Accounting *IS* Big Data Webinars

How digitization of business is redefining financial reporting

June 6, 2017
2 EDT-1 CDT-Noon MDT-11 PDT

Centers for Advancing Accounting

Accounting *IS* Big Data Webinars

CPE

June 6, 2017

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KPMG

How digitization of business is redefining financial reporting

Quality + Insight = Value

KPMG audit

AAA webinar

June 6, 2017

Presentation agenda

Today's presenters

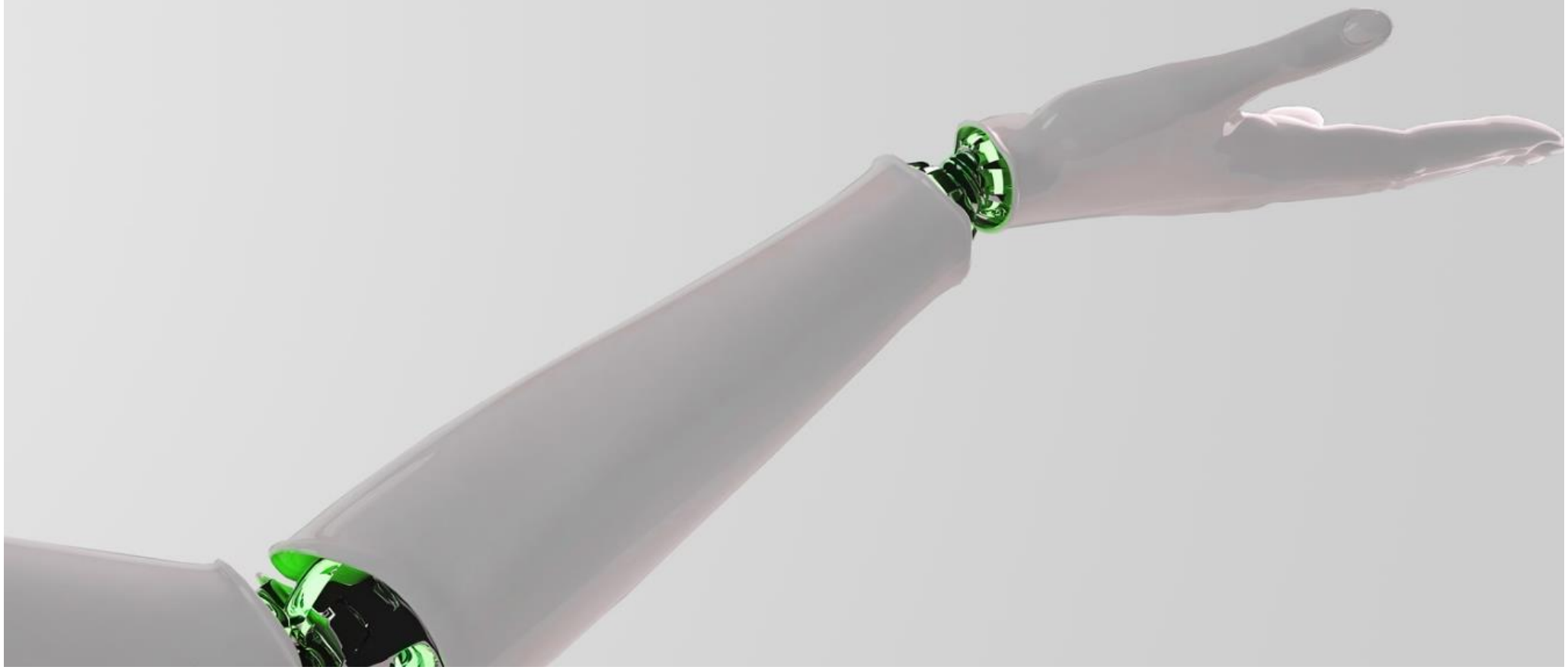
Marc T. Macaulay is KPMG's Cognitive Technology Audit Leader. He is responsible for the development and implementation of a national cognitive technology strategy in support of the firm's Audit practice. Marc is a SEC review partner and has served as the lead audit partner on a number of the firm's most prominent global financial services clients.
Contact: mmacaulay@kpmg.com

Dr. Arvind Sathi is the Chief Architect for KPMG Watson Platform with IBM® and a faculty member with University of California. Dr. Sathi worked under Nobel Prize-winner Dr. Herbert A. Simon and was a pioneer in developing AI solutions at Carnegie Group. Dr. Sathi has led several AI and Data Science programs at IBM and has published four books on analytics – Cognitive (Internet of) Things, Engaging Customers Using Big Data, Big Data Analytics, Customer Experience Analytics. Dr. Sathi is a member of IBM's Academy of Technology. ***Contact: asathi@us.ibm.com***

Presentation summary

This presentation looks at the digitization of business and how artificial intelligence is redefining financial reporting. Artificial intelligence is not just science fiction anymore. Increasingly, AI – also referred to as cognitive technology – is being used in business to improve operational processes and support management decision making, including financial reporting.

This session will explore some of the technological advancements, obtainable insights and key concerns that are part of an organization's digital journey, including those relevant to successfully implementing digital transformation in financial reporting.



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The digitization of business

An explosion of data

How do we obtain decision-relevant information from this explosion of data?

44,000,000 messages processed on WhatsApp

More than **21,000,000** messages sent

More than **430,000** Tweets sent on Twitter

More than **300** Hours of video are uploaded

More than **2,700,000** Video views and **139,000** hours of video watched on YouTube

26 New reviews posted on Yelp

486,000 Photos on WhatsApp

More than **195,000** minutes of Audio Chatting on WeChat

More than **39,300** hours of music Listened

14 New songs added on Spotify

120 New accounts opened on LinkedIn

70,000 Video messages shared on WhatsApp

More than **69,500** hours of Video watched on Netflix

More than **280,000** Snaps sent on Snapchat

More than **100** New Domains Registered

More than **150,000,000** E-mails are sent

More than **18,000** Matches made

More than **95,000** Apps downloaded on Android

More than **48,000** Apps downloaded on iPhone

Around **56,000** photos uploaded on Instagram

9,800 Articles Pinned on Pinterest

More than **2,315,000** Searches on Google

972,000 Daily swipes on Tinder

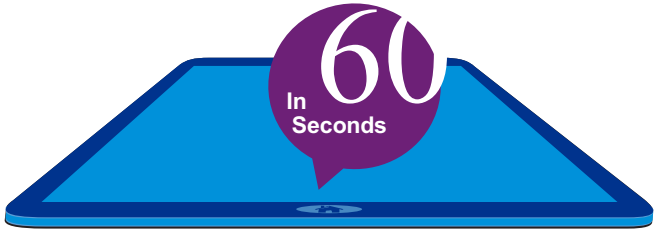
More than **140** Submissions on Reddit

3,125,000

243,055

More than **3,000,000** Items are shared on Facebook

This all happens every 60 seconds!



