Tax function of the future

Spotlight on:

How Tax is leveraging AI — Including machine learning — In 2019

The Tax Function of the Future series spotlights topics relevant to Tax with a practical focus on what Tax needs to do now to operate successfully in an increasingly complex tax and business environment.

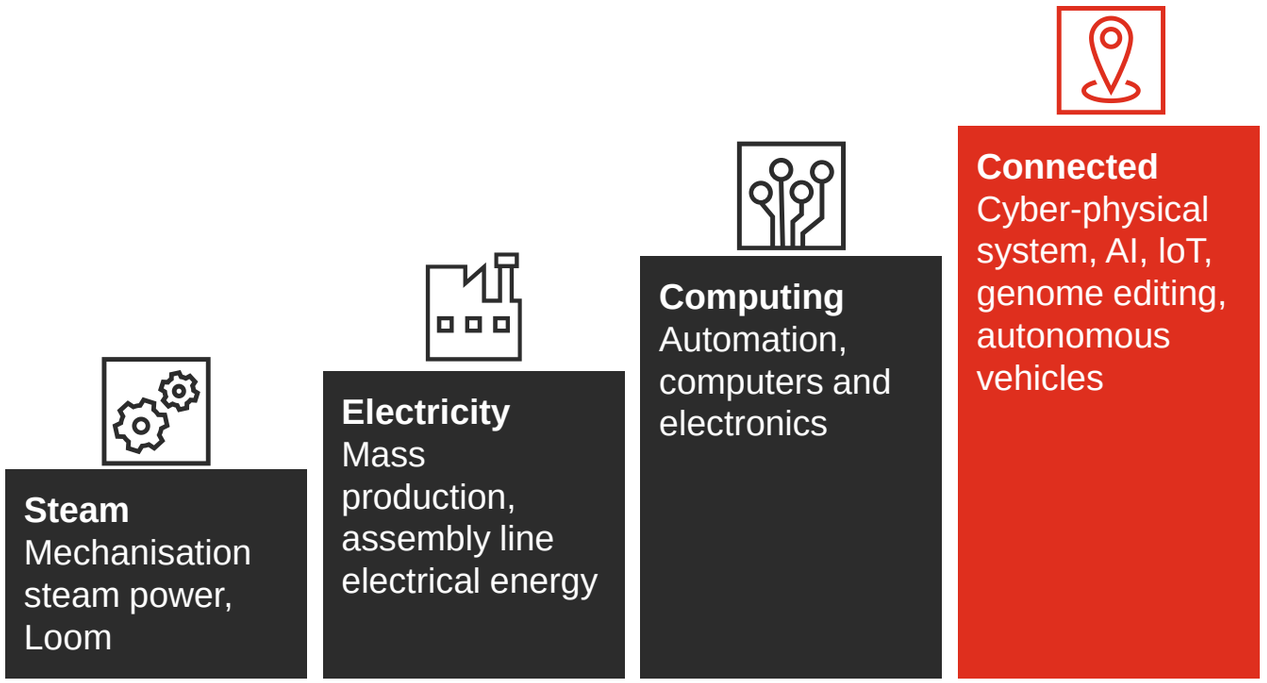
The Tax Function of the Future series predicted challenges and offers solutions that Tax functions may face now or in the future. Our prior papers presented insights on topics ranging from new legislative and regulatory challenges to evolving tax operating sourcing models with emphasis on implications for technology, data, people, and process.

For more information on our predictions for the Tax Function of the Future, please visit https://www.pwc.com/gx/en/services/tax/publications/tax-function-of-the-future.html.

