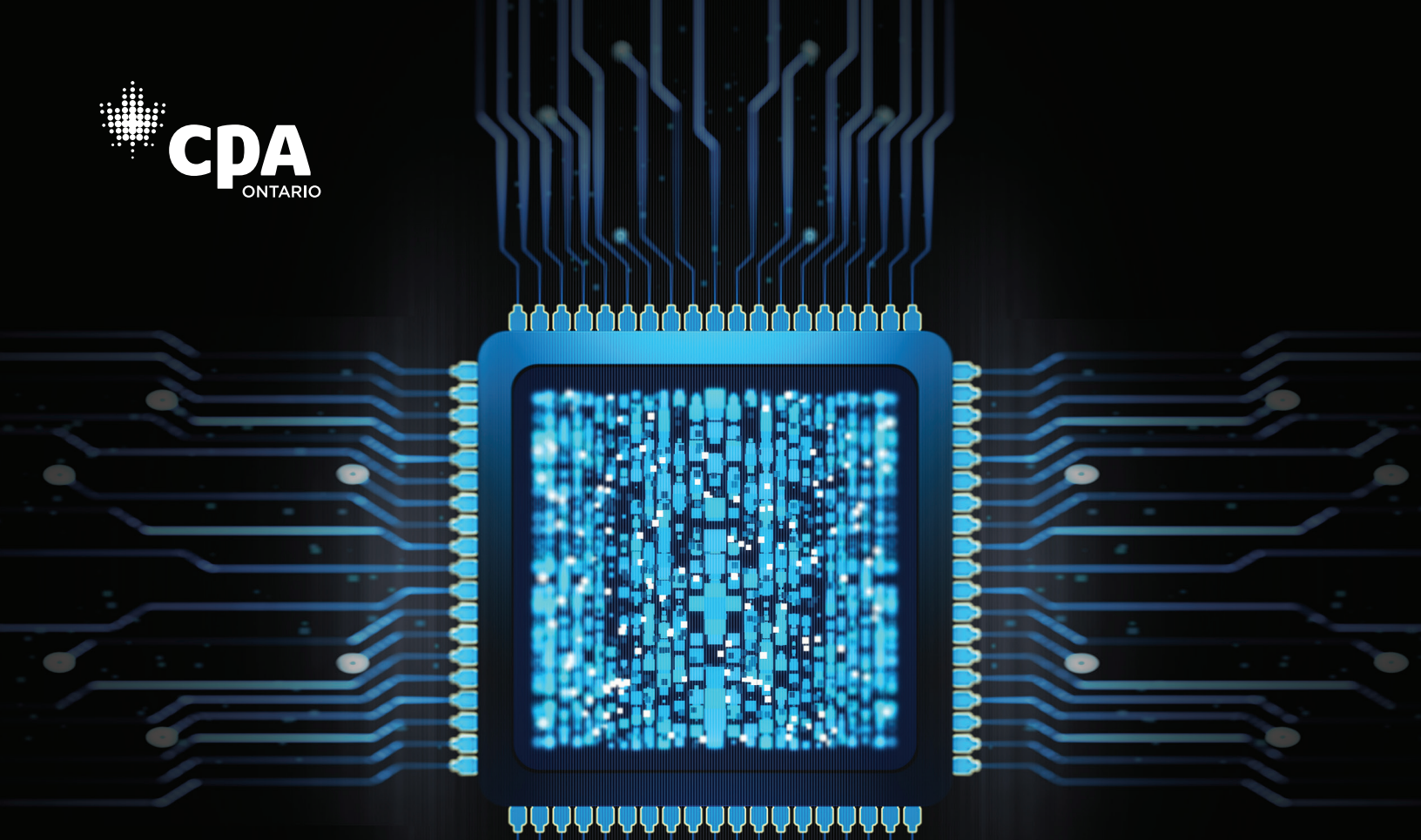


EVOLVING ALONGSIDE ARTIFICIAL INTELLIGENCE

CPA ONTARIO THOUGHT LEADERSHIP SERIES | CPAONTARIO.CA

As part of our commitment to thought leadership in the accounting profession, CPA Ontario convened a series of three panels in February and March 2019 to bring together CPAs, industry experts and academic leaders to better understand the applications and implications of AI. Insights gained from those three panels have been complemented by interviews with a range of subject matter experts to inform this paper, the latest in CPA Ontario's thought leadership series on emerging issues.

INTRODUCTION

RELEVANCE AMID DISRUPTION

INTRODUCTION

Artificial Intelligence (AI) is here and it's here to stay. As the experts in this paper attest, its arrival is an immense opportunity. Ontario CPAs willing and able to adapt – to evolve alongside Artificial Intelligence – will be better placed to offer the greatest value to their clients, their employers and the economy.

AI is already starting to take on data-ingestion tasks on a scale and at a pace that far outstrip anything that humans can do. It is having an effect on revenue forecasting, fraud detection, ledger analyses, tax report writing, and more. The full scope of the applications of AI in our profession will only get bigger from here, as will the implications.

AI enhances what CPAs do; it does not replace what CPAs do. By leveraging the better, cheaper and faster insights AI can offer, we're able to spend less time on high-volume repetitive tasks and more time doing what CPAs do best: big-picture problem solving, professional judgment, organizational leadership and strategic advising.

What does AI mean for our profession in Ontario?

The advent of AI in the accounting profession has many CPAs asking themselves what it means for their career, their company and their profession.

At CPA Ontario, we're asking questions ourselves. We do so based on our firm belief that wherever you find innovation, you will find CPAs. Wherever you see disruptive change, value creation or strategic advising for risk mitigation, you will find CPAs. Whether in industry, government, or public practice, CPAs are trusted advisors in the face of change.

CPAs are integral to shaping and assessing various applications of AI. They also play leading roles in AI-focused collaboration, developments and innovations that create jobs and wealth, attract talent and investment, and keep Ontario at the forefront of global AI advances.

However, there are concerns about the implications of AI on an individual CPA's career trajectory, and on the evolution of our profession as a whole. Some recent reports have suggested accountancy is one of the professions most at risk from AI and automation.[1] At CPA Ontario, we think AI represents more opportunity than risk and we hope this paper illustrates that AI can actually enhance what CPAs do. It's all about how CPAs position and educate themselves, and develop new skill sets.

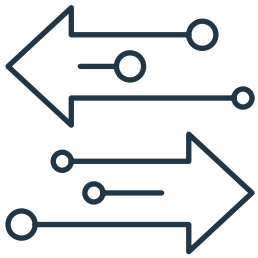
In this paper, we also address important regulatory and ethical concerns related to AI, including questions about data integrity and data bias, among other issues.

It's all about relevance

In consultation with AI experts for this paper – largely CPAs – one common opinion was clear: the applications and implications of AI on the accounting profession will be profound and irrevocable, and thus the time to embrace AI is now.

Just as CPAs have always done when managing and maneuvering through change, they need to embrace innovation, to understand what AI means and learn how it can be used as a tool.

It all comes down to relevance: to the accounting profession; to the key corporate decisions CPAs inform and make; to the employers and clients they serve; to the public interest we help protect; and to the rapidly changing economy at large. CPAs who embrace AI can be more relevant and create more value on the journey that lies ahead. By contrast, CPAs who choose not to embrace AI may effectively reduce their own relevance.



CPA Ontario is evolving with AI

CPA Ontario is aware of the regulatory and educational implications of AI. From a regulator's perspective, we are asking ourselves how far and how quickly we have to evolve as a professional body. We need to ensure that we understand AI and that we incorporate aspects of AI into our own regulatory processes. In our role as educators, we must ensure that the national CPA curriculum being used in Ontario remains attractive, flexible and challenging enough to fully prepare CPAs during a time of significant disruption.

To better understand the professional and provincial contexts of AI, we convened three AI panel discussions in February and March 2019, bringing together CPAs, industry experts and academic leaders to discuss the impact of AI on our profession – now and in the future. The insights from those panels, combined with additional expert interviews and further research, make up the basis of this paper.

