent, accountable, and sustainable organizations, financial markets, and economies. ifac.org

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ICAS is the global professional body for Chartered Accountants. We educate, examine and lead, enabling excellence whilst always working for the wider public good. All 23,000 ICAS members have earned our world-class CA designation of Chartered Accountant, the qualification that's shaped an international business community spanning industries and continents, full of local heroes and corporate leaders. And we continually foster the bonds between our members, so CAs at all stages of their careers can learn from shared experience and connect their ambitions to success. For further information please visit icas.com

ABOUT IESBA

The IESBA is an independent standard-setting board that develops, in the public interest, high-quality ethics standards and other pronouncements for professional accountants worldwide. This includes the *International Code of Ethics for Professional Accountants (including International Independence Standards)*, which establishes ethics requirements for professional accountants.

The board also supports adoption and implementation, promotes good ethical practices globally, and fosters international debate on ethics issues faced by accountants. ethicsboard.org

Background and acknowledgements

This paper is the second of four thought leadership pieces developed by Chartered Professional Accountants of Canada (CPA Canada) to build on a collaborative exploratory paper and global roundtable event held jointly with the Institute of Chartered Accountants of Scotland (ICAS) and the International Federation of Accountants (IFAC), entitled *Ethical Leadership in an Era of Complexity and Digital Change*.

The [exploratory paper](#), a [summary](#) of the event, and an [on-demand recording](#) are available on the IFAC Knowledge Gateway and on the International Ethics Standards Board for Accountants (IESBA) technology initiative's [focus page](#). The paper was also informed by diverse stakeholder views gathered through the IESBA's broader [technology initiative](#).

This post-event series of papers more fully investigates the key themes presented in the exploratory work, and leverages the event delegate discussions and recommendations, to offer practical guidance for professional accountants, professional accountancy organizations, educators and employers, as our profession evolves to address changing stakeholder needs while continuing to meet our public interest responsibilities.

The other papers in the series, released throughout 2021 and 2022, cover the following interconnected, but distinct, topics:

- [complexity and the professional accountant](#)
- identifying and mitigating bias and mis-/disinformation
- mindset and enabling skills

Technology is a Double-Edged Sword was developed by CPA Canada members Brian Friedrich (IESBA member and chair of IESBA's Technology Working Group) and Laura Friedrich (IESBA technical advisor) under the direction of Gord Beal, vice-president, Research, Guidance and Support, at CPA Canada and with valuable insights provided by James Barbour, director, policy leadership at ICAS, IESBA technical advisor, and member of IESBA's Technology Task Force; Christopher Arnold, head of SME/SMP and research at IFAC; and Ken Siong, senior technical director at IESBA.

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Feedback and comments are enthusiastically welcomed – please send to foresight@cpacanada.ca.

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Part I: Change is upon us

Enabler and disruptor. Unprecedented opportunity and existential threat. Massive benefits and unforeseen challenges. All of these describe technology and its double-edged nature.

Business opportunities and challenges

The information technology revolution is a key driver of complexity faced by business leaders, including professional accountants (PAs). Strategy and management scholars Gökçe Sargut and Rita Gunther McGrath note that “systems that used to be separate are now interconnected and interdependent, which means that they are, by definition, more complex.”¹ This digital transformation has brought with it a tremendous shift in business opportunities as well as accompanying challenges. Marketing technologist Scott Brinker has coined “Martec’s Law” to describe the gap between the exponential rate of technology change and the logarithmic curve of organizational change. Management needs to carefully choose which changes to adopt from an ever-increasing set, and so the gap between available technological changes and those implemented grows wider over time, resulting in increasing challenges.²

1 Gökçe Sargut & Rita Gunther McGrath, “Learning to Live with Complexity” (September 2011) Harvard Bus Rev <online: <https://hbr.org/2011/09/learning-to-live-with-complexity>>.

2 Neil Perkin, “Martec’s Law” (2015), online (blog): Only Dead Fish <https://www.onlydeadfish.co.uk/only_dead_fish/2015/11/martecs-law.html>.

As PAs, we are relied upon to be ethical leaders, and as such we have a key role to play in helping our organizations and clients navigate these changes in an ethical manner. To do so, we need to understand how to respect the double-edged sword of technology, actively pursuing opportunities while safeguarding against challenges.

On the opportunities side of the equation:

- Automation provides massive prospects for cost savings, especially as tools become easier to implement and more accurate in their results. The uptake of automation has been further fuelled by the COVID-19 pandemic and the need to maintain operations, cut costs and find new ways of getting things done.³
- Further along the digital spectrum, artificial intelligence (AI) systems are redefining the way organizations use machines, with deep learning algorithms being used to better understand consumer preferences and tailor experiences based on ever-more specific customization.
- The internet of things (IoT) allows us to monitor and control both our living and working environments, adding security, comfort, convenience, efficiency and additional valuable data points.
- Extended reality (XR) devices let us step into another world to train, explore and build skills through controlled, safe and more cost effective means.
- Blockchain technology offers great promise to transaction processing and verification in providing the ultimate method of verifying authenticity through immutable, distributed chains. (see sidebar)
- Communication technologies have kept us connected throughout the pandemic, and are empowering organizations to shift to a more remote-friendly or hybrid work environment, building on trends that reflect strong demands of jobseekers and employers alike.⁴

But technological innovations have the potential for significant concerns from ethics and/or social perspectives:

- Automation is expected to massively disrupt and transform jobs. Although research from the World Economic Forum suggests that, overall, more jobs will be created than destroyed, it also finds that accountants and auditors are among the roles that are likely to become increasingly redundant over the next few years.⁵ This highlights the need for the profession to embrace technology and recast its current roles (and how professional competence is defined) in the context of emerging demands.

³ See, for example, World Economic Forum, *Future of Jobs Report 2020* (Geneva: World Economic Forum, October 2020) at 13, online: <http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf>.

⁴ *Ibid* at 16-18.

⁵ *Ibid* at 29-30.