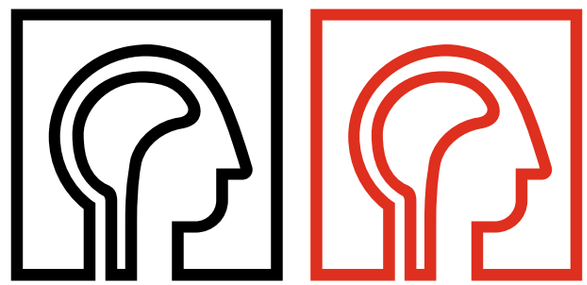
When Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, wrote in 2016 that we were at the beginning of a revolution that would fundamentally change the way we live, work, and relate to each other, he likely did not conceive that we would make such dramatic advancements in only three years.

In The Fourth Industrial Revolution, Schwab describes this period as characterised by use of various technologies, such as AI (artificial intelligence), blockchain, and the IoT (Internet of Things), that connect the physical, digital, and biological worlds, impacting all industries, functions, and economies.

Based on PwC's 22nd Annual Global CEO Survey (2019) CEOs rank technological advances as the megatrend that transformed their businesses the most over the last five years.



In fact, Schwab foresaw that the Fourth Industrial Revolution would even cause us to question and challenge what it means to be human. And, he warned that such an exciting opportunity for positive change could have negative repercussions if not handled responsibly.



AI and its enterprise applications

Indeed, the Fourth Industrial Revolution is now upon us – We are experiencing rapid technological change that is affecting all areas of life and work – and its impact extends to enabling areas such as Finance and Tax with increasing use of emerging technologies such as AI and machine learning, blockchain, and 3D printing. These solutions are being used to drive innovation, develop new business models, products, and enhance the data and analysis needed to enable insightful decision making.

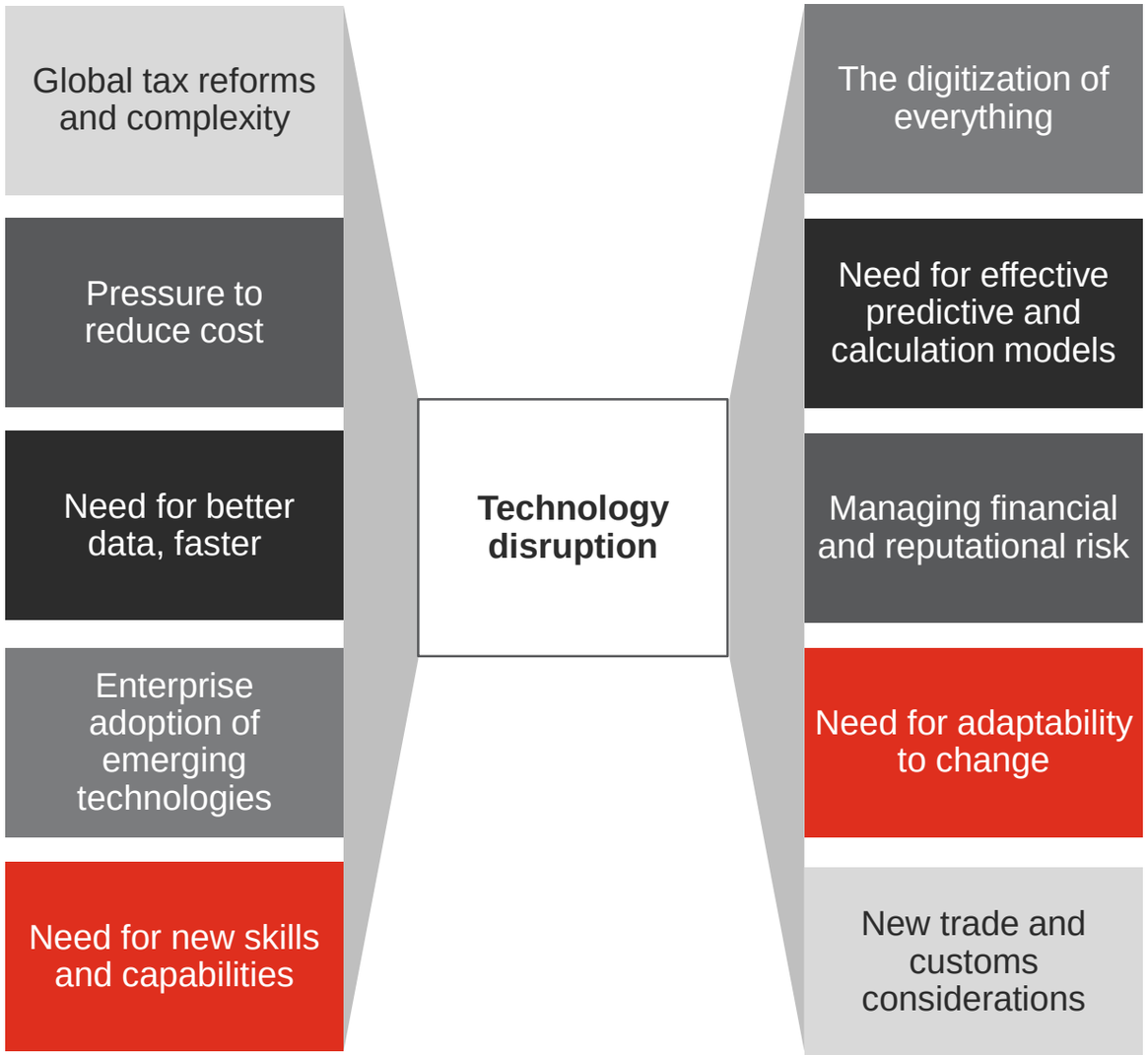
What distinguishes AI from other emerging technologies? AI is the ability of a machine to perceive its environment and perform tasks that normally require human intelligence. In only a relatively short time, AI has been developed with the ability to sense, think, and act in ways that can out-perform human capability.