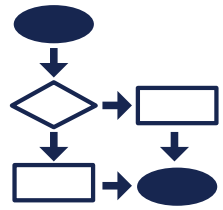
UNDERSTANDING AI

Though there are several subfields of AI, currently most applications in our profession use Natural Language Processing (NLP) and Machine Learning (ML) to quickly analyze and categorize large amounts of data. These applications allow CPAs to focus time developing richer insights and creating value, and less time on routine tasks. For these reasons, in this paper we have chosen to focus the more technological aspects of AI on NLP and ML.

SIX DISCIPLINES OF AI

Natural Language Processing (NLP):

NLP gives computers the ability to read, listen to and classify human words and phrases. NLP can extract and analyze language from within massive data sets of both structured (financial statements) and unstructured (emails, phone calls, social media) data. It's what powers virtual assistants like Siri and Alexa.

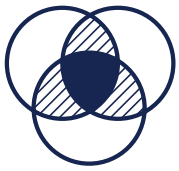


Machine Learning (ML):

ML algorithms develop and improve themselves through observation and trial-and-error, similar to the way humans learn. After being trained, ML can learn on its own by recognizing patterns in data. It can make decisions based on the outcomes of similar situations it has observed before.

Robotics:

Robotics is the science and engineering that makes machines autonomously perform specific manual tasks. In industrial and commercial settings, robots are involved in assembly lines and, in Amazon's warehouses, for transporting products from shelves to checkout. At home, robots like the Roomba can vacuum.

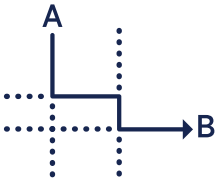


Knowledge Representation and Reasoning (KRR):

KRR is a way for machines to represent and understand concepts, the relationships between concepts, and the rules in which concepts interact and behave. KRR is not about computers storing mass data, but about actually understanding what data means and what to do with it to draw conclusions.

Computer Vision:

Vision gives machines the ability to process, understand and categorize images and alphanumeric characters. Computer vision is used in facial recognition, in document analysis and fraud detection, in the identification and censoring of explicit or illegal content, for tracking objects, and in autonomous vehicles and robots.

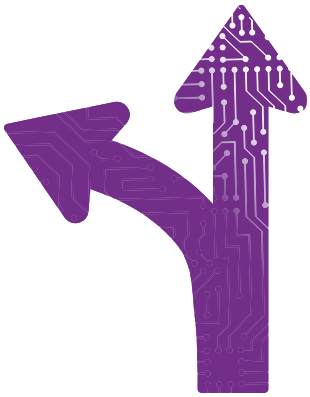


Planning:

Planning is the science of devising a hierarchical sequence of events to complete a predefined task, including also re-planning a sequence to account for unexpected variables. Planning currently has applications in production lines, construction, military and air campaigns, and robotics.

"Machines have largely substituted for human hands, not heads … It may be left to people to provide 'hearts' – that is, tasks that require emotional intelligence, originality or social skills such as persuasion or caring for others."[2]

— Mark Carney, Canadian-born Governor of the Bank of England



PART 1:

BETTER INSIGHTS FROM MORE DATA

"Don't do the boring stuff. Go use your judgment."[3]

— Ramy Sedra, Analytics Leader, PwC Canada

Artificial Intelligence is a growing, evolving and revolutionary technology. It has changed the way we watch television, listen to music, map journeys, shop and organize our schedules. It has disrupted and improved manufacturing, food science and transport logistics.

It also affects the work done by CPAs.

AI is propelling change. It is a disruptor. But that's not something to fear. CPAs have withstood technological change in the past and become better for it. AI offers CPAs another opportunity to improve upon their skill sets, and increase the efficiency and expertise of what they do.

As AI advances, more of the routine, repetitive job functions will be undertaken by algorithms, freeing up CPAs to focus more of their time on business strategy, critical thinking and other value-added work. By leveraging the deeper insights that AI offers them, CPAs can enhance their value with better and more informed decision-making.

COST OF PREDICTION IS FALLING, VALUE OF JUDGMENT IS RISING

The cost of prediction – a fundamental and defining element of AI, and the basis of its economic value – is becoming cheaper. This, according to University of Toronto professors Ajay Agrawal, Joshua Gans and Avi Goldfarb, means more AI is on the way. And this expansion in usage has important implications for productivity, employment, and competition[4] because, when something becomes cheaper, people tend to use more of it (in this case AI) and less of its substitute (in this case humans).[5]

AI doesn't necessarily replace jobs; it merely replaces tasks.

Consider how, for example, AI has and will continue to impact doctors, as machines begin to perform medical diagnostics, as well as lawyers and law clerks, with machines now able to review lengthy contracts in minutes.

The faster, better and cheaper prediction methods of AI are taking over certain tasks from the slower, less nimble and more expensive prediction methods of humans. But AI doesn't necessarily replace jobs; it merely replaces tasks. This frees up CPAs to focus on the elevated human functions that machines are ill-equipped to deal with, such as big-picture issues, creative problem-solving, innovation, and people management. So, while the cost of prediction falls, the value of critical human judgment rises.

REFINING THE "NEW OIL": HOW AI IS BEING USED IN OUR PROFESSION

Although data has always existed, we haven't always been able to access, organize and analyze it in the ways we now can. Dubbed the "new oil", data is a most valuable commodity and businesses and organizations are sitting on vast reserves of it. AI is one of the tools allowing us to now begin to extract and refine our data. And, just like with oil, the real value to an organization lies in the size of the data sets and the quality of the data available. The better the data, the better predictions AI can make.

To fully understand what's happening with AI in our profession, and the correlation between prediction and judgment underpinning many of the changes that are underway, let's examine two fields of AI that are making a difference in what we do: Natural Language Processing and Machine Learning.

Natural Language Processing (NLP): NLP is the technology that gives computers the ability to read, listen to and classify human words and phrases, and can also be trained to understand emotional sentiment and context. It's what powers virtual voice assistants like Siri and Alexa. In a professional setting, NLP can extract and analyze language from within massive data sets of both structured (financial

NLP LEARNING CURVE

Some NLP algorithms are already writing and issuing reports on companies within minutes of Chief Executive Officers speaking on a quarterly call, or very shortly after a company issues its earnings release. No human can produce these reports so quickly, which can be an advantage in the business race to "be first". However, it is possible that these automated reports can be inaccurate.

In one recent case, an algorithm that was not trained on the definition of non-GAAP financial measures issued a report saying the company in question missed consensus expectations, even though the non-GAAP results were in fact better than those expectations. Because the AI was not trained to analyze non-GAAP measures, the algorithm ignored these results and focused instead on the GAAP results, which were lower than expectations. The error was soon corrected, but this example points to some underlying concerns with machine autonomy and the veracity of NLP-based algorithms in this regard.

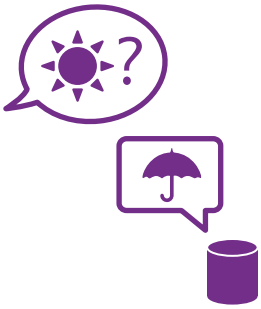
statements) and unstructured data (emails, phone calls, social media). In accounting and finance, it is being utilized to rapidly parse information from text-heavy documents such as financial performance reports, contracts, and standards and regulations.

Machine Learning (ML): ML algorithms develop and improve themselves through observation and trial-and-error, similar to the way humans learn. ML can learn on its own – after being trained – by analyzing and recognizing patterns. It can then base decisions on the outcomes of similar situations it has observed and assessed. Machine Learning is reliant on massive quantities of quality data in order to function optimally. It can only solve problems it has encountered before, with patterns it recognizes from its experience.

There are three types of machine learning:

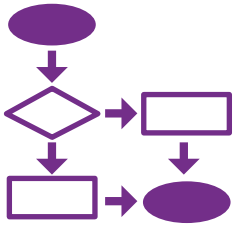
- **Supervised learning –** in which an algorithm can predict something in the future by building models based on past data. *Example: companies often use supervised learning to predict customer churn*
- **Unsupervised learning –** in which an algorithm will find relationships between data points by locating and analyzing patterns. *Examples: customer segmentation; the recommendation systems on shopping sites like Amazon*
- **Reinforcement learning –** in which an algorithm learns from its mistakes after taking action. *Example: the learning algorithms in autonomous vehicle development*

Some applications of NLP and ML in the profession today



NATURAL LANGUAGE PROCESSING

- Can review new regulations and scan existing contracts to **ensure contracts comply with legislation**
- Can scan online consumer behavior to **create revenue forecasts**
- Can **be used in the M&A process** to rapidly evaluate mass data to help determine a company's value
- Natural Language Generation (NLG), a field of AI closely related to NLP, can **write reports** (including Profit & Loss, Personal Tax, Sales, and Fund reports) from structured financial data
- Can **assist with talent acquisition**, including assessing resumes, engaging in chatbot pre-interviews and assigning scores to candidates.