- There is also concern that the pace of adoption of AI and automation has been accelerated so much by the COVID-19 pandemic that the workforce can't transition to new roles quickly enough. *Time* magazine writes “in the past, technology was deployed piecemeal, giving employees time to transition into new roles. [...] This time the change was abrupt as employers [...] rushed to replace workers with machines or software. There was no time to retrain.”⁶
- Videoconferencing platforms have led to ‘Zoom fatigue’ and raise public interest questions about the mental health impacts of constant connectivity, including non-verbal overload causing stress and exhaustion.⁷
- There are concerns regarding AI systems’ potential for bias and inequity, and the extent to which these systems – when designed and applied improperly – harm society (see sidebar).
- The use of IoT devices is prevalent and growing rapidly, leading to privacy/confidentiality and security concerns. A 2019 Forrester Consulting report in North America found that “almost three quarters (74 per cent) of respondents felt their current security controls and practices are not adequate for unmanaged and IoT devices.”⁸ Further, two-thirds of surveyed organizations had experienced a security incident related to unmanaged or IoT devices.⁹

6 Alana Semuels, “Millions of Americans Have Lost Jobs in the Pandemic—And Robots and AI Are Replacing Them Faster Than Ever” *Time* (August 6, 2020), online: <<https://time.com/5876604/machines-jobs-coronavirus/>>.

7 Jeremy N Bailenson, “Nonverbal Overload: A Theoretical Argument for the Causes of Zoom Fatigue” (2021) 2:1 *Tech Mind Behav*, online: <<https://tmb.apaopen.org/pub/nonverbal-overload/release/1>>.

8 Forrester Consulting, *State of Enterprise IoT Security in North America: Unmanaged and Unsecured* (September 2019), online: <<https://www.armis.com/success/state-of-enterprise-iot-security-in-north-america-unmanaged-and-unsecured-success-en/>> at 6.

9 *Ibid* at 5.

A closer look: Two illustrative examples of technology as a double-edged sword

Example 1: Blockchain

Opportunities

The generally immutable and tamper-proof nature of blockchains promotes trust in an environment that is entirely distributed, thereby enabling credible accounting of a wide range of digital events.¹⁰ This supports accountability over the accuracy of information, and shifts the demand for audits of historical information to real-time attestation based on systems of controls.¹¹

Blockchain technology has the potential to offer instant international settlement. Parties using blockchain technology can transact and have the transaction visible and settled in a matter of seconds or minutes as opposed to days.

Blockchain offers support for validation of identity and traceability of ownership of assets such as title to real property. This has potential use in validation and verification processes to meet anti-money laundering and anti-terrorist financing (AML/ATF) requirements for professionals such as accountants, lawyers, financial institutions, real estate professionals, etc.¹² This extends to law enforcement. For example, in the 2021 Colonial Pipeline ransomware attack, investigators were able to trace and seize a portion of the bitcoin used to pay the ransom, highlighting how the traceability of transactions on a blockchain can ultimately be used to uncover criminal behavior, rather than hide it.¹³

Blockchain technology can be used to support environmental, social, and corporate governance (ESG) initiatives, such as tracing the sources of “clean” energy, and evaluating the supply chain back to the origin of raw materials and labour.¹⁴ Further, the ability to generate trustworthy data, such as emissions data, might in future support the tokenization of data to create ESG assets, such as carbon credits, which in turn could be traded as investments or used to obtain financing.¹⁵

10 Roman Matzutt, Jens Hiller, Martin Henze et al, “A Quantitative Analysis of the Impact of Arbitrary Blockchain Content on Bitcoin” in *Proceedings of the 22nd International Conference on Financial Cryptography and Data Security* (Nieuwpoort: Curacao, 26 February 2018), pp 420–438, online: <https://www.researchgate.net/publication/321192957_A_Quantitative_Analysis_of_the_Impact_of_Arbitrary_Blockchain_Content_on_Bitcoin/link/5aa6a415a6fdcc29af531a0b/download>.

11 See, for example, Paul Brody, “The Age of Autonomous Supply Chains” (June 14, 2021) CoinDesk Insights, online: CoinDesk <<https://www.coindesk.com/the-age-of-autonomous-supply-chains>>.

12 Oliver Freeman, “Could Blockchain Technology Revolutionize ESG Compliance?” (April 23, 2021) SupplyChain, online: SupplyChain <<https://supplychaindigital.com/technology-4/could-blockchain-technology-revolutionise-esg-compliance>>.

13 Kevin Colleran, “Pipeline Investigation Upends Idea That Bitcoin Is Untraceable”, New York Times (June 9, 2021), online: <<https://www.nytimes.com/2021/06/09/technology/bitcoin-untraceable-pipeline-ransomware.html>>. For more on the traceability of crimes committed over blockchain, see also Matthew De Silva, “Bitcoin money laundering is a classically dumb crime” (December 5, 2019) Quartz, online: Quartz

14 *Supra* note 12.

15 See, for example, *supra* note 11.

Example 1: Blockchain (continued)

Challenges

The emergence of blockchain technology spotlights the natural tension between transparency and confidentiality. Questions are being raised regarding the extent to which financial transactions should remain private and anonymous. Bitcoin, for example, gained popularity among legitimate individuals and criminals alike as a secure and anonymous means of conducting transactions outside of the more regulated financial systems. In July 2021, the European Commission outlined proposals to ban cryptocurrency service providers from offering anonymous crypto wallets, with a view to enhance AML/ATF efforts. In addition, the proposals extend AML/ATF rules to the entire cryptocurrency sector.¹⁶

In addition to the meaningful data on the chain, blockchains also record arbitrary data, such as short messages and pictures. The immutable nature means that harmful content (such as links to offensive or even illegal images) cannot be easily removed, and are distributed to all participants on the blockchain.¹⁷ From a PA's perspective, this raises issues of integrity and professional behavior.

Mining of cryptocurrencies, particularly those that rely on a 'proof of work' model, use significant amounts of energy. Bitcoin mining alone has been found to consume more energy than Sweden, and about half the consumption of the U.K. as a whole.¹⁸

No technology is 100 per cent infallible, but immutability and the complicated nature of blockchain technology leads to a risk of over-reliance on the blockchain, thereby threatening objectivity. For example, blockchains might be seen as entirely safe, ignoring the risk of, for example, 51 per cent attacks where an entity or group that controls more than 50 per cent of the mining computing power on a blockchain "colludes to alter previously processed blocks and determine new ones, allowing attackers to block some transactions and reverse others."¹⁹

16 European Commission, "Beating financial crime: Commission overhauls anti-money laundering and countering the financing of terrorism rules" (July 20, 2021, press release), online: <https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3690>; Note that this does not ban anonymous wallets held by individuals using self-custody software as discussed in, for example: David Z Morris, "No, the European Union Is Not 'Banning Anonymous Crypto Wallets'" (July 21, 2021) CoinDesk Insights, online: CoinDesk <<https://www.coindesk.com/no-the-european-union-is-not-banning-anonymous-crypto-wallets>>.