The answer

Digital tools

Automation

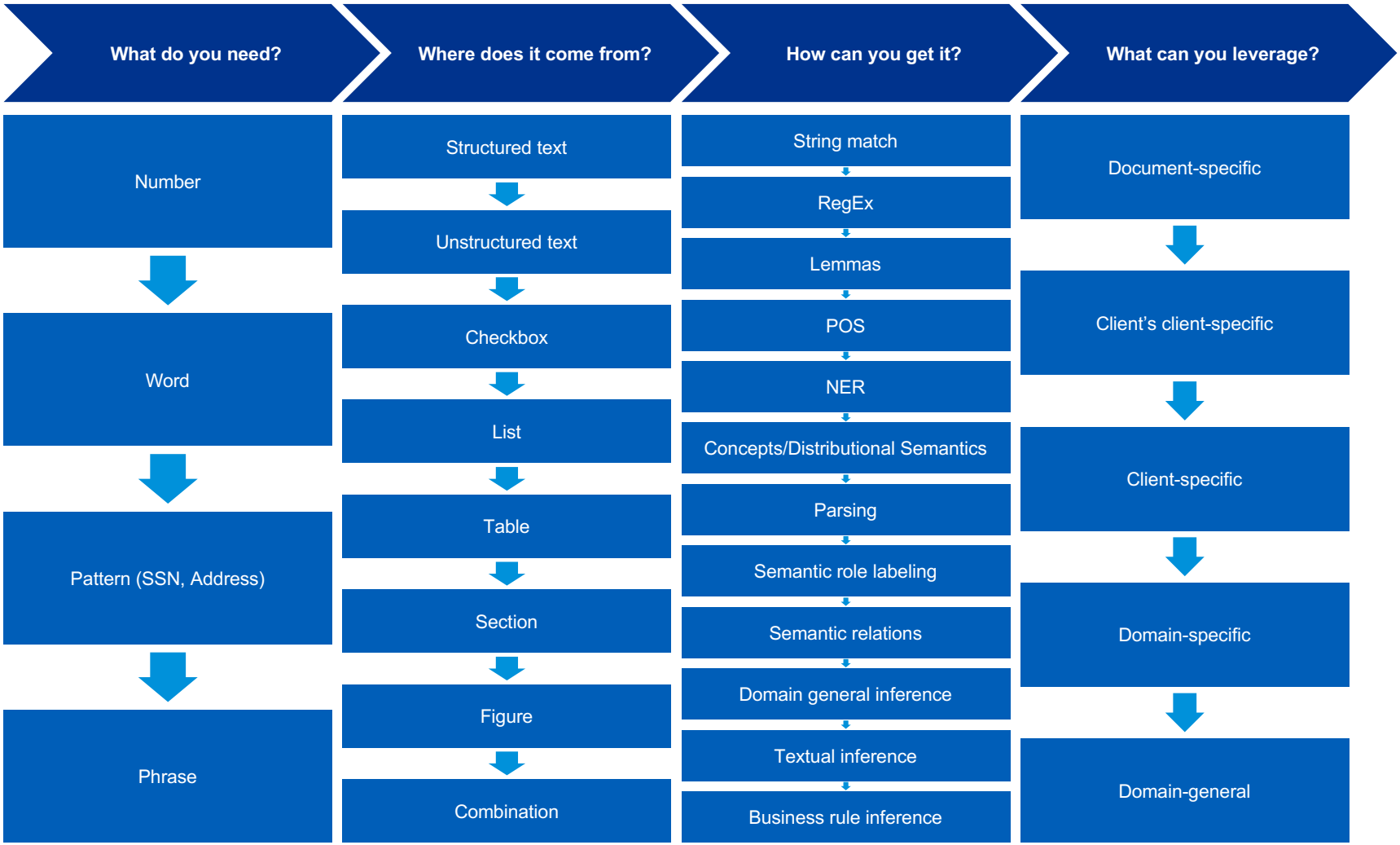
Robotics

Data analytics

Cognitive computing

* Source: Go-Global, website, 2016

Data formats and extraction technologies



Changing the way business is done

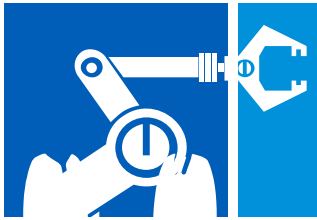
The explosion of data in business has fostered unprecedented advances in digital processing power and the capacity to support decision making across multiple activities and operations.

$152.7

— The global market for robots and artificial intelligence is expected to reach **$152.7 billion by 2020.**
— The adoption of these technologies could **improve productivity by 39 percent.**[1]

— Research indicates a **return on investment** in robotic technologies of between **600% and 800%** for specific tasks.[2]

600% to 800% ROI



— Research suggests that smart robots will replace more than **100 million knowledge workers – or one-third** of the world's jobs – by 2025.[3]

[1]"Robot Revolution – Global Robot & AI Primer" – Bank of America Merrill Lynch 2015
[2]"LSE – The IT function and Robotic Process Automation" – The London School of Economics and Political Science 2015
[3]"McKinsey Global Institute: Disruptive technologies: Advances that will transform life, business and the global economy" – McKinsey & Company May 2013

CEO views on disruptive technologies

65%

of CEOs believe that the next three years will be more critical for their industry than the previous 50 years

39%

of CEOs feel they will be running significantly transformed companies in the next three years

81%

of CEOs believe that their organizations are not keeping up with the emergence of new technologies

Other top concerns

- **76%** New entrants are disrupting their business model
- **66%** Their organization is not disrupting business models in the industry
- **59%** They need to develop an effective strategy to counter convergence in the market

Source: U.S. CEO Outlook 2016 survey: Now or never offers insights into the greatest concerns of CEO's and how they plan to mobilize for the fourth industrial revolution. Findings based on a study of the 3-year outlook of nearly 400 U.S. CEOs, with annual revenues greater than U.S. $500 million; 32% have greater than U.S. $10bn in revenues.