MACHINE LEARNING

- Can accurately **calculate depreciation** on large fleets of company assets
- Can correctly **categorize expenses**, assessing things like travel versus accommodation and split invoices
- Can detect anomalies in datasets to **detect fraud** and faulty financial reporting
- Can rapidly **assess and analyze a company's entire ledger**, while highlighting exceptions and validating "normal" transactions
- Can **automatically code accounting** entries

> "At low levels, a prediction machine can relieve humans of predictive tasks and so save on costs. As the machine cranks up, prediction can change and improve decision-making quality. But at some point, a prediction machine may become so accurate and reliable that it changes how an organization does things."[6]
>
> — *Agrawal, Gans & Goldfarb,* Prediction Machines

AI IN INDUSTRY

CPAs are present across all industries and in the coming years, all industries will be impacted by AI in some way. Present and future AI applications are just as relevant for CPAs working at banks, consumer retail companies, industrial firms and other organizations as they are for those in the national professional services firms. Today, we see AI impacting more process-reliant roles and tasks, ranging from inventory management to supplier onboarding and invoice processing.

CPAs in more senior positions can use AI to make their departments and organizations more effective, through cost reduction or through capacity expansion. For example, by replacing supplier management tasks to allow for faster onboarding and order processing, more time can be freed up for up-front supplier selection and, later, for supplier evaluation.

For CPAs whose responsibilities might be replaced by AI, there is a real opportunity today to get ahead of the upcoming shift. Many roles will become more evaluation-based, such as those assessing supplier performance or looking at exceptions and anomalies in expense management. CPAs who are able to retool themselves in time to be better positioned to function in these modified roles will fare better than others.

AI IN INDUSTRY: CASE STUDY

Erin Kelly, CPA, CMA, is CEO of Advanced Symbolics Inc., headquartered in Ottawa, which has developed a patented AI that can accurately measure public sentiment, assess messaging strategies and analyze the market, and can be used for market research, sales forecasting and even predicting political outcomes.

"Our company has invented an AI that predicts human behaviour," Kelly said.

The company's AI – which has been named Polly – is trained to analyze real-time social media data and longitudinal studies to determine mass public sentiment, and use this information to predict buyer, voter and public behaviour.

The training of the AI, Kelly stresses, is critical, as is the quality and quantity of data inputs.

"AIs are only as good as they're cared for, trained and integrated, and understand your strategy. If they don't understand what you're trying to do, they're not going to do a good job at it. It's like any employee – they need to understand."

A recent example of Polly's power was when she correctly predicted the Brexit vote – at a 52 per cent vote to "exit" the European Union.

"When you have got trillions and trillions and trillions of conversations that you're analyzing every day, you can say with a lot of confidence that this is a trend, this is a prediction," Kelly said.

"We are able to accurately predict outcomes. To use Brexit as an example, our AI got Brexit bang on."

In that case, Polly was able to note something humans did not. By analyzing and tracking news stories and online conversations of voters, the AI noticed when voters who had previously been undecided changed their minds – and she predicted they would vote "exit".

AI is not out of reach, even for small business, Kelly said. CPAs should start with a small project and learn how their AI functions and how to interact with it.

"Start small and learn how it works and learn your application in blocks. It's best to start with a small project.

"This is going to help you make better decisions so that you can be a star, so that you can have confidence in the project that you're rolling with."

AI and national firms

In many ways, AI is changing the "very core" of the national firms and the way they operate, as they invest in laboratories to develop more and better AI, hire more data scientists, employ their services differently and even alter the way they price those services[7].

The applications of AI within our profession are relatively new, but the national professional services firms in Canada are utilizing AI in a variety of accounting, auditing and consulting approaches across a range of industries.

Many of the firms have a national head of AI initiatives, with the organization's AI insights and experiences increasingly important to the overall mix of services provided to clients. In addition to using AI and advanced analytics to influence the speed and accuracy of their accounting roles, national firms also bring their considerable experience to bear in helping clients learn about and adapt AI-based technologies to the particular needs of their situation and strategies. They work with private-sector companies, research labs and incubators to develop and deliver innovative AI-based products, services and research reports.

The potential applications of AI in our profession are widespread and the national firms each develop and employ AI differently. These are just some of the benefits the national firms are experiencing with their implementations of AI:

- Analyzing and extracting unstructured data from multiple additional data sources, including images, invoices and contracts using advanced pattern recognition in auditing[8]
- Garnering greater trust from clients and offering improved value by assessing greater data sets and minimizing human error[9]
- Slashing by as much as 80 per cent the time it takes for a team to comb through many thousands of legal documents to locate contract changes[10]
- Compiling and analyzing M&A accounts payable and receivable data more than 90 per cent faster[11]

- Identifying anomalies in massive data sets to detect fraud, including across international jurisdictions[12]
- Using a "bot" to analyze billions of data points in order to detect aberrations within general ledger data[13]

By virtue of their size, these national – indeed, international – firms are able to invest a lot into developing their considerable AI capabilities. Many have inward-facing AI initiatives that help their staff learn about and hone their AI expertise. Some have also invested in and partnered with leading research institutions in Ontario and beyond.

But where does this leave the smaller firms when it comes to AI adoption?

AI AND SMALL AND MID-SIZED FIRMS

While the national firms have the capacity – and, in some cases, are spending hundreds of millions of dollars – to shape and deploy scalable AI applications in serving their local and global customers, small to medium-sized firms may feel they do not have the same access to AI.

However, the cost of AI applications, many of which are scalable, are actually not out of reach for smaller firms.

According to Steve McCaughey, CPA, CMA, Managing Partner of DSpace at Deloitte Canada, smaller firms can join the competition by employing a "buy or subscribe" model when it comes to AI: "I think we're going to see smaller firms 'rent' customizable AI applications from the large cloud providers, and then adapt them to their own uses."[14]

Whatever the size of the firm, AI technologies are available. Erin Kelly, CPA, CMA, CEO of Advanced Symbolics Inc. in Ottawa, said firms interested in AI should "start small" and expand their AI capabilities over time.

> AI in audits "will move from an option to consider to an absolute necessity".

Speaking at one of CPA Ontario's Evolving Alongside Artificial Intelligence panels in February, Kelly explained the approach for smaller firms: "Start with a small project – don't try to boil the ocean. Do it bit by bit, otherwise it's overwhelming. Start with a $25,000 project … then build from there. You can get that started in 30 days."

But how should a smaller firm choose what project to invest in? "It's the project that's keeping you up at night," Kelly said. "Start with that [and think]: Is there a way I could be doing this better?"[15]

AI AND AUDITS

According to research by CPA Canada, AI in audits "will move from an option to consider to an absolute necessity".[16]

Using AI in audits opens the door for auditors to review entire ledgers of transactions, rather than simply consider a sample as a proxy for the whole. This technology is a game changer. In the past, this was all but impossible because humans can only work so fast. Now, machines can perform ledger reviews in mere days or weeks that might take humans months or years. While this may not lead to an elimination of fraud, it does greatly enhance auditors' capabilities to detect anomalies, exceptions, risk and errors.