17 *Supra* note 10.

18 Katie Martin and Billy Nauman, "Bitcoin's growing energy problem: 'It's a dirty currency'", Financial Times (May 19, 2021), online: <<https://www.ft.com/content/1aeb2db-8f61-427c-a413-3b929291c8ac>>.

19 See, for example, Noelle Acheson, "Crypto Long & Short: 51% Attacks and Open-Source Value" (August 9, 2020) CoinDesk Insights, online: CoinDesk <<https://www.coindesk.com/crypto-attacks-bitcoin-ethereum-classic-open-source-value>>.

Example 2: AI systems

Opportunities

AI systems are contributing to significant advances in a broad range of applications, such as speech recognition and translation, image recognition, self-driving vehicles, crime and cybercrime prevention, and digital productivity assistants.²⁰ Many of these advances have the potential to significantly improve social well-being, such as in the areas of medical research, diagnosis and care.²¹

AI systems perform evaluations on data sets using more variables than humans can manage, thereby enabling enhanced decision-making.²²

AI systems can be used to counter threats posed by emerging technologies (such as overcoming algorithmic bias,²³ detecting deepfakes, computer-generated text, and adversarial attacks).

Challenges

If AI algorithms are trained on biased/non-representative data sets, they will naturally incorporate that bias as an unintended consequence.²⁴ For example, a system widely used to predict recidivism in the United States was found to be significantly biased against non-Caucasian defendants.²⁵ Facial recognition software, used for decisions in wide contexts including law enforcement, employment, housing and public surveillance, has been shown to be less accurate at identifying and categorizing images of people of colour, and raise concerns about unjust use.²⁶ Isaac Kohane, head of Harvard Medical School's Department of Biomedical Informatics warns, "getting diversity in the training of these algorithms is going to be incredibly important, otherwise we will be in some sense pouring concrete over whatever current distortions exist."²⁷

20 See, for example, Michel Girard, Michael Lionais & Rob McLean, *What is Your Data Worth: Insights for CPAs*, (Toronto: CPA Canada, 2021), online: CPA Canada <<https://www.cpacanada.ca/en/foresight-initiative/value-creation/data-value-primer-whats-your-data-worth>>.

21 See, for example, Alvin Powell, "AI revolution in medicine" (November 11, 2020) Harvard Gazette, online: Harvard <<https://news.harvard.edu/gazette/story/2020/11/risks-and-benefits-of-an-ai-revolution-in-medicine/>> [Powell]; Jonathan Greig, "How AI is being used for COVID-19 vaccine creation and distribution" (April 20, 2021) TechRepublic AI, online: TechRepublic <<https://www.techrepublic.com/article/how-ai-is-being-used-for-covid-19-vaccine-creation-and-distribution/>>.

22 See, for example, Powell, *supra* note 21.

23 See, for example, Jake Silberg & James Manyika, "Tackling bias in artificial intelligence (and in humans)" (June 6, 2019) McKinsey Global Institute, online: McKinsey & Company <<https://www.mckinsey.com/featured-insights/artificial-intelligence/tackling-bias-in-artificial-intelligence-and-in-humans>> [McKinsey]; Theodore Kinni, "The algorithmic trade-off between accuracy and ethics" (March 12, 2020) strategy+business, online strategy+business: <<https://www.strategy-business.com/article/The-algorithmic-trade-off-between-accuracy-and-ethics>>.

24 Ibid

25 Julia Angwin, Jeff Larson, Surya Mattu & Lauren Kirchner, "Machine Bias" (May 23, 2016) ProPublica, online: ProPublica <<https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>>.

26 See, for example, Alex Najibi, "Racial Discrimination in Face Recognition Technology" (October 24, 2020), online (blog): Harvard University Science Policy <<https://sitn.hms.harvard.edu/flash/2020/racial-discrimination-in-face-recognition-technology/>>.

27 Isaac Kohane, head of Harvard Medical School's Department of Biomedical Informatics, quoted in Powell, *supra* note 21.

Example 2: AI systems (continued)

Challenges (continued)

AI systems can be used to create highly realistic disinformation, such as audio and video deepfakes, computer-generated false text, and adversarial attacks to mislead computer vision systems.²⁸

Data is the new gold

Many of today's emerging technologies are data-saturated systems capable of watching, learning, predicting and influencing in ways that would have been unthinkable not long ago. It is estimated that in 2020, digital data totalled 40 trillion gigabytes, and the total pool has been roughly doubling every two years.²⁹ Data is created by data producers (e.g., social media networks, telecommunication companies, banks, private enterprises), aggregated by data brokers, and purchased by third parties who use the data for their own purposes.

This data is the lifeblood of data analytics systems that offer insights and information that impact every part of society – from business strategy, infrastructure planning, healthcare, transportation, global supply chains, climate change, fraud and crime prevention, and the list goes on. The vast majority of Fortune 1000 companies are investing in big data and AI systems.³⁰

The potential of data analytics is unbounded, but there are several caveats and practical limitations:

- Not all data is good data, and the old adage 'garbage in, garbage out' still holds. Poor data quality is estimated to cost a significant portion of business revenues.³¹ Without proper safeguards, the high volumes of data exchanging hands so frequently can make it challenging to distinguish original data from data that has been tampered with. Quadrant co-founder Mike Davie

28 See, for example, Institute of Chartered Accountants of England and Wales (ICAEW), "The rise of deepfake audio fraud" (February 20, 2020) ICAEW, online: ICAEW <<https://www.icaew.com/insights/features/2020/feb-2020/the-rise-of-deepfake-audio-fraud>>; Renee Diresta, "AI-Generated Text is the Scariest Deepfake of All" (July 31, 2020) Wired Ideas, online: Wired <<https://www.wired.com/story/ai-generated-text-is-the-scariest-deepfake-of-all/>>; Kyle Wiggers, "Adversarial attacks in machine learning: What they are and how to stop them" (May 29, 2021) The Machine, online: VentureBeat <<https://venturebeat.com/2021/05/29/adversarial-attacks-in-machine-learning-what-they-are-and-how-to-stop-them/>>.

29 Christo Petrov, "25+ Impressive Big Data Statistics for 2021" (August 5, 2021), online (blog): techjury <<https://techjury.net/blog/big-data-statistics/>>.

