

# AI and Machine Learning for Complex Business Decision Making



## PART 4-DATA AND TRUST

In **Part 4** of this six-part series of 10-minute reads, we present highlights of the [2020 MMPA Conference](#),<sup>1</sup> **AI and Machine Learning for Complex Business Decision Making**, to illustrate the versatility and ubiquity of new digital technologies and to spotlight CPAs' changing competencies and emerging opportunities.

[Part 1-From Excel to AI: The Analytics Evolution](#) looks at the **analytics evolution** and the way CPAs in finance and audit need to adapt their analytics skillset to keep up with this rapidly changing field.

[Part 2-Technology for Problem Solving](#) warns against the **digital transformation trap**: losing sight of problem solving and, instead, following the lure of technology. How should CPAs assess AI technology and **value creation**?

[Part 3-Systems Thinking and a Framework for Applying AI](#) looks at **systems thinking** – a critical-thinking competency for CPAs – and a **framework** for applying AI and machine learning to complex business decision making.

Here, [Part 4-Data and Trust](#) examines **data management value chains**, new roles for CPAs and initiatives to ensure that data and AI systems are used fairly, accountably and transparently.

1 The 2020 MMPA Conference was hosted by the Master of Management & Professional Accounting (MMPA) Program and BIGDataAIHUB at the Institute for Management & Innovation (IMI), University of Toronto at Mississauga (UTM). The MMPA Program combines an MBA curriculum with the development of technical and leadership skills vital for the accounting profession.

[Part 5 - Humans, Machines and Humachines](#) focuses on **human skills**. It introduces AI-augmented intelligence in emerging organizations called **humachines** and the way CPAs' human and technical skills can play a role in commercializing Canada's AI start-ups.

[Part 6 - Moving to an AI Advantage](#) looks at the way companies move to an **AI advantage** and steps CPAs can take to be future ready.

## PART 4 - Data and Trust

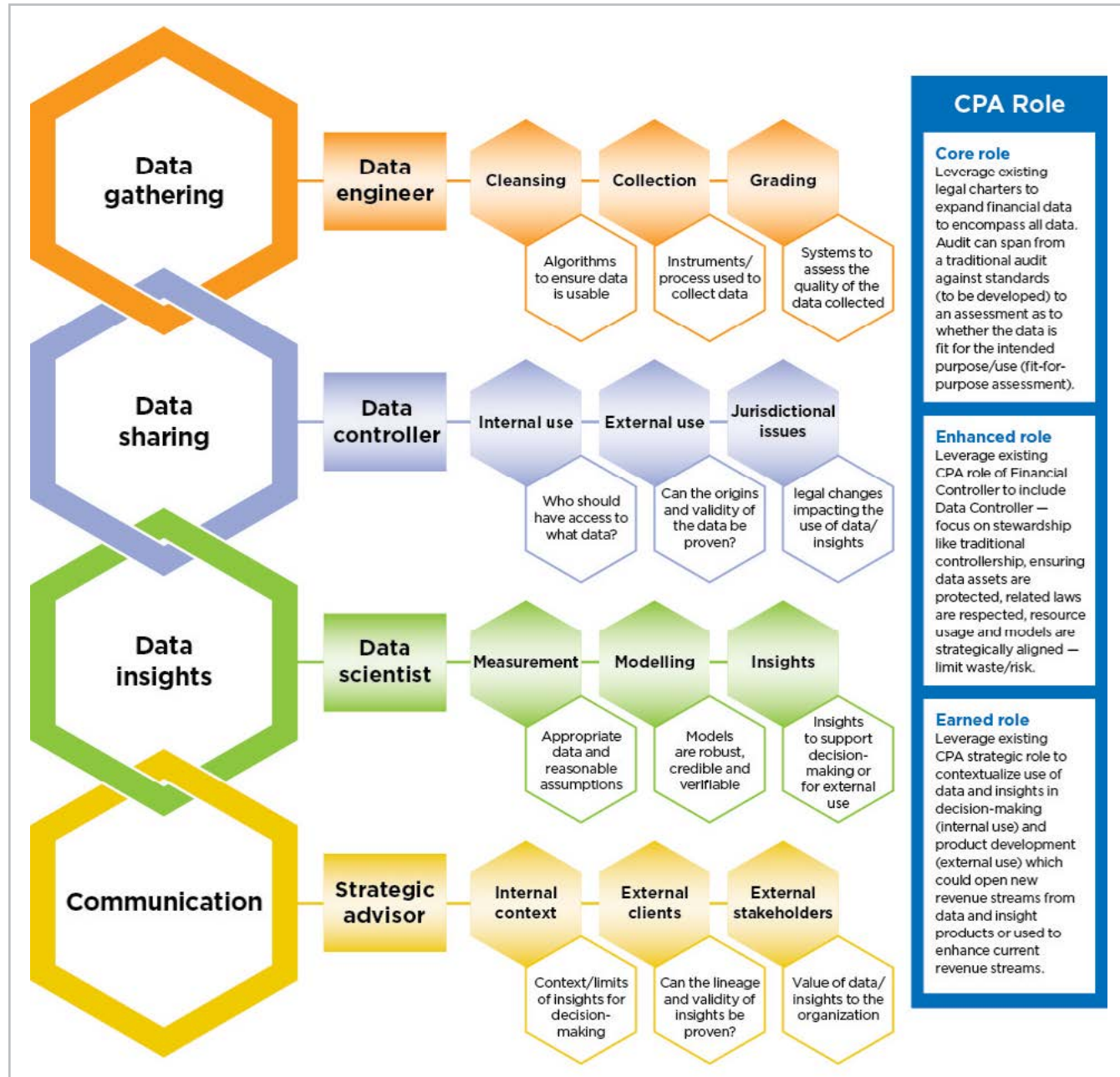
Historically, accounting roles have supported industrial-age value chains that deal with **tangible** assets. In this section, [Michael Lionais](#) looks at how CPAs could support the functions associated with **data management value chains** that support **insights from data**.