Sense	Think	Act
AI can see, hear, speak, smell, feel, understand gestures, and even interface with your brain	AI is helping us **make better decisions** – and doing it faster, better, more cheaply, and more accurately	AI is **equaling or surpassing humans** in all sorts of tasks - playing games, driving cars, and making recommendations
Natural language	Knowledge and representation	Intelligent automation
Audio and speech	Planning and reasoning	Deep question and answering
Machine vision	Machine learning	Machine translation
Navigation	Deep learning	Collaborative systems
Visualization	Simulation and digital twins	Adaptive systems

Why does tax need AI now?

Internal and environmental challenges require Tax to be nimble and accurate in providing information the enterprise needs for business decisions as well as complying with increasingly complex rules and calculations for tax jurisdiction reporting.

Key challenges facing tax



Technology trends

Tax needs to consider innovative ways to collect and process financial data, moving away from manual manipulation and reconciliation to more forward-thinking analytics for real-time decision-making.

The recent trend towards **'small' automation** empowers Tax professionals to be innovative without the need for big IT involvement, using Extract, Transform and Load (ETL) solutions for pulling and analyzing source system data. **Visualization tools** are also being used to enhance the quality and dynamic display of data for dashboard and presentation purposes. However**, AI has the power to do so much more.**

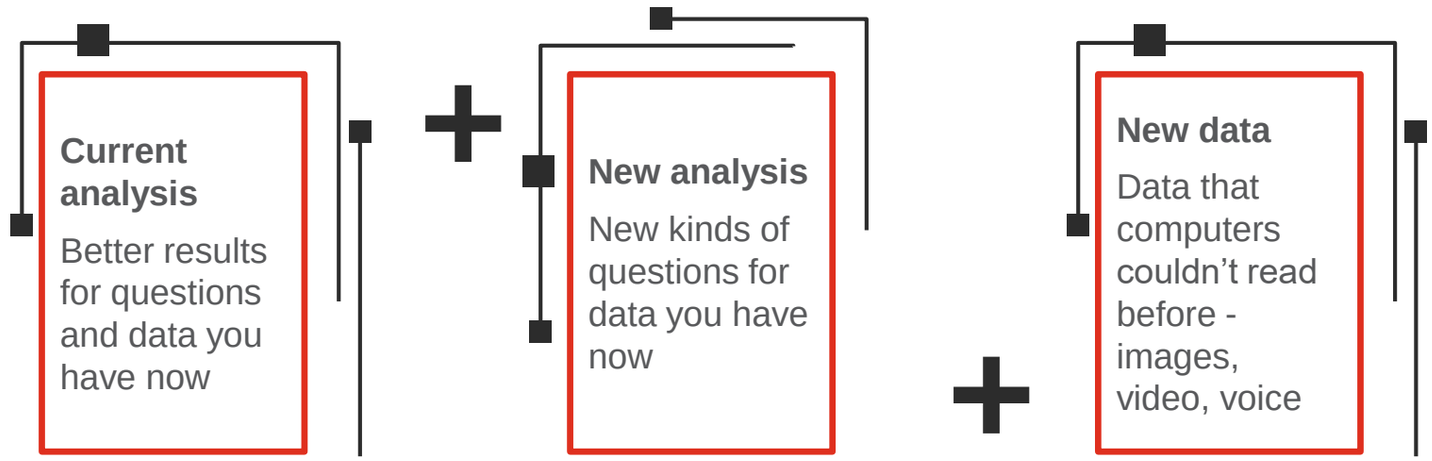
How tax benefits from AI

AI allows detailed, accurate data from new sources to drive more in-depth questions, answers, and analyses that would previously be difficult, time-consuming, or even impossible to accomplish. AI can also perform structured or unstructured tasks, mimicking the actions of humans, but with greater speed and accuracy. These transformative capabilities apply throughout the tax lifecycle from planning to compliance reporting, and controversy.

1. Data manipulation:

Reading, understanding and manipulating data

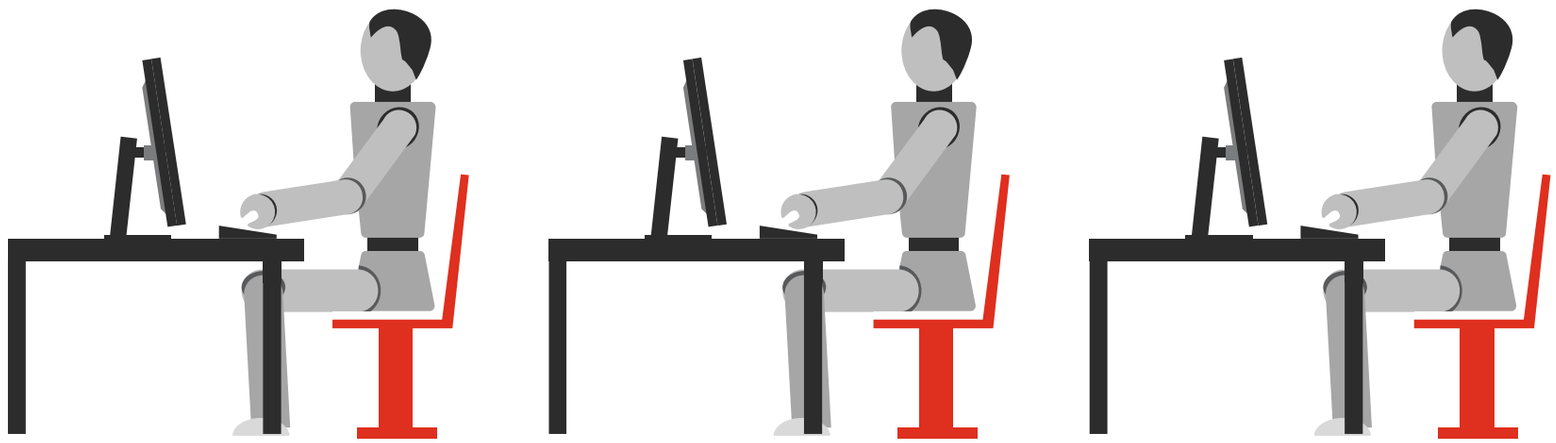
AI can enable tax data strategy at a time when availability to more granular data is needed to respond to tax **complexity**, governments' increasing demands for **transparency**, and to **manage financial and reputational risk.**



2. Taking action:

'Automated interns' Performing structured and unstructured tasks

With AI, a digital workforce can be constantly available to support Finance and Tax, improving **efficiency** and **effectiveness.**



Practical AI applications for tax

Much has been said about how AI can be used in business; however, what are the actual tax activities that AI can facilitate?