30 *Ibid.*

31 Mike Davie, "Why Bad Data Could Cost Entrepreneurs Millions" (April 15, 2019) Entrepreneur Asia Pacific, online: Entrepreneur <<https://www.entrepreneur.com/article/332238>>.

explains that when we “add to this the problem of non-transparent and anonymous sourcing and you have a cocktail for rampant bad data at a global scale.”³²

- Just as money is laundered by criminals, so too is data: “Click farms exist precisely because they can launder their false data through the data economy, with their data ending up being purchased by legitimate businesses, who then go on to make decisions often worth hundreds of millions of dollars.”³³
- Unstructured data (data that is not organized in a pre-defined manner – for example, answers and insights conveyed in emails between employees) is difficult and costly to manage, but 80-90 per cent of the data we generate today is unstructured.³⁴
- The value of data is not only intangible, but also perishable: “While other intangibles are accrued over considerable periods of time, data portfolios are highly dynamic and continually evolving as new data is accumulated. Portfolios that are not continually refreshed typically become dated quite quickly. In many situations, it is important to think of data as a ‘flow asset’ rather than as a ‘stock asset’ because, unless data is continuously refreshed, its value might diminish to zero in a remarkably short period of time.”³⁵
- Turning data into useful, actionable information requires skills that are still in short supply.³⁶ Data provides a new and unique value chain, which comes with a need for governance all along the chain, from gathering the data, through data sharing and security, determining insights, and communicating those insights through strategic decision-making.³⁷

These challenges will be mitigated, in theory at least, as global regulators settle on new requirements that span the data governance lifecycle – data collection, use, quality, protection and privacy, among others. Regulation in the data governance space is still nascent, and – much as with other large industries where regulation will have a significant impact on the business environment – lobbying is taking place. Among the interested parties are the data brokers that collect, sell, or share people’s personal information without having a direct

³² *Ibid.*

³³ *Ibid.*

³⁴ *Supra* note 29.

³⁵ *Supra* note 20.

³⁶ See, for example, Karthik Ramachandran & Jeanette Watson, “Tech looks to analytics skills to bolster its workforce: Addressing the analysis talent shortage” (March 2021) Deloitte Insights, online: Deloitte <<https://www2.deloitte.com/us/en/insights/industry/technology/data-analytics-skills-shortage.html>>.

³⁷ CPA Canada & IFAC, *The Professional Accountant’s Role in Data: Discussion Paper* (Toronto: CPA Canada, April 2021), online: CPA Canada <<https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/publications/professional-accountants-role-data>>.

relationship to them.³⁸ A U.S.-based study found that “Collectively, data broker spending on lobbying in 2020 rivaled the spending of individual big tech firms like Facebook and Google. [...] Many of the top spenders were not pure data brokers but companies that nonetheless have massive data operations.”³⁹ As an indication of the interest in data-enabled services, Accenture, PwC and Deloitte Consulting are examples of the many stakeholders actively leading developments in this area.⁴⁰

38 Alfred Ng & Maddy Varner “The Little-Known Data Broker Industry Is Spending Big Bucks Lobbying Congress” (April 1, 2021) The Markup, online: The Markup <<https://themarkup.org/privacy/2021/04/01/the-little-known-data-broker-industry-is-spending-big-bucks-lobbying-congress>>.

39 *Ibid.*

40 *Ibid.*



Part II: Views from the field

During the roundtable event and other global outreach discussions,⁴¹ a number of key themes emerged:

Ethical leadership is needed in choosing, designing and implementing technology

- Technology adoption is often motivated by cost savings, but the consequences of choices related to the design and implementation of technology can be far-reaching, and they impact what we do as PAs.
- PAs have an important perspective to contribute to technology design and implementation decisions, but we need the appropriate technical and professional competence to evaluate and speak knowledgeably with those designing and implementing solutions.
- We need to be flexible in our communication to understand and be understood by a range of professionals (lawyers, engineers, data scientists, social scientists, etc.).
- There is considerable value in tech-savvy PAs and more experienced, world-savvy PAs working together. Digital natives might see opportunities overlooked by other colleagues, while more experienced PAs who have gone through a number of technology changes in the past bring additional perspective based on that experience.
- Ethical decision-making requires judgment, interpretation and perspective. As PAs, our public interest responsibility results in an expectation that we not only comply with professional ethics standards, but also encourage and promote an ethics-based culture in our organizations.⁴² This requires us to pay more attention to ethics than some of our counterparts might.

⁴¹ See, for example, IESBA Technology Working Group, *IESBA Technology Initiative Phase 1 Final Report* (New York: IFAC, February 2020), online: IFAC <<https://www.ethicsboard.org/publications/iesba-technology-working-groups-phase-1-report>> [IESBA TWG]; Brian Friedrich & Laura Friedrich, “Ethical Leadership in an Era of Complexity and Digital Change: Event Highlights” (May 12, 2021) IFAC Knowledge Gateway, online: IFAC <<https://www.ifac.org/knowledge-gateway/building-trust-ethics/discussion/ethical-leadership-era-complexity-and-digital-change-event-highlights>>.

⁴² IFAC, *2020 Handbook of the International Code of Ethics for Professional Accountants* (New York: IFAC) [IESBA Code] at 200.5 A3, in the extant Code, or 120.13 A3, which becomes effective December 31, 2021, online: IESBA <<https://www.iesbaecode.org>>.

- We need to have discussions up front about what ethics means in a given context and build this approach into organizational governance structures.
- At the outset, organizations need to decide on the desired outcomes and how they will be measured and monitored from a control and risk management perspective.
- Ethical leaders are relied on to explain issues. In the technology domain, we need the appropriate depth of expertise to be able to explain issues to others.

There are two crucial areas where we can leverage our expertise: setting standards and auditing or otherwise verifying results.