The technology does not, and will not, replace auditors. But auditors who leverage AI are able to do more with their clients' data than auditors without AI. As John Colthart, General Manager of Audit and Assurance at MindBridge Ai, an Ottawa-based company that specializes in auditing AI, summarized to CPA Canada's *Pivot* magazine in February: "AI will not replace auditors. Auditors that use AI will replace auditors that don't."[17]

AI allows auditors to evaluate larger data sets, but it doesn't replace the need for professional judgment, rationale and understanding. These prime skills of CPAs will always come into play. As Naveen Kalia, KPMG Canada's Partner in Charge of

> "As with any industry, clients will always want to work with someone they find trustworthy, reliable and savvy … In the end, we are accountable for explaining our judgment. We can't just tell a client the machine made the decision. We need to understand what is behind it and then sit down with the client to explain our reasoning."
>
> *— Naveen Kalia, KPMG Canada's Partner in Charge of Audit Innovation*

Audit Innovation, describes it, the "audit of the future" will allow auditors to catch more anomalies and conduct more complex risk assessments. However, "we will still need the traditional auditor skill set when it comes to understanding judgments made in financial statements". Human logic will still be needed to work through any issues identified by a machine. After all, AI is just a tool – the standard of reasonable assurance will still need to be met and will continue to be as rigorous as always. "As with any industry, clients will always want to work with someone they find trustworthy, reliable and savvy," Kalia said. "In the end, we are accountable for explaining our judgment. We can't just tell a client the machine made the decision. We need to understand what is behind it and then sit down with the client to explain our reasoning.[18]"

What, then, is the future of AI in auditing?

Auditing Full Populations

With traditional sampling, a CPA may notice an anomaly with a prescribed sample set but not fully understand the scale or potential frequency of that anomaly. AI algorithms can quickly and efficiently analyze an entire population of data, thereby eliminating sampling and reducing the time spent on audit data preparation.[19]

By viewing entire transaction sets, CPAs will be able to understand how many times similar errors have been repeated, thus providing them with more information with which to form opinions.[20] This ability to evaluate full populations also allows CPAs to ask better questions and to interact more effectively with their clients, executives, audit committees and company boards, all of which adds value to the audit process.[21]

Auditing in Real-time

AI could allow for real-time proactive audits, thus enabling auditors to make key analyses year-round. Better data throughput in this way allows CPAs to focus more on analysis and less on repetitive data entry. Real-time audits could also open up the doors to proactive predictive financial modelling.

Risk-based Pricing

The ability of AI to quickly analyze vast amounts of information could help CPAs flag a variety of risks earlier in the audit process than they could by working without AI. This, in turn, could enable them to consider whether to take on an audit to which they applied some AI-based risk assessments. Greater information gleaned through AI at the outset can enable better risk-based pricing. If an algorithm identified considerable risks at the outset, an auditor could better determine how to proceed with the audit and how to price it accordingly. [22]

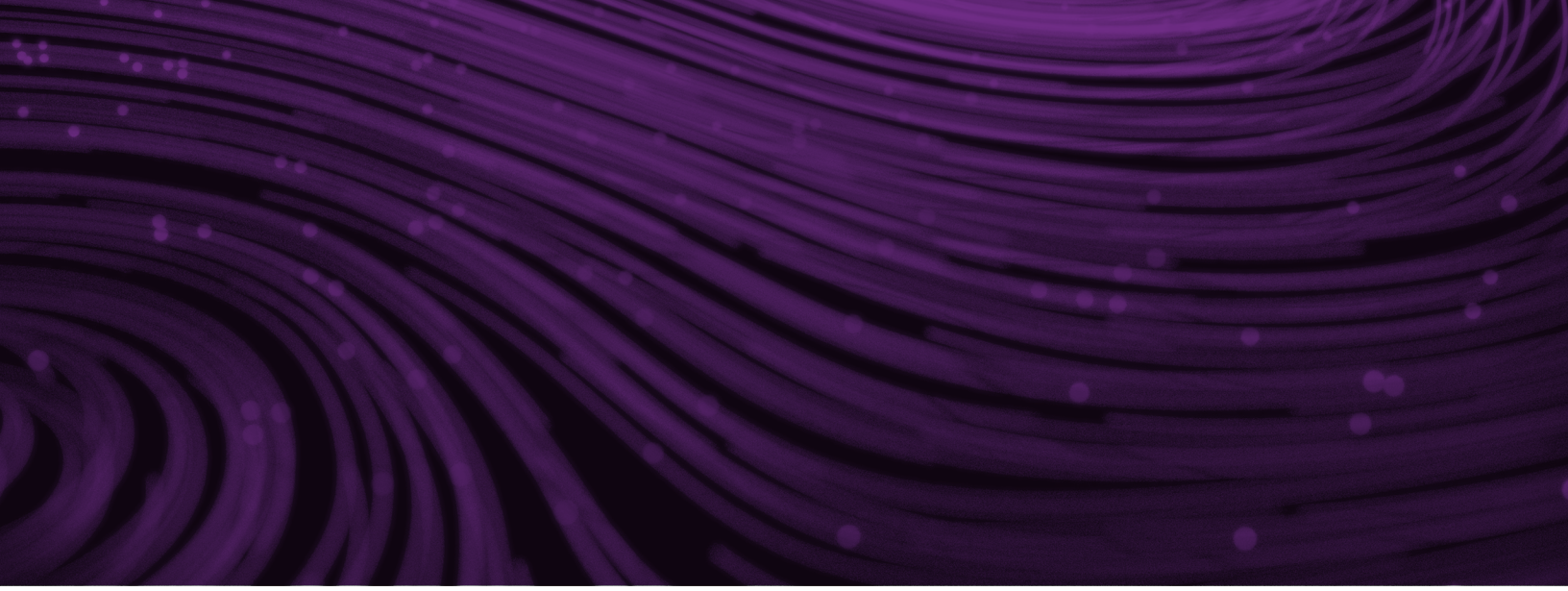
Understanding the "black box"

The integrity of financial reporting should never be compromised by technology. CPAs need to bring critical thinking and technical skills together to fully understand the AI they might use in audits, and apply their professional skepticism and judgment, as they always have.

CPAs will potentially also need to develop the skills and knowledge base to audit others' AI algorithms. And that, according to Jeff Lui, CPA, Director of Artificial Intelligence at Deloitte Canada, could alter the very nature of auditing in the next five to 10 years.[23]

As more organizations adopt AI and develop their own algorithms for handling their data, accounting firms may need to start auditing algorithms and data sets.

Understanding the "black box" – the algorithms behind AI – is critical. And those algorithms should never need to be kept secret to an auditor. "Don't talk to anybody who says, 'this is my black box and you can't look in the black box.' That's your red flag right there," said Kelly of Advanced Symbolics. "They should show you their algorithm, and if they are not willing to show it to you, that's a bad sign. You need to ask questions about what's inside that box and have those questions answered."[24]



Can AI Close the Audit-Expectation Gap?

The audit-expectation gap, broadly speaking, is the difference between what an auditor does and expects to achieve, and what the public expects an audit will achieve.

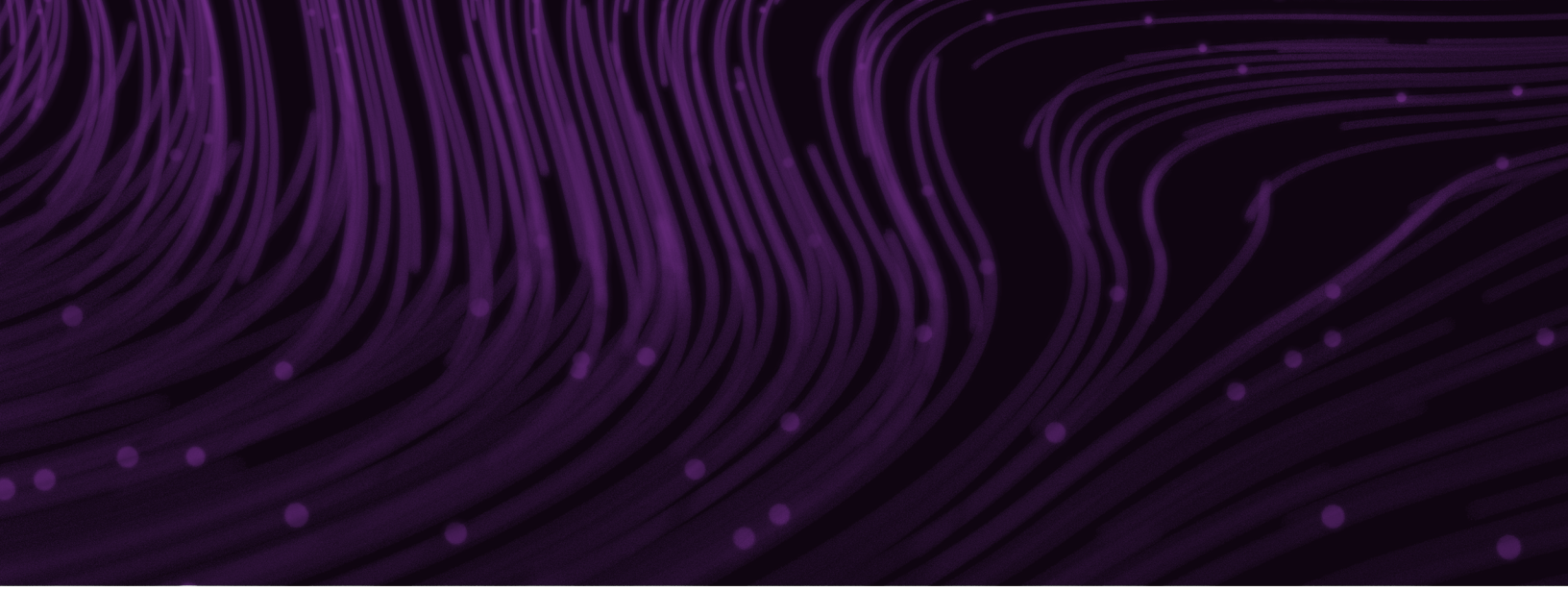
While an auditor designs and performs their audit to obtain reasonable assurance that the financial statements as a whole are free from material fraud or error, there are inherent limitations to this process in traditional audit.