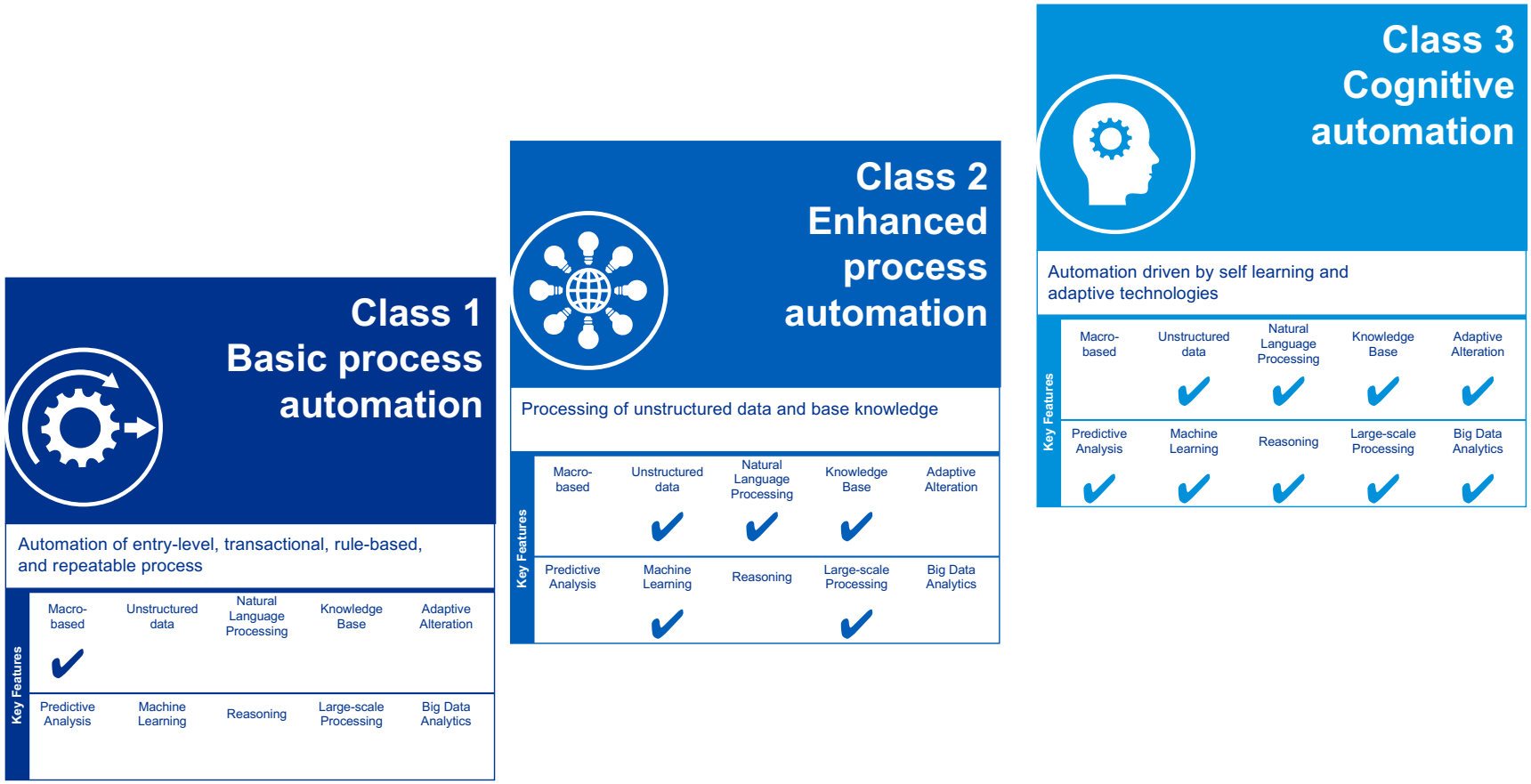
Recent PCAOB commentary

Based on recent remarks by Steven Harris[1] and the March 31, 2017 PCAOB standard setting agenda

Impact on the audit	Matters to consider in possible PCAOB standard changes	Tasks for educators
— Mine and analyze large volumes of data — Test up to 100% of transactions — Automate routine tasks — Identify anomalies and risks — Track and analyze trends and risks against industry and geographical datasets	— New tools being used in audits — Changes to firms' audit methodologies — C&A of data sets — Academic research — Activities of others, including auditing standard setters (e.g., IAASB's data analytics working group)	— Students must have the ability to work with large quantities of data and possess strong analytical skills — Educators must teach students the skills needed for changing audit environment

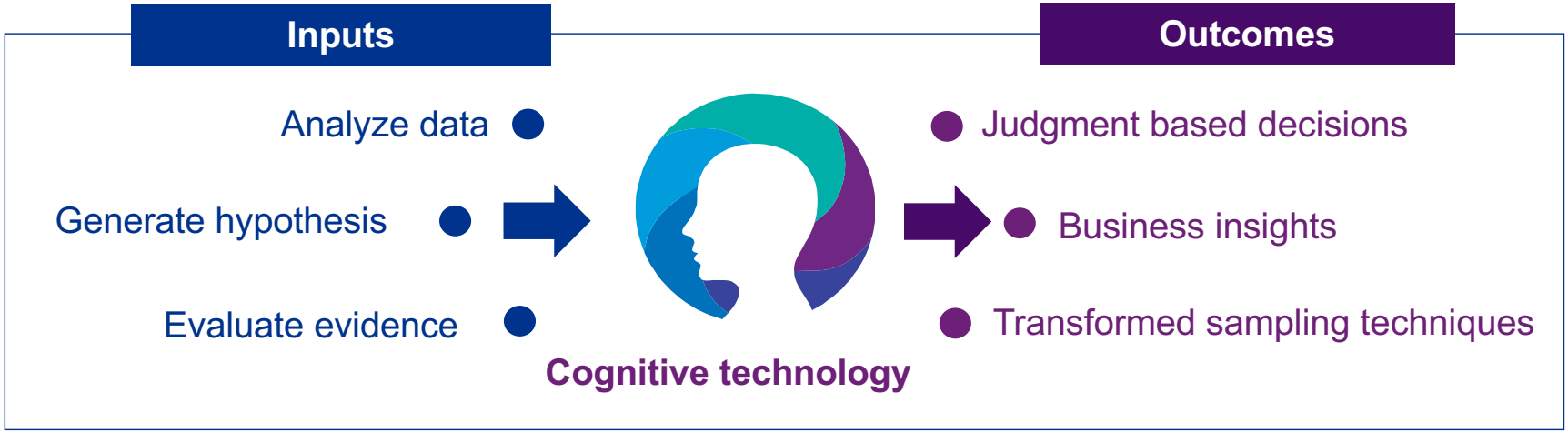
[1] Speech by Steven B. Harris, PCAOB Board Member, to the PCAOB/AAA Meeting, April 20, 2017