- Digital transformation is creating a new business sector of intangibles, with benefits and risks. Society is dependent on technology in the same way as it depends on, for example, the energy sector and physical infrastructure.
- Regulations over the use of technology are needed to safeguard the public and ensure consistency. But without a crystal ball, it's hard to know where standards should focus. Additionally, jurisdictional differences in both how technology is applied and the norms or values around data use and ownership create challenges for global standard setting.⁴³ Within our domain, however, the profession has a great deal of experience in setting principles-based standards, which are also more resilient in times of change. This experience is useful in broader conversations with governments regarding future regulations, to ensure ethics implications are included at the outset.
- Diversity in those responsible for crafting the ethics frameworks can reduce the incidence of bias and inequity which is carried forward in technology standard setting and regulation.
- Auditing compliance with standards and regulations is a historical area of strength for the profession. In today's world, such assurance often goes well beyond financial reporting and includes reporting on the systems of controls over technology.
- Organizations need someone they can rely on to validate what is happening, and this verification role is a key source of trust in the profession. Promoting our involvement in such activity is important, as some stakeholders might not think of PAs as being the "go to" for this type of decision-making activity.
- We need to be careful not to lose independence when it's required; we can't design systems and also audit them.

⁴³ See, for example, Mary Meeker, *Internet Trends 2019 Report* (June 11, 2019), online: Bond <<https://www.bondcap.com/report/itr19/#view/6>>.

Technology won't supplant professional judgment, but be careful about what we call judgment

- There's a tendency for negativity (focusing on threats) when talking about technology, perhaps out of a lack of confidence in our ability to master it, but we need to be using it to enhance what we do by applying professional judgment to outputs from evolving systems.
- Much of what we call 'professional judgment' is actually recognizing a pattern and applying tried and true logic to shape the outcome. But pattern recognition and applying logic are tasks that machines and intelligent agents can typically perform better and faster, so we need to avoid just assuming that our role is protected.
- When intelligent technology is applied to a complex system, the ability to generate an 'answer' might make the situation seem less complex, even though it isn't. Perspective and an inquiring mind are needed to avoid over-reliance.

Technology replaces some of the quantitative 'grunt work,' but we also lose some of the qualitative benefits

- When employees are replaced by technology, human perspective and independent feedback loops might be shut down as well. The impact of losing these voices needs to be taken into consideration when designing and implementing technological solutions.
- In a remote workplace environment, technology helps keep us connected, but some soft skills have fallen by the wayside as we have lost face-to-face interaction. It is harder to collaborate on both complicated and complex issues over electronic platforms, and the impact of cultures (geographic and organizational) seems more pronounced.

Upskilling will be necessary

- Financial and non-financial reporting and forecasting are becoming more reliant on data analytics and AI systems.
- Technical skills in our core areas of accounting, finance and assurance are still fundamental, but the areas where we are expected to have technical knowledge are expanding to include emerging technologies such as AI systems, blockchain and cryptocurrencies, and data analytics.
- Even with upskilling, the lack of transparency and explainability of some systems, for example, neural networks, will challenge our abilities to both understand and communicate with clients and stakeholders.

Part III:

Technology and the ethical leader

The need for guardrails

The pace of change is dizzying and leads to a high-pressure environment for competitors. Advanced data analytics and AI now make it possible to understand and influence consumer behaviour like never before, and the massive potential economic value for businesses provides strong motivation to achieve early adopter advantages.

Times of rapid innovation also create complex environments where principled people face intense financial incentives, among other pressures.⁴⁴ For example, start-up companies are typically valued based on their potential, rather than on actual performance. At the same time, business models and processes for many such companies are typically purposefully opaque and built on complex technologies. Such start-ups are often led by dominant personalities focused on results at any cost. Without sufficient safeguards, this combination can lead to situations where there is a lot at stake financially, so it takes real courage to have a contrary point of view, particularly if the momentum of innovation might be impeded.

In the product development space (whether physical or digital), traditional models of building and testing have given way to a ‘move fast and break things’ mentality, a phrase coined by Facebook founder Mark Zuckerberg. Facebook, Twitter and other innovations of their time did indeed move

⁴⁴ As discussed by John Kerr, Chair of Kin and Carta plc., in the global *Ethical Leadership in an Era of Complexity and Digital Change* roundtable, online: IFAC <<https://www.ifac.org/events/ethical-leadership-era-complexity-and-digital-change>> [Roundtable].

fast, and at the same time the technologies have arguably led to significant unintended consequences⁴⁵ so it seems that Zuckerberg's mantra has been borne out.

Looking forward, *Harvard Business Review* author Hemant Taneja writes that “the technologies of tomorrow – genomics, blockchain, drones, AR/VR, 3D printing – will impact lives to an extent that will dwarf that of the technologies of the past ten years. At the same time, the public will continue to grow weary of perceived abuses by tech companies, and will favor businesses that address economic, social, and environmental problems.”⁴⁶ At the most foundational level, leadership teams in innovative organizations need to address the “can versus should problem”⁴⁷ by recognizing and remembering that just because science and technology *can* enable or do something, that doesn't mean it *should* be enabled or done.

Ethical leaders are needed to effect a balance between innovation and reasoned controls, especially until regulation is firmly in place. PAs are well-placed to oversee some of the guardrails needed to support progress in the right direction.

The ethics principles of innovation

Focus on the ethics implications of emerging technologies has gained attention in recent years, spurred in part by the publicity of AI ethics failures,⁴⁸ massive data breaches, and cryptocurrency concerns related to resource usage and risk of fraud.

AI and autonomous systems represent a particular area where a significant amount of work has been done. Over 170 frameworks of ethical AI have been created,⁴⁹ signifying the importance that is being ascribed to addressing

45 See, for example, Todd Bishop, “Can Facebook be fixed? Social media and the unintended consequences of technology in the wild” (July 28, 2019) GeekWire, online: GeekWire <<https://www.geekwire.com/2019/can-facebook-fixed-social-media-unintended-consequences-technology-wild/>>; Bernhard Debatin, Ann-Kathrin Horn & Brittany Hughes, “Facebook and Online Privacy: Attitudes, Behaviors, and Unintended Consequences” (2009) *J Computer-Mediated Comm* 15 at 83-108, online: International Communication Association <<https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1083-6101.2009.01494.x>>.

46 Hemant Taneja, “The Era of ‘Move Fast and Break Things’ is Over” (January 2019) *Harvard Bus Rev*, online: Harvard <<https://hbr.org/2019/01/the-era-of-move-fast-and-break-things-is-over>>.

47 Ayanna Howard & Deven Desai, “Taming AI's Can/Should Problem” (May 2021) *MIT Sloan Management Review*, online: MIT <<https://sloanreview.mit.edu/article/taming-ais-can-should-problem/>>.

48 See, for example, Charlie Pownall, “AI, Algorithmic and Automation Incident and Controversy Repository” (accessed September 10, 2021), online: AIAAIC <<https://www.aiaaic.org/aiaaic-repository>>.