But, rather than the audit-sampling used in the traditional process, the audit of the future will be able to examine every transaction and may be able to overcome some of the limitations of a traditional audit. As mentioned above, AI algorithms can very quickly provide a CPA with an analysis of vast amounts of data on which that professional can base insights that are deeper than those based on smaller sample sets.[25] But what effects, if any, will AI have on the audit-expectation gap?

The existing standard for reasonable assurance is well defined, but the public has low awareness of reasonable assurance and of the audit process in general.

AI provides our profession with tools to expand the dimensions of the audit process, which allows auditors to review more information through their AI, to free up time for investigation into areas of potential risk found by themselves or with the assistance of their AI tools.

As AI is introduced into more facets of audits, will the public alter its expectations? Or will the capabilities of AI-powered audits meet public expectations? The impacts on the gap, if any, may become clearer over time, as the technology develops and the future of AI auditing unfolds.



AI ADOPTION: THE SPEED OF CHANGE

Phase One – Selected Adoption

According to Ajay Agrawal of the University of Toronto, we're currently in an early stage in which AI adoption is mostly found within companies already using some traditional predictive analytics. In professional services, banks use AI to predict loan losses, credit card companies use AI to detect fraud, and insurance companies deploy AI to assess claims. In these cases, companies are effectively swapping out old statistical tools with new machine learning techniques, thereby upgrading predictive analytics.

Phase Two – Widespread Adoption

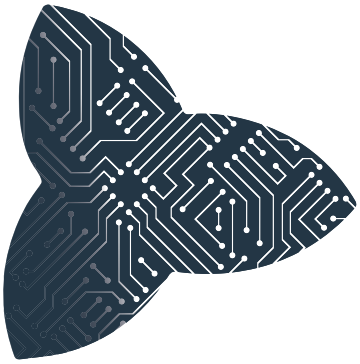
Widespread adoption of self-driving cars, for example, will be guided by AI-based algorithms that predict what an average human driver would do in any given circumstance. Automated language translation algorithms, AI-informed corporate retention and attraction strategies, and AI-enabled equipment and asset inspection tools may also soon become widespread. During this transition, implementing AI technologies won't necessarily replace humans. Rather, it will switch them to new, AI-assisted tasks.

Phase Three – Streamlining and Job Dislocation

Finally, workflows will be optimized by AI in ways that will likely dislocate jobs. This streamlining will arrive once there is increased confidence that AI works. At the same time, the implementation of new predictions will generate new tasks and new jobs that did not exist before. The overall impact on jobs will depend on the timing with which old jobs are eliminated and new jobs are created.[26]

"The depth of Ontario's AI ecosystem means that CPAs have access to talent and capabilities, as well as opportunities for partnerships and alliances in shaping AI."

— Kristy Carscallen, Canadian Managing Partner, Audit, KPMG[27]



PART 2:

ONTARIO AS A GLOBAL LEADER IN AI

ONTARIO'S VIBRANT AI ECOSYSTEM

Home to leading academics, incubators, accelerators, and prominent research organizations, Ontario's robust innovation ecosystem is filled with vitality and diversity. The province has long been considered a powerhouse of Artificial Intelligence research and application.

The Toronto-Waterloo Innovation Corridor boasts roughly 300 AI startups[28], and Toronto, individually, is home to the highest concentration of AI startups in the world.[29] The Greater Toronto Area, in particular, has variously been dubbed "the epicentre of machine learning", "the birthplace of modern AI research", and "one of the world's foremost hubs for AI research and development".[30]

In the wider tech context, the province is considered the second-largest Information and Communications Technology (ICT) hub in North America, hosts R&D departments for seven of the 10 largest tech companies in the world and Toronto produces more than 42,000 STEM graduates a year[31] (the region has committed to increasing that to 50,000 a year, which would make Toronto largest producer of STEM graduates in North America).[32] In terms of employment, last year Toronto was reportedly the fastest-growing tech market for the second consecutive year, growing by 14 per cent to reach more than 240,000 tech workers. According to the same report (the CBRE Annual Tech Talent Scorecard), Ottawa ranked as the North American city with the highest concentration of tech workers.[33] Nationally, we experienced a 500 per cent increase in AI-related jobs created between 2015 and 2017.[34]

Meanwhile, in the financial services sector – a veritable petri dish of AI innovation – Ontario is again seen as a global leader. Toronto is the second-largest financial centre in North America, with more than 675,000 direct and indirect jobs involved in the financial sector and is home to Canada's five largest banks (three of which are among the 25 largest banks in the world) and three of the top 15 life insurance companies.[35] The four largest national accounting firms are also all headquartered in Toronto.

Evidently, the market, innovation culture and opportunities are all in place for Ontario's CPAs to learn and develop alongside AI. Over the coming years, the catalytic effects of AI will have substantial impacts on jobs in Ontario. The growth of AI will stimulate economic activity in existing industries and create new roles and workstreams. This evolution will reward and be shaped by people with the combination of critical thinking, professional judgment, healthy skepticism and technical skills that CPAs embody.

This map illustrates the clusters of AI activity in the province, including academia, incubators and accelerators, research centres, and the multinationals with major R&D labs leading AI advances in Southern Ontario.

Kitchener-Waterloo:

University of Guelph
Waterloo.ai
Thomson Reuters
GM
Velocity
Google
Communitech
IBM
Laurier
Perimeter Institute
Lazaridis Institute
CPAMI

Guelph:

University of Guelph

Hamilton:

McMaster University
IBM

Ottawa:

University of Ottawa
Algonquin College
Shopify
Cours Bayview Yards
OneEleven

Kingston:

Queen's University

Toronto (Greater Toronto Area):

MaRS
Uber
Etsy
Samsung
DMZ
OpenText
Thomson Reuters
GM
University of Toronto
Ryerson University
Vector Institute
CIFAR
Borealis AI
OneEleven
Creative Destruction Lab
NextAI

WORLD-LEADING DEPTH IN RESEARCH

The Godfather and his disciples

Ontario is fortunate to have one of the greatest minds in AI call Toronto home. Dubbed the "Godfather of Deep Learning", Geoffrey Hinton, an AI pioneer, has had a profound influence on the development and current state of AI, not only in Ontario, but globally. Since setting up in the University of Toronto in 1987, after some time at American universities, the British-born Hinton has been at the forefront of deep learning, a subfield of AI instrumental in the development of computers that can think and learn like humans.

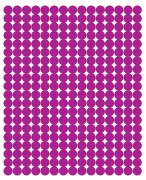
Now Emeritus Distinguished Professor of Computer Science at the University of Toronto, Chief Scientific Adviser at the Vector Institute, and Vice-President and Engineering Fellow at Google, Hinton has been awarded Canada's top science and engineering award, the Natural Sciences and Engineering Research Council (NSERC) Herzberg Gold Medal, in 2010. Last year, he was also awarded the "Nobel Prize of Computer Science", the Turing Award, along with Yoshua Bengio, Scientific Director at Quebec's Artificial Intelligence Institute, Mila, and Professor at the Université de Montréal, and Yann LeCun, Vice-President and Chief AI Scientist for Facebook and Professor at New York University, who did his postdoctoral study with Hinton at the University of Toronto.