The classes of digital labor



Benefits of cognitive technology

1. Extract key attributes from unstructured data
2. Train the cognitive system to perform judgmental activities
3. Engage machine learning to enhance items 1 and 2 above
4. Generate richer, more detailed audit evidence for evaluation and provide insights on systems, risks, processes and controls



Why now?

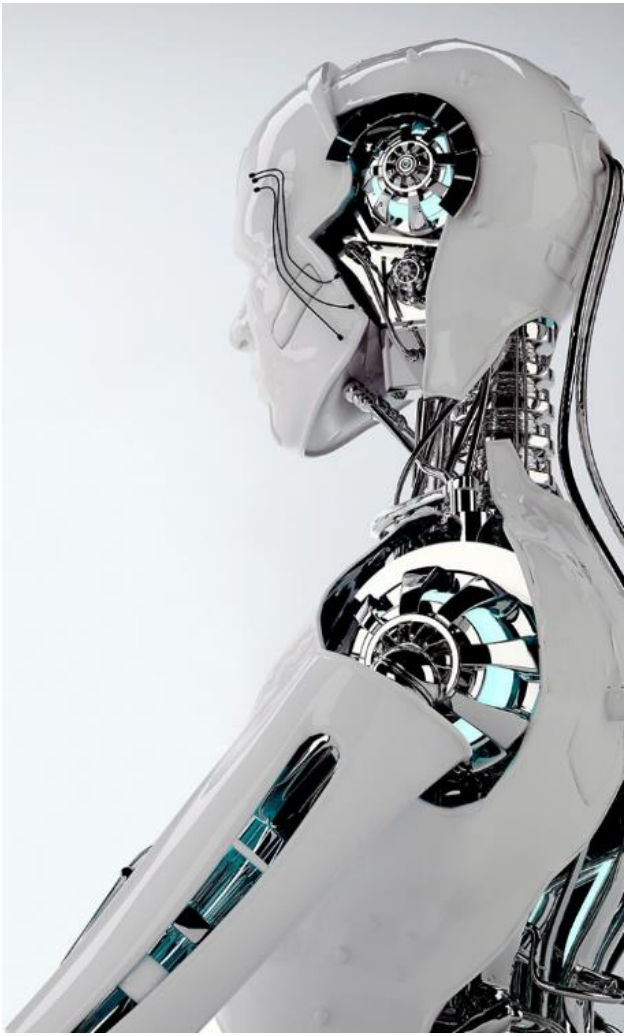
— **Human experience and knowledge shared freely** on the internet along with billions of connected devices are creating explosive, exponential growth of digital data

— **Exponential improvement in technology** accelerates at more meaningful baselines, beyond Moore's Law

— **Frictionless access** to technology (mobile, cloud)

— **Advancements in machine learning,** analytics and cognitive technology

— **Global demographic shifts,** reduction in working age population and need for talent



Question #1

Which is not a benefit of cognitive technology?

A. Extracts key attributes from unstructured data

B. Trains the cognitive system to perform judgmental activities

C. Completely eliminates need for human interaction in financial reporting

D. Provides insights on systems, risks, processes and controls

Question #1 (continued)

Which is not a benefit of cognitive technology?

A. Extracts key attributes from unstructured data

B. Trains the cognitive system to perform judgmental activities

C. Completely eliminates need for human interaction in financial reporting

D. Provides insights on systems, risks, processes and controls

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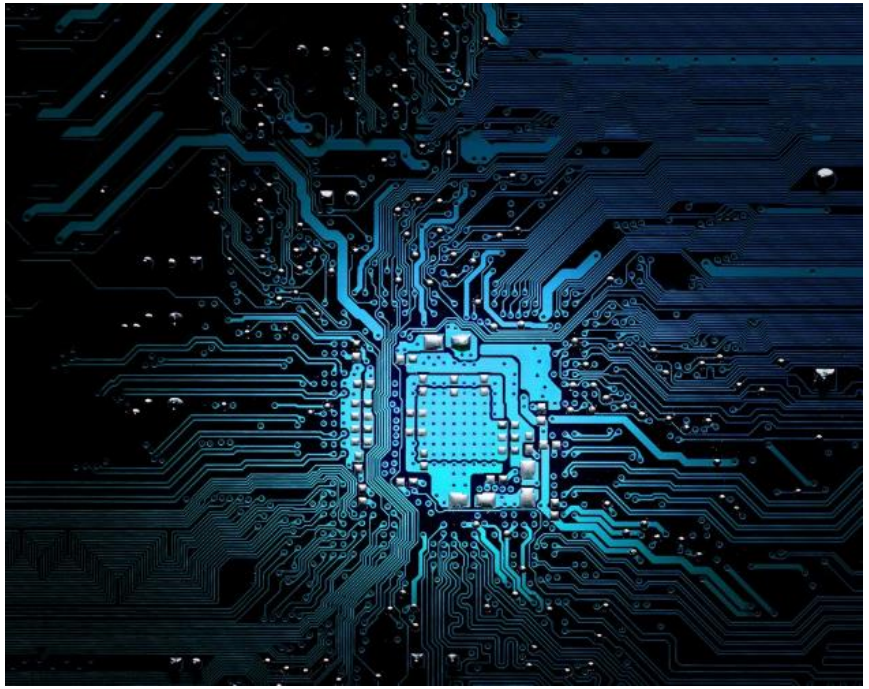
Automation in action

Cognitive technology in action

KPMG's alliance with IBM Watson

- Integrates machine learning and other artificial intelligence technologies with KPMG's audit methodology
- Makes it possible for auditors to analyze larger volumes of both structured and unstructured data
- Enhances the ability to identify data outliers and anomalies and provides deeper insights into risks, processes and controls



Today, KPMG is exploring the application of IBM Watson's capabilities to demonstrate the impact and benefits of cognitive technology on audit processes, decision support and engagement deliverables.