### Data Management Value Chains and Roles for CPAs

Data management value chains are about creating data-driven outcomes. Examples of possible outcomes could range from insights to guide development of a new product or business strategy, to the streamlining of a specific workflow with [an AI] solution that performs routine decision making. A data management value chain (see [Figure 4.1](#)), consists of processes associated with gathering, sharing, analyzing and communicating insights arising from data.

IFAC & CPA CANADA, 2021, p. 11

FIGURE 4.1: DATA MANAGEMENT VALUE CHAIN



Source: Professional Accountants' Role in Data, p. 6

CPAs have potential roles in these processes to support the functions of data engineer, data controller, data scientist and context setter/strategic advisor. CPAs don't need to become computer scientists, Lionais contends, but they do need to understand data analytics, big data and the logic of programming. "Accountants have always been data processors," says Lionais, "so they need to adapt that skillset."

**Data engineers** collect, cleanse and grade data to assess the data and to determine how the data can be used. *CPAs could answer: Are purchased data certified? Fit for purpose? Are data limitations understood? CPAs could make sure that data collected or purchased are fair, representative and serving the public interest.*

**Data controllers** are **data stewards**, much like financial controllers. The controller protects the data of the organization from compromise, aligns data to legal and ethical frameworks, certifies the provenance of the data for internal or external use and ensures data does not become a liability. *CPAs could ensure that the data is appropriately stewarded, much like a system of internal control that is documented, tested and monitored.*

**Data scientists** use cleansed, graded data as input to models structured around decision making to generate insights. They must understand the data's strengths and weaknesses, and the assumptions made to compensate for gaps in the data. If the assumptions are invalid, then anything generated by the model could be invalid. *CPAs could ensure that models are – and remain – strategically aligned and ensure that assumptions are documented. Strategic thinking is all about integrated thinking. CPAs could act as integrators and **translators** between business problems, data analytics and data.*

**Context setters** or strategic advisors understand the organization's internal context, including assumptions behind insights and the validity of insights for either decision making or product development (e.g., selling insights). *CPAs could ensure that decision makers understand the data insights – both strengths and limitations – and do not use low-quality data for decisions that require more precision. For example, when a complex problem is simplified and solved as a complicated problem, decision makers must be told where the model is failing so that generated insights are used as data points, not directives. Enhanced trust could be placed on accountants by decision makers if accountants could explain the strengths and weaknesses of a model and show that its insights must be contextualized.*

The potential roles for accountants in the data management value chain are explored in more detail in the 2021 joint IFAC & CPA Canada publication, [Professional Accountants' Role in Data](#).

### COMPLEX VS. COMPLICATED PROBLEMS

“**Complicated** problems differ from **complex** ones” (CPA Canada Foresight, et al., 2021, p. 4). “They are often technical in nature and have linear solutions, the type humans are good at” (Benjamin & Komlos, 2019).

“Although complicated problems are challenging to solve, once solutions are found, they generally stay solved” (CPA Canada Foresight, et al., 2021, p. 4).

“Complex problems, on the other hand, are not solvable by applying static algorithms, rules and processes” (CPA Canada Foresight, et al., 2021, p. 4). “These problems are what machines are good at: multi-dimensional problems that cannot be solved with linear thinking [...] For example, fixing a car is complicated; disrupting the automotive industry is complex” (Benjamin & Komlos, 2019); “implementing a new policy is complicated; transforming a company's culture is complex” (Speaker Michael Lionais).

“Complicated thinking is the default managerial approach, but treating a complex problem as though it were complicated leads to costly mistakes and potentially disastrous unintended consequences” (CPA Canada Foresight, et al., 2021, p. 4).