As a Bloomberg report recently said, "Hinton and his students put Canada on the map as an AI super-power."[36] Members of his AI circle – students and associates – are heading up Artificial Intelligence departments globally at Apple, Facebook, Google and Uber[37].

This year, in February, the Toronto Region Board of Trade recognized Hinton with the Toronto Region Builder Award, for his "extraordinary commitment" to improving the Toronto region as a place to live, work and learn. Carol Wilding, FCPA, FCA, President and CEO of CPA Ontario, which sponsored the award, said the award was "honouring a leader who is making Toronto synonymous with advanced thinking

RANK #1

Toronto: fastest-growing tech job market in North America. Ottawa: highest concentration of tech workers in North America



300

AI startups housed within the Toronto-Waterloo Innovation Corridor

42,000+

STEM graduates each year in Toronto

and innovation in the eyes of the world. Through his dedicated commitment to innovation, research and advocacy," she said, "Geoffrey is ensuring that we have the talent, resources and knowledge to excel in a changing world."

Research, funding and development

At the Toronto-based Vector Institute, which was launched in March 2017 with $135 million in funding from government and private-sector partners, Hinton heads more than 21 faculty members, 220 researchers and 24 professional staff[38]. According to one report, the Vector Institute has been among a series of catalysts for more than $1 billion of announced AI and tech-related investments that will result in the creation of 25,000 jobs across Canada.[39]

But the Vector Institute is just one of many public and private research and funding vehicles for AI development in the province.

Collectively, Ontario-based research institutions, AI-powered corporations, multinational R&D labs and funding centres make up a robust AI infrastructure that spans the breadth of the province. From the Toronto-Waterloo "technology supercluster" in the west-central region – which, in 2016, made up 17 per cent of the national GDP,[40] and includes the considerable heft of Waterloo.ai, the Canadian Institute for Advanced Research, the Vector Institute, the MaRS Discovery District, powerhouse computer science education at the Universities of Toronto and Waterloo, and big name AI labs for multinationals like Uber, Microsoft, IBM and Samsung – to the burgeoning AI industry in the east, including Algonquin College, the University of Ottawa, and the headquarters of award-winning audit AI company MindBridge Ai and Canada's AI-powered e-commerce giant Shopify.

This infrastructure plays a substantial role in attracting leading computer scientists in AI to Ontario. This, as Tiff Macklem, Dean of the Rotman School of Management at the University of Toronto, puts it, is the "jet fuel energizing innovations in this rapidly evolving field". These partnerships – between business, government and academia – are helping to fund the research for applications of AI in industry and government.[41]

> "Canada is great at science. Where we've struggled has been commercializing that science and creating business value."
>
> — *Tiff Macklem, Dean of the Rotman School of Management at the University of Toronto*

CHALLENGES IN COMMERCIALIZING THE RESEARCH

However strong Ontario's research assets may be, we have traditionally been challenged in how well we commercialize that research. The fact is we lag behind competitors in the pace and scale of commercializing local research. This point was summarized by Macklem during a CPA Ontario AI panel discussion in February: "Canada is great at science. Where we've struggled has been commercializing that science and creating business value."[42]

Jodie Wallis, Accenture's Managing Director of AI in Canada, recently echoed this point. We need to do a better job of keeping our AI expertise here, "rather than letting our supply trickle elsewhere", she said.[43]

A recent study by the Waterloo-based Centre for International Governance and Innovation (CIGI) highlights this commercialization challenge. According to CIGI's research, Canada has become a hot spot for big-data analytics over the past few years, with Google, Microsoft, Facebook, Adobe and other global heavyweights announcing millions of dollars in investments in AI research hubs in Ontario, Quebec and Alberta. However, fewer than half of the roughly 100 Machine-Learning patents developed in Canada between 2007 and 2017 have stayed in Canadian hands.[44]

These challenges highlight the fact that Ontario lacks a deep community of experienced entrepreneurs who have started and built multi-$100 million technology companies. This results in a failure in what Agrawal has called "the market for judgment". That is, it is hard for AI ventures to connect with experienced angel investors and science-based entrepreneurs who have done it before, in order to get the advice (specifically, their judgment based on experience of what to prioritize) and ultimately the capital they need to build and scale rapidly to secure a global footprint before someone else takes the market. The Creative Destruction Lab and other research and funding institutes and groups were designed around solving this problem – the failure in the market for judgment – by connecting the most promising AI ventures with successful tech entrepreneurs who know what it takes to build a scaled tech company and keep it in Canada.[45]

AN OPPORTUNITY FOR CPAs: BRIDGING RESEARCH AND COMMERCIALIZATION

Given their broad range of roles and skills, CPAs can bridge the gap between researchers who develop AI technologies in a lab and investors who finance and commercialize that research. These and other bridging roles are crucial, given the obstacles often found between research and commercialization. CPAs who understand the applications and implications of AI can recognize and help monetize AI opportunities, thereby helping create jobs, companies and wealth from that AI commercialization.

Similarly, within an organization, CPAs can bridge the channels between application and development, and leadership buy-in. CPAs who understand the specific market advantages, the efficiency gains and the long-term cost-saving benefits of AI, as well as understanding some of the more technical algorithmic elements, will be in prime position to champion and oversee uptake when promoting AI capabilities to executive and leadership teams.

CPAs are business decision makers with global perspectives. Armed with deep experience and a growing range of AI-related skills and tools, they can encourage and lead in the application of AI in business – both in applying AI in their business and helping their clients leverage new AI technologies. By doing so, CPAs can help reverse the historic trend that has seen AI researchers invent something only to see the economic benefits flow south of the border.[46]

ENHANCING ONTARIO'S COMPETITIVE EDGE

Canadians from coast to coast are not alone in the race for AI leadership. China and the United States are both angling for a sustainable edge in AI, an important engine of innovation.[47] The quantity of AI spending abroad signals how tough that global competition has become. China, for example, has committed $150 billion to AI by 2030, France will invest $1.85 billion by 2022, and the European Commission will contribute €1.5 billion. In the U.S., AI is no longer a nascent industry, as venture-capital investments are shifting to mature AI start-ups.[48]

So, when we are competing with AI spending on such massive scales elsewhere across the globe, where does our advantage lie?

We can compete on the basis of the intellectual leadership and critical thinking capabilities of the province's talent base, as well as with the diversity of that talent. And we can compete in sectors with global scale, such as financial services. Helping enhance AI in this sector can further increase its global competitiveness and act as a platform for AI expansion in other sectors. There are also numerous local AI start-up successes, receiving considerable – and globally comparable – venture capital funding. Ontario is well positioned in these areas and CPAs can play a vital role in the success this expansion.

The depth of Ontario's AI talent pool means that startup companies and established players do not have to look far for high-quality talent. That this talent pool is itself diverse adds to the value of Ontario's innovation ecosystem. Talented professionals from around the world are taking a closer look at what Ontario has to offer them and their families, and are able to access the province's AI and tech infrastructure through the Startup Visa Program, which allows highly skilled immigration to fast-track their Canadian residency.

The diversity foreign workers bring to Ontario's economy energizes companies operating here with fresh voices at the table, sparking innovation and boosting performance.[49] Taken together, the assets of talent and diversity drive economic development, adding to the considerable AI talent pool and introducing more technologies and applications for commercialization.

The talent pool – made up of Ontario's STEM graduates and highly skilled Canadian newcomers – combined with our rich network of AI research institutes, incubators, accelerators and funding has helped attract the major global firms who now see the enormous value of what Ontario has to offer.

"Ultimately, the purpose of an audit is to provide confidence to the capital markets, and that won't change. What will change, however, is how the auditor takes advantage of new technology and embeds it as a fundamental and required part of audit service delivery."[50]

— Felice Persico and Hermann Sidhu

PART 3:

REGULATORY AND ETHICAL CONSIDERATIONS

AI AND REGULATION

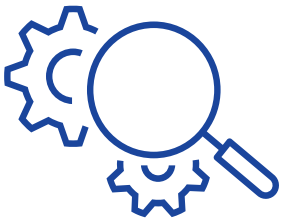
The rapid evolution of AI and its accounting applications, particularly in auditing, leads to some important regulatory considerations for our profession. Regulators need to fully understand the policy and economic implications of the rapidly changing technologies that are driving AI forward.