Where are we today?

Deep learning methods have had a profound impact on a number of areas in recent years

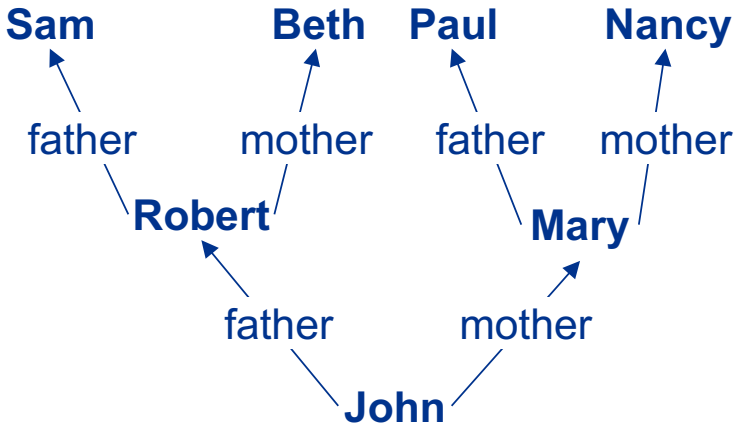
- Image understanding and speech recognition
- Natural language processing, biomedical image analysis, and the analysis of sequential signals in a variety of application domains

As good as they may be at recognizing patterns in images, AI researchers know that neural networks have limitations.

Artificial intelligence techniques comparison

Machine learning	Knowledge graphs
Discovers patterns by creating one or more layer of connected nodes to connect results to its inputs.	Discovers patterns by explicitly reasoning about entities and relationships.

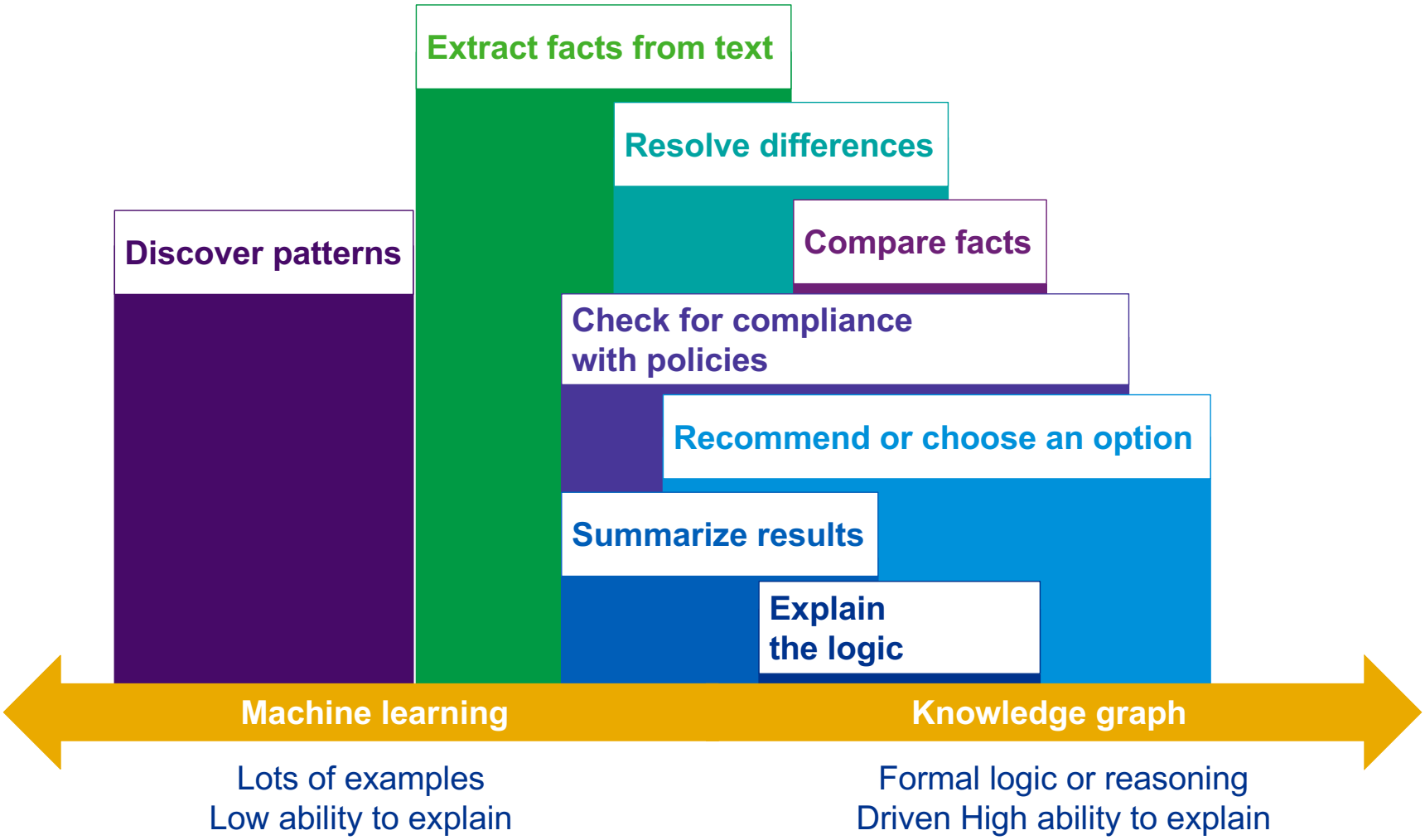
Couple of images
and lots of repetition
(let it sink)
repeat again