Sensing

- **Natural language processing**: Understanding the meaning of written text.
  - Tax data extraction
- **Audio and speech**: Understanding the meaning of spoken words.
  - Voice to text translation
- **Machine vision**: Recognizing the patterns and "features" in scanned documents. This capability can be used to digitise materials including tax forms, notes, and contracts.
  - Scanned tax form data extraction

Thinking

- **Machine learning:** Applying statistical learning techniques to automatically identify patterns in data. These patterns can be used for accurate predictions.
  - Trial balance and transaction account classification
  - Predictive models for planning and forecasting
  - Determining the tax implications of transactions
  - Scanned tax form data extraction

Tax use case: Tax notice processing

Tax notices are an unstructured data problem. PwC leverages AI to extract key terms from this unstructured data in various federal, state, and global tax notices to automate tracking and preparation of responses. Data annotation is the first step to help the machine understand what key terms are to be extracted from tax notices. The following AI capabilities apply:

- **Natural language processing:** Converting scanned tax notice images to text
- **Machine Vision:** Understanding the text and extracting specific data

Tax use case: Account classification

Account mapping is a classification problem. PwC leverages AI to predict trial balance and transaction account names, mapping to a PwC taxonomy for a variety of purposes including the calculation of tax adjustments where affected book income or expenses are spread across multiple accounts. The following AI capability applies:

- **Machine learning:** Human in the loop classification algorithm

Practical AI applications for tax (cont'd)

Acting

- **Robotic Process Automation (RPA):** The simplest form of AI, mimicking human actions by executing pre-programmed rules on mostly structured data.
  - Performing structured tax accounting and compliance activities
- **Cognitive automation:** Making inferences based on information contained in unstructured data.
  - Making determinations such as levels of tax risk
- **Deep question and answering: Answering specific questions by searching a large database of compiled information.**
  - Research and data gathering/documentation

Tax use case: Tax compliance and reporting

Tax compliance and reporting is a standardisation problem. PwC leverages AI in combination with RPA to perform structured and unstructured income tax compliance activities. Structured, routine, manual activities include gathering trial balance data from source systems, preparing routine book/tax adjustments, completing forms, and posting tax accounting entries. The following AI capability applies:

- **Robotic automation (RPA):** Mimicking human behavior in desktop or web based applications to perform tax compliance and reporting activities

Tax use case: Tax chatbot

Tax guidance is a question/answering problem. PwC leverages AI for understanding the natural language of tax questions and leading the user to the appropriate answer based upon the intent of the question. The chatbot uses PwC curated knowledge bases and is able to respond quickly and efficiently to tax related questions. The following AI capability applies:

- **Deep question and answering:** Deep learning and knowledge bases to understand and respond to tax questions

The responsible AI framework

A responsible AI framework establishes a roadmap that captures important considerations that are crucial to safe deployment of AI. Each phase is designed to ensure proper protocols including alignment with business strategy, incorporating controls for security breaches and bias, training, as well ongoing monitoring of operations against AI program objectives.

Strategy	• Align with business and Tax strategic goals – Avoid separate initiatives operating in isolation
Design	• Embrace transparency around models and calculations • Create a compelling user experience • Embed controls
Develop	• Implement effective program management – Rigorous testing, training and adaptability is needed to manage the complexity of new, innovative solutions
Operate	• Eliminate unintentional bias • Guard against malicious attacks • Monitor quality of data and effectiveness of models • Be mindful of systemic risks and develop an action plan

84% of CEOs in PwC's 22nd Annual Global CEO Survey (2019) say AI-based decisions need to be explainable in order to be trusted.