49 See, for example, AlgorithmWatch, “AI Ethics Guidelines Global Inventory” (accessed September 10, 2021), online: AlgorithmWatch <<https://inventory.algorithmwatch.org>>; Alan Winfield, “An Updated Round Up of Ethical Principles of Robotics and AI” (accessed September 10, 2021), online (blog): <<https://alanwinfield.blogspot.com/2019/04/an-updated-round-up-of-ethical.html>>.

the ethics concerns that can arise in this area and the need for AI to be trustworthy. The IESBA Technology Working Group noted that “[s]uch organizations are also committed to developing AI ethics frameworks in order to maximize the potential of AI in bringing positive transformations to society and to minimize the risk of significant societal damage.”⁵⁰

Disruptive technologies raise a broad range of ethics challenges, which also have relevance in the context of the fundamental ethics principles of the accounting profession.⁵¹ Consider the following:

- The profession’s responsibility to act in the public interest can be challenged by systems lacking human rights protection and values alignment (e.g., where there is inadequate equity and fairness, justice, inclusivity or collaboration).
- Concerns around bias in AI data sets, bias in those developing AI algorithms from the underlying business logic, and failures to test autonomous systems for bias raise questions of fairness and threaten the PA’s objectivity where biased outputs are relied on.
- The expectation for privacy and autonomy with respect to personal data heightens the importance of the profession’s commitment to confidentiality, but the public’s expectations around increasing transparency can work in opposition.
- A lack of explainability of the outputs of neural networks has the potential to undermine a PA’s ability to demonstrate due care.
- Rapid advancements in technology and the complexity of interdependent systems can threaten the PA’s ability to demonstrate sufficient professional competence in decision-making.
- In light of the increasing importance of trust in the digital age, there are greater expectations for leaders – including PAs – to be accountable and act responsibly. Failure to do so could be seen as a lack of integrity and could discredit the profession under the principle of professional behaviour.

The IESBA Technology Working Group is considering these types of relationships in its ongoing work and notes that “generally, the Code currently provides high level, principles-based guidance for most technology-related ethics issues that PAs and firms might encounter” and that “a PA needs to

⁵⁰ IESBA TWG, *supra* note 41 at 14.

⁵¹ See, for example, *IESBA Code*, *supra* note 42 at 110.1 A1; Chartered Professional Accountants of British Columbia (CPABC), *Code of Professional Conduct* (Vancouver: CPABC, October 2020) [*CPABC Code*] at 5 (<https://www.bccpa.ca/member-practice-regulation/act-bylaws-code-of-professional-conduct>); and Institute of Chartered Accountants of Scotland (ICAS), *ICAS Code of Ethics (including International Independence Standards)* [*ICAS Code*] at 110.1 A1 (<https://www.icas.com/professional-resources/ethics/icas-code-of-ethics>). Note that the professions in Canada are provincially regulated, so the Code of one of the larger jurisdictions is referenced for illustration. The Codes of other provincial bodies are substantially equivalent with respect to the elements referred to.

think concurrently and holistically about compliance with the fundamental principles in a technology-enabled organizational environment.”⁵² Stakeholders also expressed to the working group that the current professional environment highlights a broader societal role for PAs in promoting ethical behavior as a critical, consistent foundation, particularly when developing and using technology.⁵³

Ethics must be built in, not bolted on

Supporting both innovation and control might seem like somewhat contradictory objectives, but the profession needs to be simultaneously advancing both. The challenge will be in helping to drive innovation without losing trust. The fundamental principles of ethics do not change in a disruptive environment, but when working in areas outside of one’s core competence, it can require a more purposeful consideration of the ethics dimensions of a decision.

With respect to data in our organizations, for example, PAs need to consider how to apply both technical competence and broader professional skills with due care to ensure accuracy, quality and security all along the data governance chain. Particular care is also needed in complying with the profession’s requirements for confidentiality.

Similarly, when our organizations are developing or implementing AI and autonomous systems, we need to help ensure that ethics considerations are built into the design from the outset.⁵⁴ Once a system is developed, it’s too late to ask the truly vital questions such as “Should this be system built at all?” and “How do we safeguard against bias and ensure fairness?” The proverbial genie is, at that point, out of the bottle, especially if an ethics shortcoming is discovered after a significant amount of time, money and creative energy has been invested in development. The Institute of Electrical and Electronics Engineers’ (IEEE) *Ethically Aligned Design*⁵⁵ initiative provides insights and resources (including standards and certifications) to help organizations establish metrics to measure success that adequately prioritize environmental and social impacts, and not just profits.

⁵² IESBA TWG, *supra* note 41 at 14.

⁵³ *Ibid* at 9-10.

⁵⁴ As discussed by John C. Havens, Executive Director, IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, *Roundtable*, *supra* note 44.

⁵⁵ Resources on the IEEE’s *Ethically Aligned Design* series are available online: <<https://ethicsinaction.ieee.org>>.

Technological innovation needs human intervention, enabled by establishing an ethics-based culture in the organization.⁵⁶ This includes creating more opportunities for the organization to stop and think about what they are trying to achieve, why, and how. John Kerr, chair of the global digital transformation firm Kin and Carta plc., counsels PAs about the theory that: When you run, you break fewer things if you purposefully put obstacles in the way. Obstacles cause us to think more deliberately about the path that we're following. Kerr suggests that perhaps the role of PAs is to introduce 'obstacles' – in the form of safeguards – to encourage organizations to pay closer attention and help them 'move fast' without breaking ethical behaviour.⁵⁷

Such safeguards might include:

- undertaking activities that support compliance with established frameworks for enhanced stakeholder reporting (such as sustainability standards around consistent and trustworthy ESG reporting)⁵⁸
- sparking boardroom conversations that lead to increased transparency and accountability⁵⁹
- encouraging and supporting individuals who raise concerns – both informally by encouraging a 'speak up, listen up' culture, and through more formal whistleblower programs⁶⁰

56 *IESBA Code*, *supra* note 42 at 120.13 A1-A2.

57 As discussed by John Kerr, *Roundtable*, *supra* note 44.

58 See, for example, IFAC's work in supporting sustainability reporting initiatives, "Sustainability Standards" IFAC, online: IFAC <<https://www.ifac.org/knowledge-gateway/contributing-global-economy/discussion/sustainability-standards>>.