Trusting data is crucial, especially in the finance sector. (See [Part 1's Use Case: Technology in Banking Services](#).) The next section outlines actions to achieve that trust.

## Gaining Trust in Data and AI Systems

The [IEEE](#), the world's largest technical professional organization, is developing “playbooks” for smart cities, healthcare and financial services, to ensure that data and AI systems are used fairly, accountably and transparently.

### IEEE Financial Playbook

[The IEEE Trusted Data & Artificial Intelligence Systems \(AIS\) Playbook for Finance Initiative](#), known as the **IEEE Financial Playbook** for short, is a new global standard approved by the IEEE Standards Association on June 4, 2020.<sup>2</sup> [Pavel Abdur-Rahman](#) describes the initiative.

The mission of the **IEEE Financial Playbook** is “to ensure every stakeholder involved in the design and development of autonomous and intelligent systems is educated, trained, and empowered to prioritize ethical considerations so that these technologies are advanced for the benefit of humanity,” says Abdur-Rahman. The **Playbook** incorporates **ethically aligned design** principles from the IEEE report of the same name,<sup>3</sup> meaning that ethics are considered at the beginning of the process, not as an afterthought, explains Abdur-Rahman.

The **Playbook** is one step on the journey to achieving trusted AI (see [Figure 4.2](#)). It will “curate, summarize, and contextualize trusted data and AI best practices for the financial sector around design principles, standards, and certifications. The first edition [...] will focus on a wide range of use cases including [...]: loan and deposit pricing, personalized marketing offers, credit adjudication optimization, customer sentiment tracking, customer lifetime value used in retail banking, and robot advisors” (IEEE SA, 2020). It will align with anticipated European, Singaporean and Canadian monetary regulatory authorities and policy frameworks (IEEE SA, 2021) (AI HLEG, 2020).

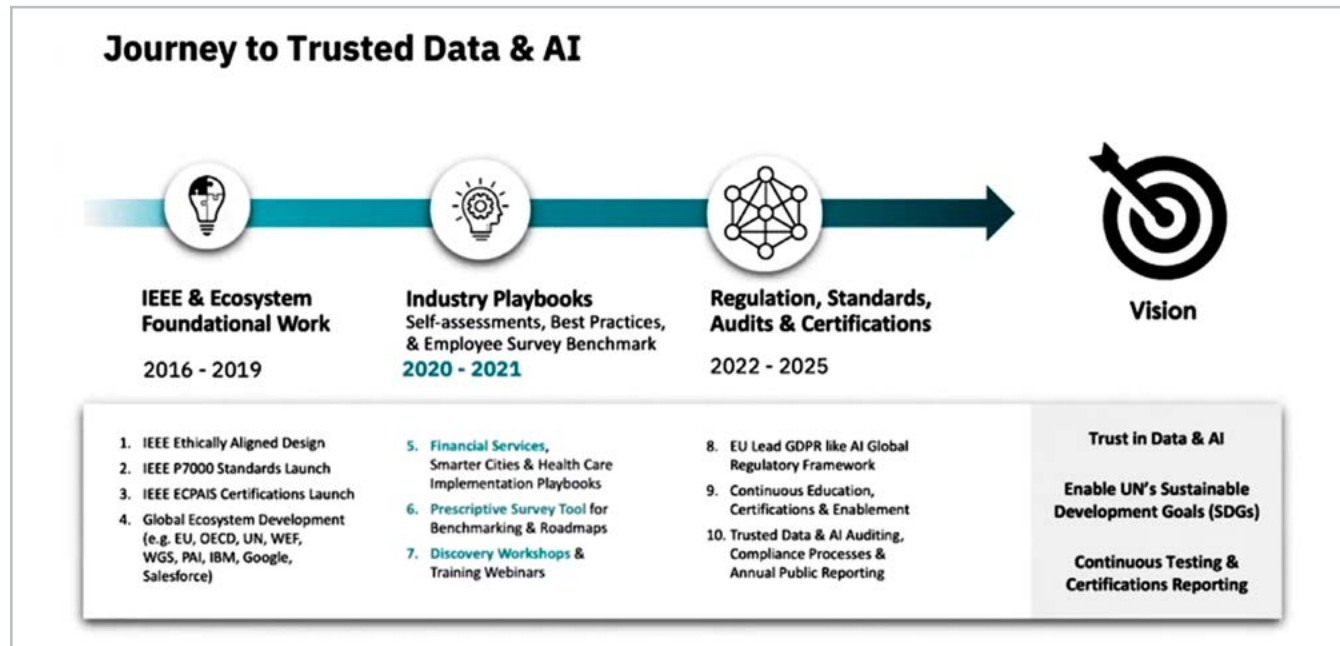
The vision is to achieve trust in data and AI by 2025, says Abdur-Rahman.