Moving forward with AI

The world is changing quickly. What we now can accomplish with technology in our daily lives and work is truly astonishing—but we must proceed carefully. Based on PwC's survey of AI-savvy executives, we believe the following six strategies are key to becoming a leader in AI. Tax must work alongside enterprise leadership to bring AI to life in the Tax function.

2019 AI predictions

6 strategies for leading with AI

Structure

Workforce

Reinvention

Trust

Convergence

Data

Structure: Organise for ROI and momentum.

Workforce: Teach AI citizens and specialists to work together.

Reinvention: Monetise AI through personalisation and higher quality.

Trust: Make AI responsible in all dimensions.

Convergence: Combine AI with analytics, the IoT, and more.

Data: Locate and label data to teach machines

For more information on 2019 AI predictions, visit: http://pwc.com/AI2019

Connect with us

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To have a deeper conversation about how these issues and predictions may affect you and your business, please contact:

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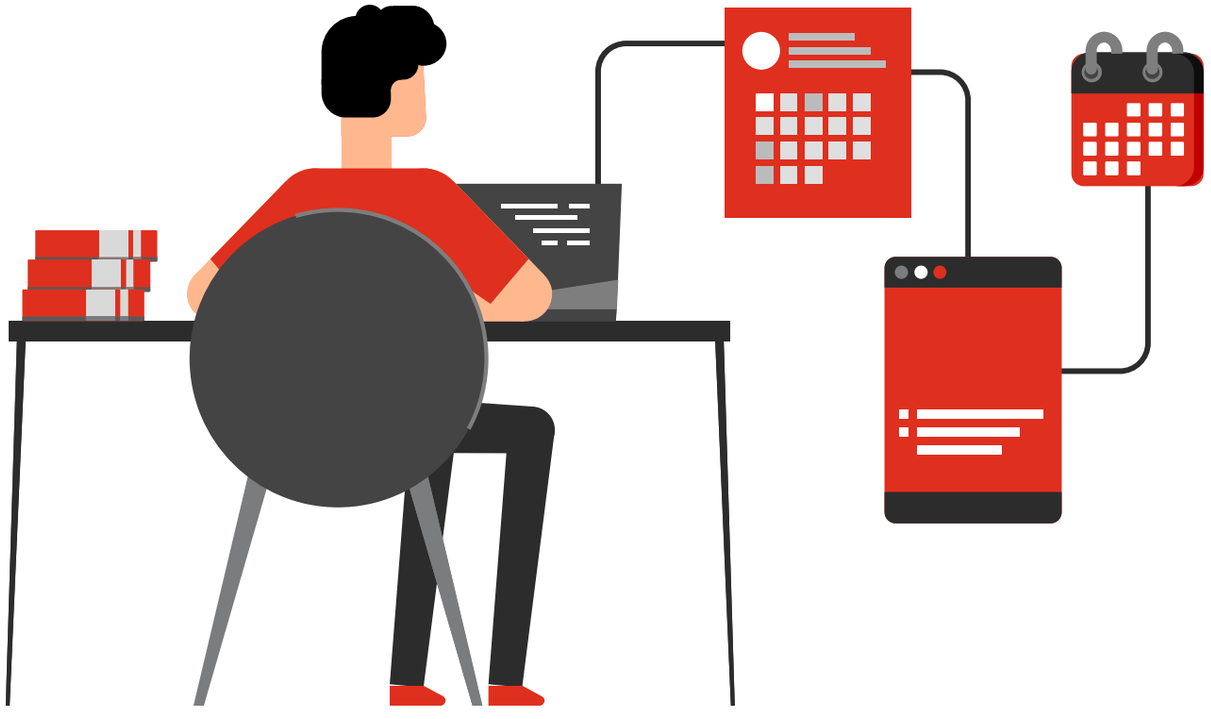
Click here for more information on PwC's Tax Function of the Future series and access additional publications.



Thank you

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