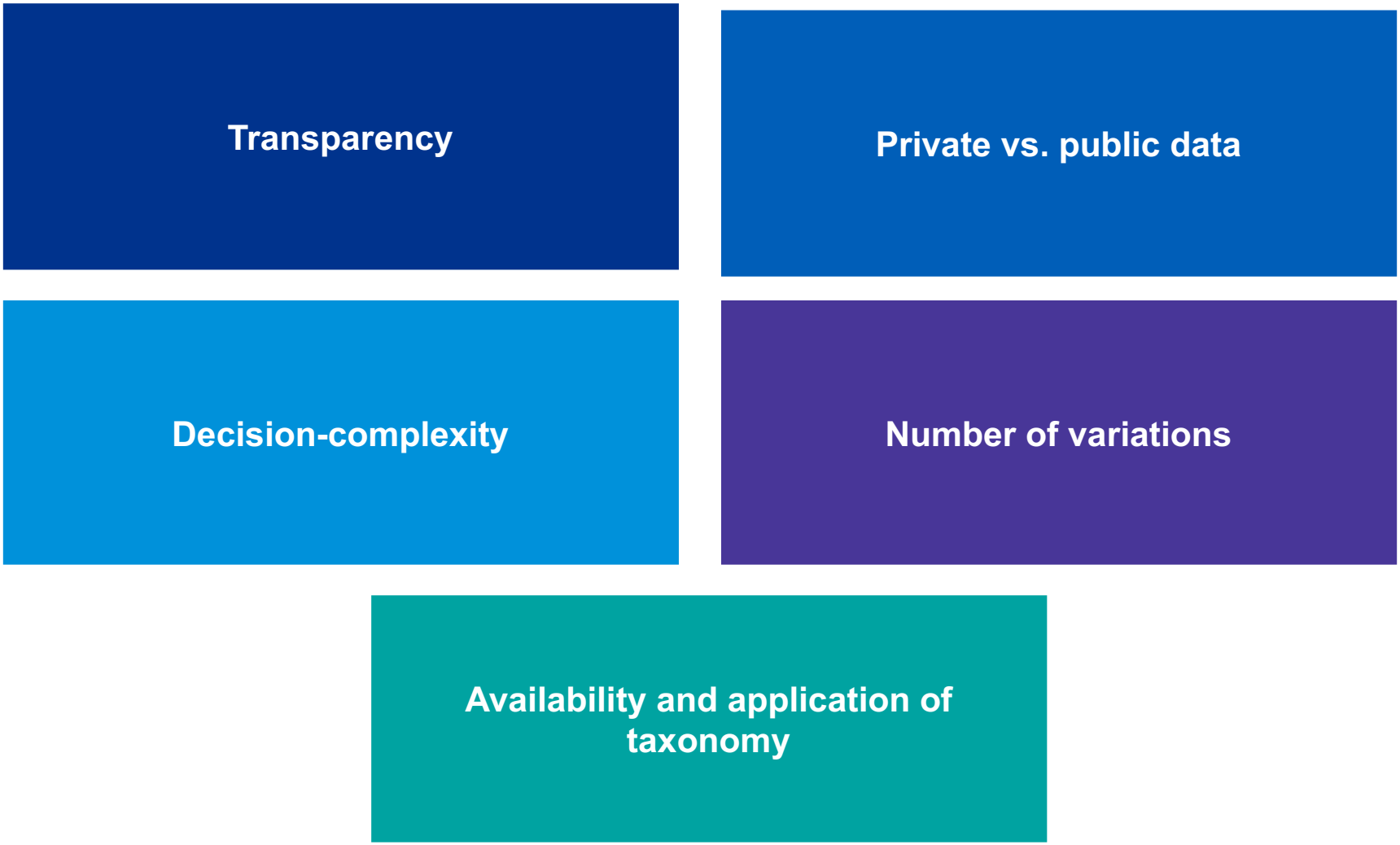
How do we define grand-parent?
Who are John's grand-parents?

How do we decide which technique to use?

Application of techniques



AI decision-making considerations



Some cognitive use cases

Commercial loan grading

- Objective: Process loan documentation, relevant external information and KPMG IP to generate a loan grade for each loan, indicative of the loan's creditworthiness
- Ingest loan documentation, external data and KPMG IP
- Extract key attributes from the data
- Train system on KPMG loan grading IP
- Generate a loan grade based on KPMG loan grading scale

Leasing

- Objective: Process lease documentation, relevant external information and KPMG IP to assess the classification, recognition and measurement of leases in the financial statements
- Ingest lease documentation, external data and KPMG IP
- Classify the documentation
- Extract key attributes from the data
- Apply KPMG IP to assess the classification, recognition and measurement of the lease in the financial information

Financial statement disclosures

- Objective: Process financial statement information, relevant external information (including the corresponding GAAP being applied in the financial statements) and KPMG IP to assess the financial statements and footnotes for conformity with GAAP/IFRS/other
- Generate a financial disclosure checklist that determines conformity with generally accepted accounting principles and identifies anomalies versus these principles

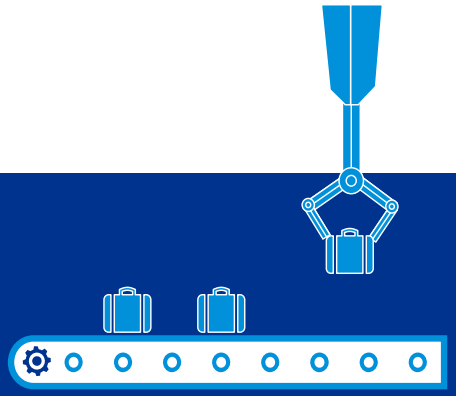
Revenue, sales invoices, procurement

- Objective: Process client documentation, third-party information and KPMG IP to assess revenue or expense information contained in the client ledger
- Ingest revenue contracts, invoices, trial balances and other data and assess the completeness and accuracy of the client's ledger

Learnings to date

- Data: The biggest constraint today is “digital” data; the procurement, curation and maintenance of digital data to enable digital tools
- Align your technology solution to the business challenge
- Cognitive applications typically have longer investment cycles and higher resource requirements
- Digitizing your organization will help facilitate your digital journey
- Visual data (i.e., charts and graphs) continues to be a challenge for many cognitive tools to process
- Digital capabilities can
  - Help drive quality
  - Provide an enhanced user experience
  - Unleash deeper insights into available data

Don’t wait... You should consider embarking on your journey now because your customers, your businesses, your people are all making decisions based on their “user” experience.