59 See, for example, Don Taylor, *Governance for Not-for-Profit Organizations: Questions to Ask* (Toronto: CPA Canada, 2021, 2e), online: CPA Canada <<https://www.cpacanada.ca/en/business-and-accounting-resources/strategy-risk-and-governance/not-for-profit-governance/publications/governance-for-nfp-organizations-directors-questions>>; Catherine Bannister, "Technology without ethics is a wild beast" (July 2021) Deloitte, online: Deloitte <<https://www2.deloitte.com/us/en/pages/center-for-board-effectiveness/articles/technology-without-ethics-wild-beast.html>>.

60 See, for example, ICAS, "Speak up? Listen up? Whistleblow? In their own words – Insights into the ethical dilemmas of ICAS members research and resources on whistleblower, speak-up, listen-up programs" (accessed September 1, 2021) ICAS, online: ICAS <<https://www.icas.com/members/newly-qualified/professional-ethics/ethics-resources-and-support/Publications-and-guidance/speak-up-listen-up-whistleblow-in-their-own-words-insights-into-the-ethical-dilemmas-of-icas-members>>.

Part IV: Practical implications for the profession

The way forward

Discussions with event delegates and other outreach participants offer the following concrete steps that Professional Accountancy Organizations (PAOs) and individual PAs can take to help organizations harness technology and innovate, while purposefully considering and addressing ethics implications from the outset.

For PAOs:

- Ensure that the organization's board sets an appropriate tone from the top with respect to ethical leadership in technology. This might include, for example, developing strategic plans to ensure that:
 - professional services delivered by members (such as the presentation of, and assurance over, data and information) can drive trust in data and information integrity, particularly given the increased use by decision-makers of real-time, non-financial data
 - the PAO stays focused on protecting the public interest as emerging technologies become more prevalent for accounting-related decisions and the role of their professional members shifts more to that of future-oriented, trusted advisors.
- Partner with other PAOs and/or professions (such as data scientists and engineers, lawyers, etc.) at a national/regional level who have complementary goals and face similar challenges with their memberships.
- Communicate the value and breadth of PAs to the broader stakeholder group, to open doors for PAs to be included in important conversations (e.g., when governments consider appropriate regulation in this space).

- Support members in broadening and enhancing their information and communications technology (ICT) competence,⁶¹ including with respect to related ethics issues, by facilitating continuing professional development programs in conjunction with skilled technology trainers.
- Build resources for members and students to develop both technical and ethics skills in interacting with the machines of the future (such as how to decompose problems and analyze situations from a human perspective to take advantage of machine outputs).
- Re-examine training programs to consider acknowledging course completion from other learning institutions in relevant technology fields (such as data science, programming, technology courses from MBA programs, especially if they have an ethics/leadership/strategy component).
- Communicate clearly with the membership as to PAO research and initiatives undertaken in this area.

For individual PAs:

- Determine your own professional value proposition and communicate it clearly and effectively. Upskill strategically to support and build this value proposition.
- Build the technology skills needed to effectively marry technical knowledge with professional or enabling skills – and particularly ethics.⁶² Professors Sargut and McGrath express this as follows:

Combining “soft” but flexible storytelling techniques with “hard” but rigid quantitative analyses can be an extremely powerful way to make sense of complex systems. The former help us explore unlikely but important possibilities and unintended consequences, while the latter give us concrete insights into the relationships of the system’s visible components.⁶³

⁶¹ See, for example, the newly revised IFAC *International Education Standards* 2, 3, 4 and 8, which address learning and development for information and communications technology (ICT) and professional skepticism. These standards became effective on January 1, 2021 and are available online: <<https://www.iaesb.org/publications/visions-ies-2-3-4-and-8-1>>. In addition, see the related *Information and Communications Technologies Non-Authoritative Learning Outcomes* (2019) that enhance the professional competence and development and application of the knowledge, skills, and behaviours needed in ICT by both aspiring and professional accountants, online: <<https://www.iaesb.org/publications/information-and-communications-technologies-non-authoritative-learning-outcomes>>.

⁶² *IESBA Code*, *supra* note 42 at 113.1 A2.

⁶³ *Supra* note 1.

- Learn to work with machines. The World Economic Forum’s Future of Jobs Report 2020 predicts that “by 2025, the time spent on current tasks at work by humans and machines will be equal.”⁶⁴ Appreciate the strengths of machines, but also recognize their limitations. Be questioning and skeptical to avoid over-reliance.⁶⁵
- Use the IESBA Code’s principles-based conceptual framework⁶⁶ and guidance offered through the IESBA Technology Initiative⁶⁷ to help evaluate situations that pose ethics challenges related to developing and using technology. In particular, consider the sections related to promoting an ethics-based organizational culture, evaluating bias and maintaining objectivity, applying professional judgment and maintaining professional competence with respect to emerging technology.
- Be the “human in the room” and have the moral courage⁶⁸ to ask the hard questions, in line with professional requirements to apply an inquiring mind/professional skepticism.⁶⁹
- Slow things down; build safeguards into the process to maintain a controlled pace of innovation that allows ethics to be considered from the outset.⁷⁰

Finding – and earning – our place

As ethical leaders and skilled, trusted advisors, professional accountants have many roles to play in the continuing digital era. IFAC and CPA Canada’s discussion paper *The Professional Accountant’s Role in Data* outlines a range of core, enhanced and earned roles throughout the data management value chain of data gathering, sharing, generating insights and strategic communication.⁷¹

More broadly, the growing need for ethics to be designed into systems – particularly those involving AI and autonomous components – opens the door for PAs to be instrumental in these conversations. Accenture’s global study of

64 *Supra* note 3 at 5.

65 *IESBA Code*, *supra* note 42, section 120.

66 *Ibid.*

67 Numerous resources are provided on the IESBA Technology Working Group’s focus page, online: <<https://www.ethicsboard.org/focus-areas/technology-ethics-independence-considerations>>.

68 ICAS, *The Power of One: Moral Courage* (Edinburgh: ICAS, November 2020, 2e), online: ICAS <<https://www.icas.com/professional-resources/ethics/resources-and-support/moral-courage>>.

69 See, for example, *IESBA Code*, *supra* note 42 at R120.5(a) and 120.16 A1-A2.

70 *IESBA Code*, *supra* note 42, section 120.