2 See IEEE Standards Association (IEEE SA). (2020, May 7). *The IEEE Trusted Data & Artificial Intelligence Systems (AIS) Playbook for Finance Initiative: Industry Connections Activity Initiation Document (ICAID)* [Version: 1.0, 7 May 2020; IC20-008-01, Approved by the IEEE SASB 4 June 2020.].

3 See IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. (2019). *Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems (First edition)*. IEEE.



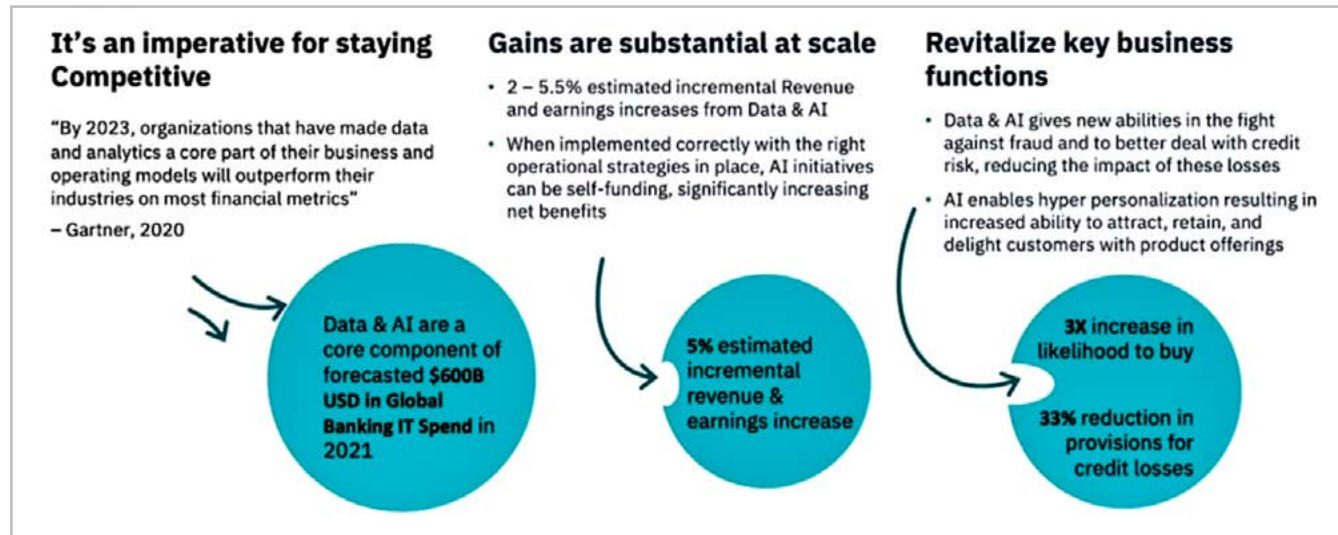
FIGURE 4.2: JOURNEY TO TRUSTED DATA &amp; AI



Source (modified): Speaker Pavel Abdur-Rahman and IBM

Financial services must use **trusted data** and implement **trusted AI** to stay competitive, increase revenue and revitalize key business functions, explains Abdur-Rahman (see [Figure 4.3](#)). Every path to value in financial services is dependent on data and AI, because creating value in the banking industry is all about Analytics 4.0. (See [Part 1's Use Case: Technology in Banking Services](#).) The **Playbook** will ensure that paths to value are ethically aligned.

FIGURE 4.3: TRUSTED DATA AND AI ARE ESSENTIAL TO FINANCIAL SERVICES



Source (modified): Speaker Pavel Abdur-Rahman

### Proposed Canadian legislation

In the past, consumers trusted traditional banks to hold their money. Now that money is becoming just an electronic concept, will consumers trust banks' algorithms and AI with their personal data?

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Trust in institutions is important. Betraying that trust will now have more serious consequences in Canada. Proposed federal legislation, [Bill C-11](#), if passed by Parliament in 2021, will replace Canada's existing privacy legislation, the *Personal Information and Protection of Electronic Documents Act* (PIPEDA), with a new *Consumer Privacy Protection Act* (CPPA) to bring Canada's privacy regime into the digital age. Among the provisions of the legislation are new transparency requirements that will apply to automated decision-making systems that make predictions. "Individuals would have the right to request that businesses explain how a prediction, recommendation, or decision was made by an automated decision-making system [...] and how the information was obtained," says Abdur-Rahman, noting that the legislation also provides for substantive monetary penalties for failure to comply.

[Part 5](#) in this six-part series focuses on **human skills**. It introduces AI-augmented intelligence in emerging organizations called **humachines** and the way CPAs' human and technical skills can play a role in commercializing Canada's AI start-ups.

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