CPA Ontario: Regulations and AI

As the regulatory body of the accounting profession in Ontario, CPA Ontario has a responsibility to remain relevant and to ensure we help our members stay ahead of market trends and regulatory change. Considering the rapid ascent of AI, we have to carefully consider how to effectively fulfill our regulatory mandate as our members begin to use new AI capabilities in their roles. We continue to monitor developments in auditing standards that are affected by AI, and we are exploring AI and its applicability in our own regulatory functions. We are actively engaging in discussions with various stakeholders to keep abreast of the development and use of AI in industry and public practice.

In order to maintain effective regulation, CPA Ontario will closely monitor the evolving use of AI by firms in the performance of their audit engagements. As with any new tool, we will develop our understanding of how data is collected, managed, processed and analyzed with AI, and will evaluate compliance with relevant professional standards. This may include the engagement of AI experts, along with additional staff training.

CPA Ontario will also explore ways to incorporate AI into our Practice Inspection Program. This may eventually include integrating AI into our risk-based inspection process, including the selection of offices and engagements for inspection, as well as specific areas of focus in audit files. Similarly, CPA Ontario will consider how AI may be deployed in other regulatory activities, such as our Continuing Professional Development (CPD) audit process and detection of professional misconduct in the market.



Auditing Standards and AI

In January 2018, the International Auditing and Assurance Standards Board (IAASB) released a Feedback Statement on its Request for Input for its study: *Exploring the Growing Use of Technology in the Audit, With a Focus on Data Analytics.* The IAASB decided to undertake the study to best determine the future of its International Standards on Auditing. According to its Feedback Statement, "The IAASB has recognized the importance of understanding how the use [of] technology, and more specifically data analytics, is influencing audit quality. To ensure that the International Standards on Auditing (ISAs) continue to form the basis for high quality, valuable and relevant audits, the IAASB agreed to explore whether the ISAs remain 'fit for purpose' in light of emerging developments in the technologies used by auditors."

Though the focus of the study is data analytics, respondents also called on the IAASB to consider the "effects of new technologies, such as block chain, artificial intelligence, and robotics".[51] AI and data analytics in today's computer analysis often go hand in hand, with AI enhancing and automating the capabilities of the analytics. In reviewing the feedback, it became clear that no single standard could adequately capture the implications of data analytics and AI on audits. Rather, it was agreed that the importance and implications of these technologies should be reflected across the standards.

Looking ahead, the IAASB's Proposed Strategy for 2020–2023 and Work Plan for 2020–2021 will be examining the need for changes to its standards related to audit evidence and how AI and other emerging technologies are used in the audit process. One of the outlined "strategic actions" for the IAASB is to assess "the need for changes in the standards to address issues and challenges related to audit evidence, in particular in relation to evolving technologies and automated tools that are being used, as well as thinking more about how professional skepticism can be further enhanced within the International Standards on Auditing (ISAs)".[52]

The IAASB is currently gathering information and research on issues related to audit evidence. As part of this initiative, it is expected that additional focus will be placed on professional skepticism as well as the source, quality, and reliability of data in light of the effects of new technologies such as blockchain, AI and robotics on audits. The IAASB is expected to decide on how to move forward with this initiative by early 2020.[53]

CPAB and AI

The Canadian Public Accountability Board (CPAB) regulates Canadian auditors of publicly listed companies and operates independently from the provincial accounting regulators.

To date, while CPAB has been hearing more about the applications of AI in audits generally, CPAB reports it has seen limited use of AI in audits of public companies in Canada. That said, the organization is conceptually supportive of integrating AI into audits, given that AI has the potential to increase audit quality. To that end, CPAB is in ongoing discussions with auditors, industry and other regulators on the evolving state of play of AI in audits.

CPAB is considering ways to use AI in its own operations.[54] CPAB's focused attention on AI reflects the growing importance of AI in the audit discussion, if not yet the audit experience.

TECHNICAL AI IMPLICATIONS

Connotations: The meanings of words change over time and can mean different things to different people. A good Natural Language Processing algorithm, then, needs to be capable of accurately determining connotations of words from context and audience – particularly when extracting data from and analyzing social media from different demographics. (For example, a review referring to a product or service as "sick" could mean it was "great" to some people, and "bad" to others.)

Accurate: A lack of transparency about the method by which data is collected or from where it is being purchased can present reputational and regulatory risks for companies and individual CPAs connected to AI-based initiatives. In addition, there are risks involved in the selection of data features: including too many features in an algorithm may provide a false sense of accuracy; using too few could mean the model is unable to deal with nuance, or it could skew analyses by weighting the importance of one data feature over another.

Intelligible: Even though an algorithm may offer a high level of accuracy, it needs to also be understood and readily explainable. Algorithms are complex and they evolve – but CPAs and other AI trainers need to be able to justify the decisions they make, on the basis of their AI's analysis and recommendations. CPAs using AI need to understand the algorithms they use and be able to explain how and why they process data they way they do.

Free from bias: CPAs must also be careful to ensure neither conscious nor unconscious bias enters into the labelling training of an algorithm. Unconscious bias in an AI, for example, could include human traits like sexism, racism, or ageism. If an AI is trained with biases, its processing of information will be distorted.

The use of AI in digital assistants illustrates many of these technical considerations. AI is very good at extracting meaning and intent based on a few words or sentences. But AI is not good at maintaining sustained conversations the way two humans would talk to one another.

> "As we hurtle towards increasingly advanced machine intelligence, it is more important than ever that we enhance our understanding of human empathy. Maintaining the intelligence/empathy balance is critical for the persistence of civilization."[55]
>
> — *Ajay Agrawal, the Geoffrey Taber Chair in Entrepreneurship and Innovation at the University of Toronto's Rotman School of Management*

Ethical Considerations of AI

As a profession, we need to develop a clear and broadly accepted understanding of what we will accept when it comes to the ethical boundaries of AI.

We need to understand the societal, economic and enterprise risks of AI. As a recent paper by Deloitte Omnia AI points out: "To ensure Canada reaps the benefits of AI in the years to come, it's vital that Canada's businesses and governments work together to [...] develop the controls, rules, and practices necessary to address legitimate concerns about the impact of AI on our society."[56]

In helping to set the controls, CPAs must ask key questions to ensure they're positively shaping the development of AI in ways that are consistent with protecting the public good:[57]

- What controls can we put in place to help guard against breaches of privacy in the use of AI algorithms?
- What can CPAs do to help reduce bias in AI algorithms that unfairly discriminate against certain communities?
- How can we help build AI applications that reflect the values of the societies in which the applications are being used?
- What is our role in shaping AI applications designed to automatically report on companies and their financial statements?

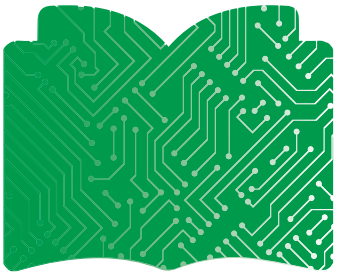
AI does not define or replace the critical skills of judgment, problem solving, strategic planning and professional skepticism in the CPA toolkit. AI is, after all, a tool used by CPAs - used correctly, it amplifies those core skills. CPAs know their companies, clients and firms far better than any machine and, by using AI as a tool, the insights CPAs bring to their work will only increase and improve.

"In the coming decade, the demand for talented individuals with management skills and knowledge of advanced AI applications will continue to grow exponentially."[58]

— *Murat Kristal, program director, Master of Management in Artificial Intelligence, York University, Schulich School of Business*

PART 4:

AI SKILLS AND THE CPA CURRICULUM



IMPLICATIONS FOR SKILLS

A Growing Demand for AI Skills

According to Igor Perisic, Chief Data Officer for LinkedIn, jobs calling for AI skills increased by 190 per cent between 2015 and 2017.[59] The demand for AI skills is growing rapidly across industry, with employers increasingly looking for professionals with a broad and dynamic range of hard and soft skills. AI is taking on greater influence in virtually every facet of business and, increasingly, in government.[60] Though the full effects of emerging technologies on our profession are still uncertain, what is certain is the need for CPAs to have a rising degree of proficiency with AI technologies to stay ahead of the curve.