71 *Supra* note 37.

more than 1,000 large companies identified three new categories of roles that are emerging as AI becomes prevalent, and all three offer opportunities for PAs to add value as ethical leaders.⁷²

- PAs can provide strength as *trainers* of digital models, to help algorithms learn to make ethical choices.
- As *explainers*, PAs can interpret the output and processes of systems, and communicate these to stakeholders effectively and efficiently to support organizational decision-making.
- In the role of *sustainer*, PAs can monitor that technology is operating as intended and that concerns are raised with appropriate urgency, to build confidence in the systems.

It is imperative that the designers and developers are not the only voices in the conversation. Angela Love, founder of the leadership consultancy Daymark Group, cautions that “the biggest mistake companies can make is assuming that only technical experts should be at the table. The silos that are built as a result inevitably turn into echo chambers – the last place you want to hold a conversation about ethics.”⁷³

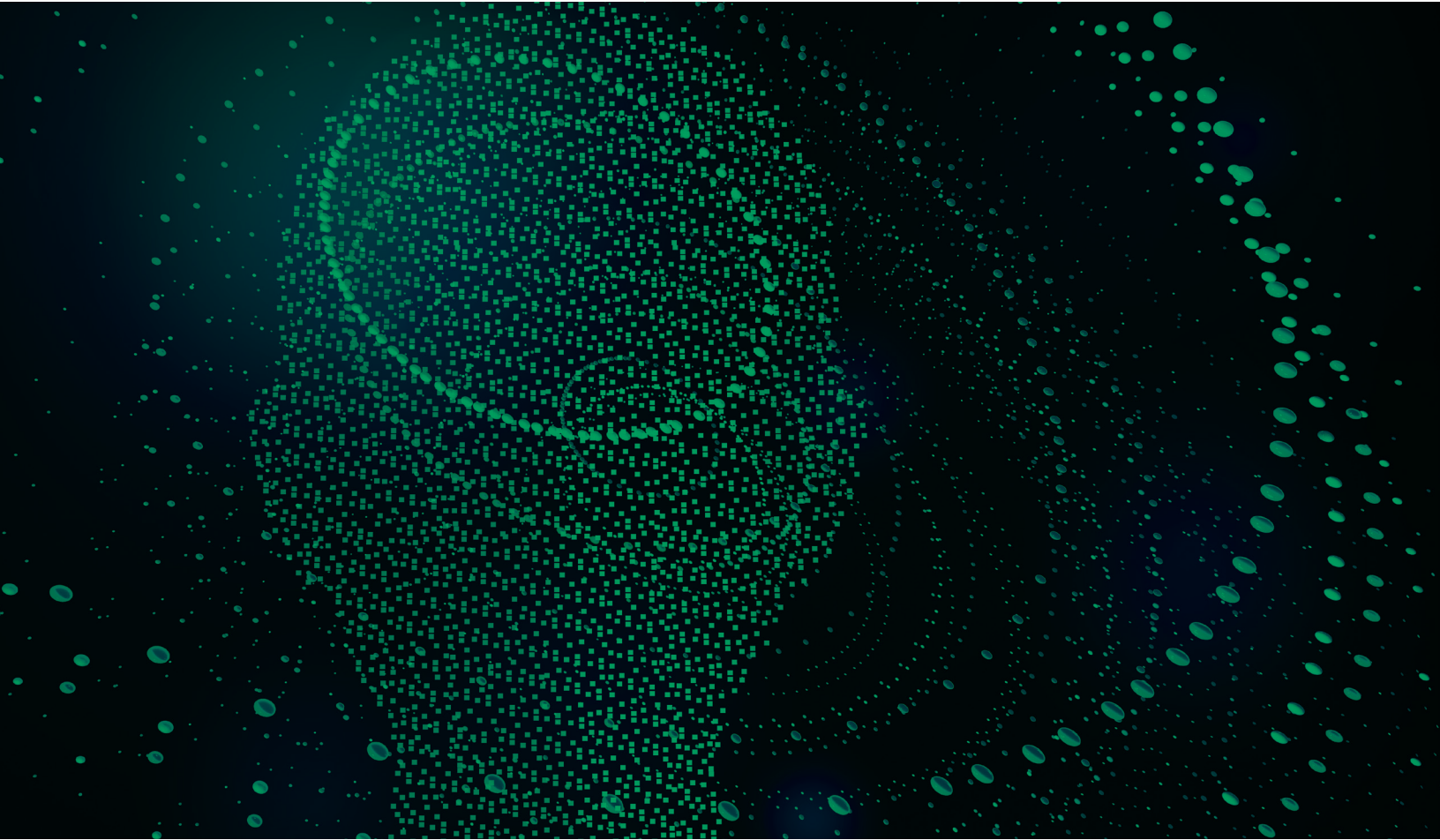
Getting a place at the table requires effort and perseverance, but the outcomes are worth it. CPA Canada, for instance, is participating in work undertaken by the Standards Council of Canada with respect to data governance, management and standards. Although it might not be an obvious fit for accountants to be in this space, the collaboration has been very valuable and mutually beneficial. Gord Beal, CPA Canada’s VP Research, Guidance, and Support, explains that “as time goes by, as data becomes more integral to the decision-making process, it can so easily be a natural space for us. Of course, that’s going to require a substantial amount of preparation.”⁷⁴ Through collaboration in these types of initiatives, the mindset is shifting to recognize the increasing value that professional accountants bring to technology-related conversations. As Peter Drucker once said, “you cannot predict the future, but you can create it.”⁷⁵

72 H James Wilson, Paul R Daugherty & Nicola Morini-Bianzino, “The Jobs that Artificial Intelligence will Create” (March 23, 2017) MIT Sloan Management Review, online: MIT <<https://sloanreview.mit.edu/article/will-ai-create-as-many-jobs-as-it-eliminates/>>.

73 Angela Love, “How to Lead a Digital Transformation – Ethically” (May 3, 2021) TechCrunch, online: TechCrunch <<https://techcrunch.com/2021/05/03/how-to-lead-a-digital-transformation-ethically/>>.

74 As discussed by Gordon Beal, CPA Canada’s Vice-President Research, Guidance and Support, during the webinar “CPA Foresight: Re-imagining the Profession”, online: CPA British Columbia (March 2021) <https://pd.bccpa.ca/pd-search/#/m10810b_od/m0810od/>.

75 Peter Drucker, as quoted by William A Cohen, in *Drucker on Leadership: New Lessons from the Father of Modern Management* (San Francisco: Jossey-Bass, 2010) at 4.



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