Question #2

True or False: Cognitive applications typically have longer investment cycles and higher resource requirements

True

False

Question #2 (continued)

True or False: Cognitive applications typically have longer investment cycles and higher resource requirements

True

False

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Academic considerations

People and talent

Experts are required to train and oversee design, content management, data analytics and technology development and improvement on the platform i.e., Digital Work.

Talent becomes more critical as a differentiator as many of the routine activities are automated at a low cost and skill, innovation and agility becomes the competitive advantage.

Technological unemployment may occur in lower skilled areas but demographic shifts are putting pressure on labor supply and demand.

The challenges we face in the 21st century

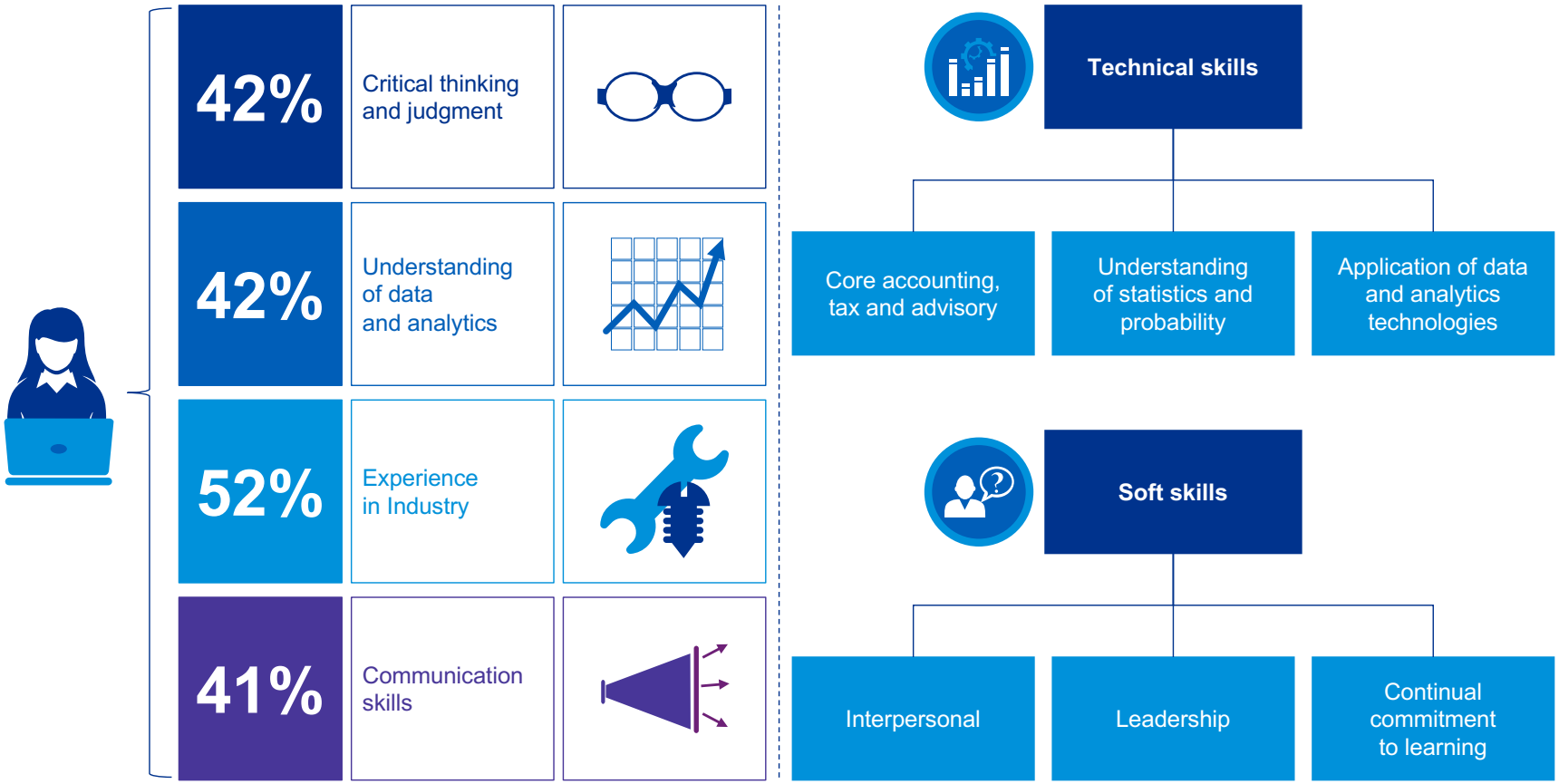
Academic Challenge

- Accounting and audit curriculum is not changing fast enough to incorporate data and analytics.
- Our talent therefore lack the practical knowledge to implement a data and analytics strategy when hired.

Challenge of a Master's Degree

- A large percentage of top talent from campuses do not obtain a Master's Degree due to its cost, despite the immediate and long term career value.