Demonstrate Your Ongoing Relevance

The collaborative nature of AI creates opportunities for enterprising CPAs to work with data scientists and other colleagues to understand the potential of these emerging technologies and to gain experience in using AI tools.

With knowledge of AI, CPAs can work with algorithms to enhance their own assessments around data input quality and the reasonableness of outputs while enhancing their management of risk. CPAs can then build on these richer analyses to create added value, both for their clients and for their organization.

Take Steps to Learn More About AI

To prepare for the oncoming wave of AI, Jon Raphael, CPA, Deloitte's National Managing Partner for Audit and Assurance in the U.S., said CPAs should gain database and IT skills by taking on specialized projects in their workplace, attending seminars, completing self-directed learning, and taking classes. "We don't want to have people relying on an [AI] tool blindly,"[61] he said. His advice applies to CPAs everywhere, including here in Ontario.

Steps you can take to learn more about AI:

- attend courses and enrol in self-learning online programs
- listen to AI podcasts
- seek work opportunities to learn about and deploy AI
- help create the business case for, then take an active role in, a focused and small AI project from which you and your colleagues can learn
- remain current on the latest accounting trends and industry news, especially as it relates to AI and emerging technologies.

AI Means Different Things at Different Career Stages

For every CPA, learning to use AI is a journey that requires a combination of practical experience, experimentation, lifelong learning and networking.

As AI takes over more routine tasks, it could also, in effect, reduce (if not eventually eliminate) the ability and necessity of novice CPAs to do those tasks themselves. As a result, they may not get experience in consolidations, for example, as there may be little need to do them manually in the future.

Emerging CPAs

Upwards of four million Canadian youth entering the workforce over the next decade will need a broad foundation of skills that sets them up for many different jobs and roles rather than a single career path.[62] While still in school and in their early career years, emerging CPAs should therefore focus on two things: they should develop a keen understanding of how emerging technologies, such as AI, can be used in our profession, and be able to analyze the impact of emerging technologies on the organization, a specific role, or a functional area; and they also need to hone their enabling competencies such as leadership, collaboration, creativity and problem resolution.

This likely means that emerging CPAs will take on more responsibilities at an earlier age than was the case for junior CPAs in the past. It also means they will have to develop their skills in evaluating data quality and accuracy (inputs), as well as those in evaluating data analysis for decision making (outputs). In addition, emerging CPAs will likely need to assess the impact of the use of emerging technologies on enterprise risk and develop appropriate risk management strategies.

Experienced CPAs

Mid-career CPAs must be able to marry their considerable business experience with knowledge of AI in order to best determine the highest ROI use cases for AI development. Attending technology boot camps and perhaps completing post-secondary courses for intensive AI-related training can help. Across Ontario, most major universities and post-secondary institutions are responding to the growing demand for AI skills in our labour market and now offer a range of certificates, degrees and diplomas on the foundations and economic implications of AI.

The potent combination of experience and AI skills makes experienced CPAs more valuable as accounting professionals, business leaders and trusted advisors. With some understanding of AI, experienced CPAs can work more effectively with colleagues in such areas as data analytics in leveraging AI tools. In the words of Ofer Shai, National Director of AI at Deloitte Canada: “Use your experience to shape the future.”[63]

What’s more, they will also make different judgments based on the different data available to them now compared with the early career experiences of established CPAs. This, in turn, signals the need for active involvement by the latter in mentoring and managing the former, in a collaborative and symbiotic fashion. AI will not only expand within our profession, it will very likely expand our profession.

Organizational talent pool

Employers interested in leveraging AI increasingly will need to hire specialized computer scientists, data analysts and software engineers who are able to write and train AI algorithms and manage the technology. CPAs who understand the business implications of AI have a crucial role to play in bridging the comprehension divide between the technology and business sides of an organization. Successful adoption of AI within our profession needs a sustained commitment by top-level leadership to invest in AI-based training for CPAs.

AI AND THE CPA CURRICULUM

We know prospective students rate technology high when deciding on which credentials and career paths to pursue. Emerging CPAs are, and will continue to be, interested in our profession knowing that their investments of time, money and energy will be valuable and applicable in an era of considerable technological disruption. Our curriculum, therefore, has to engage and set them up for long-term success. The curriculum also needs to be flexible enough to allow for retraining and upgrading skills for mid-career CPAs to add technical proficiencies to their considerable experience as accountants and business leaders.

To ensure the continued relevancy and value of our designation, the CPA Competency Map is evolving and CPA Ontario is evolving with it.

Three Steps to an Evolving Curriculum

Technology is evolving fast, and so must we. By listening to our CPAs and responding to industry, we are taking the following steps in our pre-certification competency map to better align the curriculum with the needs of an AI economy:

1) Increase proficiency levels

The current Competency Map, which lays the foundation for the CPA certification program, has technology-oriented competencies such as those related to Information Systems at a lower expected level of proficiency for newly qualified CPAs. We are committed to change in this area. We must expect newly qualified CPAs to do more than just explain emerging technologies – in large part because employers have clearly indicated that CPAs must at least be able to analyze the impact of emerging technologies on their given role or organization. Changes in this regard will be addressed as early as the next version of the Competency Map in 2020.

2) Enhance enabling skills

Research on skills development consistently points to the importance of enabling skills such as leadership, collaboration, continuous improvement, problem solving and decision making. The profession is working on ways to incorporate more of these enabling skills into the curriculum, with a view towards publishing the appropriate changes in the next version of the Competency Map in 2020.

Although it is important, identifying required competencies is not in and of itself sufficient. As a profession, we have to critically assess whether the CPA Certification Program needs to increase the weighting of the enabling competencies within the program. That work is also underway.

3) Optimize curriculum components

While CPAs have to be both broader and deeper in their skill sets as AI becomes more pervasive, the answer is not found in simply adding more courses to the existing curriculum – the courses need to be of the utmost relevance to the profession and to the future roles of CPAs. Increasing technical proficiencies around emerging technologies and potentially adding greater emphasis and weight to enabling skills means that other technical competencies likely will have to come out.

It is key to determine to determine and develop core technical competencies that are transferable, so that CPAs can then apply these skills and understanding to current and future technologies.

Our goal here is to make the overall curriculum more streamlined to reflect the rapid pace of change in today's economy without compromising in any way the rigour of the curriculum and the overarching principles of oversight and mentorship that still apply to our pre-certification program.

Continuing Professional Development and AI

Our Continuing Professional Development (CPD) program will evolve so that all CPAs place greater emphasis on enabling skills that allow them to be more proficient with AI and related technologies. Part of this could be a self-directed requirement to learn more about AI through online courses, seminars and podcasts, for example.

Our diverse members deserve as much support as possible on matters relating to AI as the profession tries to understand and incorporate this technology tool into our CPAs' work as business leaders, strategic thinkers, trusted advisors and financial experts. That's why we are working very closely with our members and industry partners to evolve our course offerings and certification programs in ways that will continually attract, prepare, graduate and ultimately heighten the skills of CPAs and make them relevant to the needs of a rapidly changing world.

CONCLUSION:

OWNING THE FUTURE

AI doesn't replace jobs, it replaces routine tasks. AI enables us to do more, better and faster. It empowers CPAs to do what CPAs do best. By freeing up time to focus on analysis and strategy, AI places a premium on the transcendent CPA skills: professional judgment, problem solving, big picture insight.

AI presents immense opportunities for CPAs. But this AI opportunity is not going to just be handed to anyone.

CPAs need to work to understand the foundations of AI and how it can be used as a powerful tool. They need to upskill and develop AI learning. Just as CPAs incorporated other innovation-based change into their roles in the past – such as the introduction of spreadsheets – they will again need to incorporate this new technology into their jobs in order to survive and thrive.

Ontario owns a unique part of the history of AI. We need to own the future of AI too. CPAs can play a vital role in expanding the understanding and usage of AI in workplaces across the province, to help innovate, create jobs, attract talent, and keep our province at the global forefront of AI advances.

To remain relevant to employers and clients and to continue to continue to protect the public interest, CPAs need to embrace AI. Those who don't may well get left behind.

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