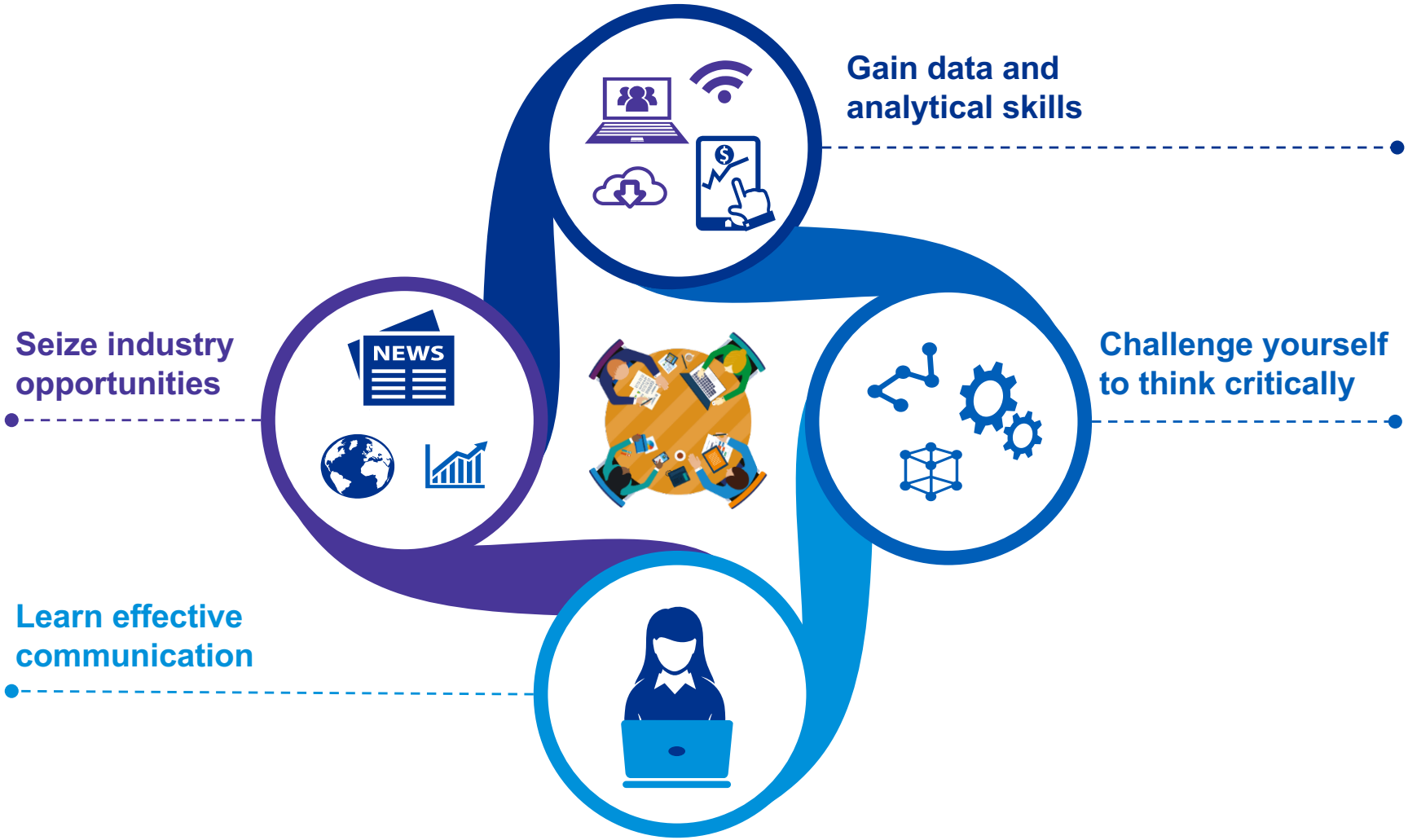
What is expected of professionals



Forbes Insights

kpmg.com/us/audit
Based on a survey of 151 U.S.-based respondents, including audit committee chairs and members, C-level financial executives, audit associates and accounting students.

What can students do now?



KPMG master of accounting with data and analytics program

Developed and hosted at

The Ohio State University Max M. Fisher College of Business

Villanova School of Business

Expanding in 2018

Data and analytics focused curriculum, aimed at our **profession**

Fully funded tuition for "**Top Talent**" students

Internship assignments with **unparalleled** access to hands-on experience

Accelerated career and leadership development

Additional major universities to be added in the near future

Watson University programs

Many graduates don't have the skills businesses need most. The IBM Academic Initiative helps better prepare students for careers as business analysts, data scientists, cybersecurity professionals, software engineers and more.

University Courses	**Great Mind Challenge**	**Use Case Study**
Watson Case Competition	**Hackathons and Showcases**	**Watson Academy**

Question #3

Which of the following is not a case for the application of the Knowledge Graph AI technique?

A. Discover patterns

B. Explain the logic

C. Compare facts

D. Recommend an option

Question #3 (continued)

Which of the following is not a case for the application of the Knowledge Graph AI technique?

A. Discover patterns

B. Explain the logic

C. Compare facts

D. Recommend an option

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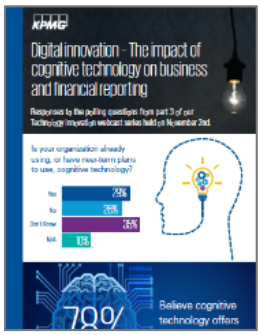
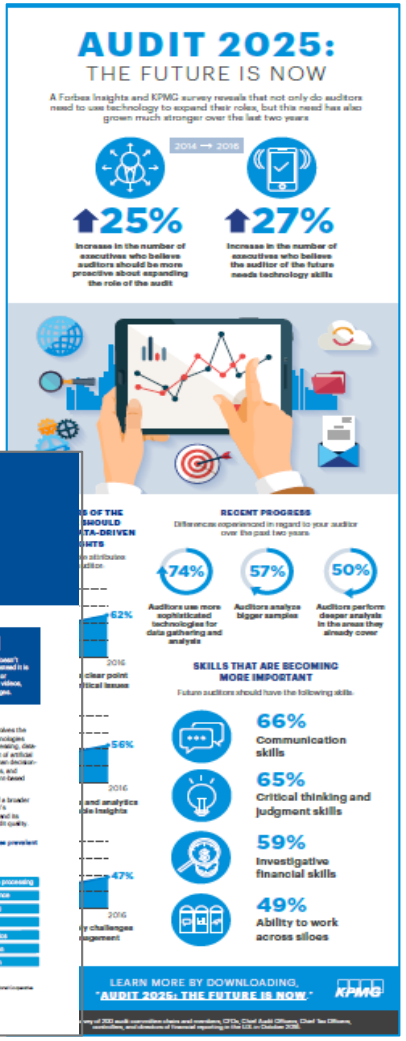
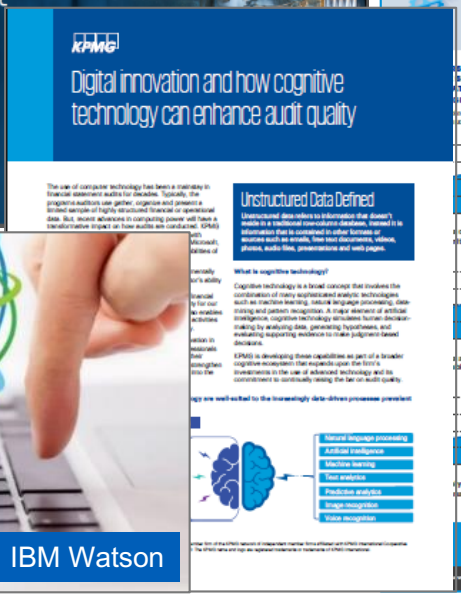
Questions?

Perspectives on innovation







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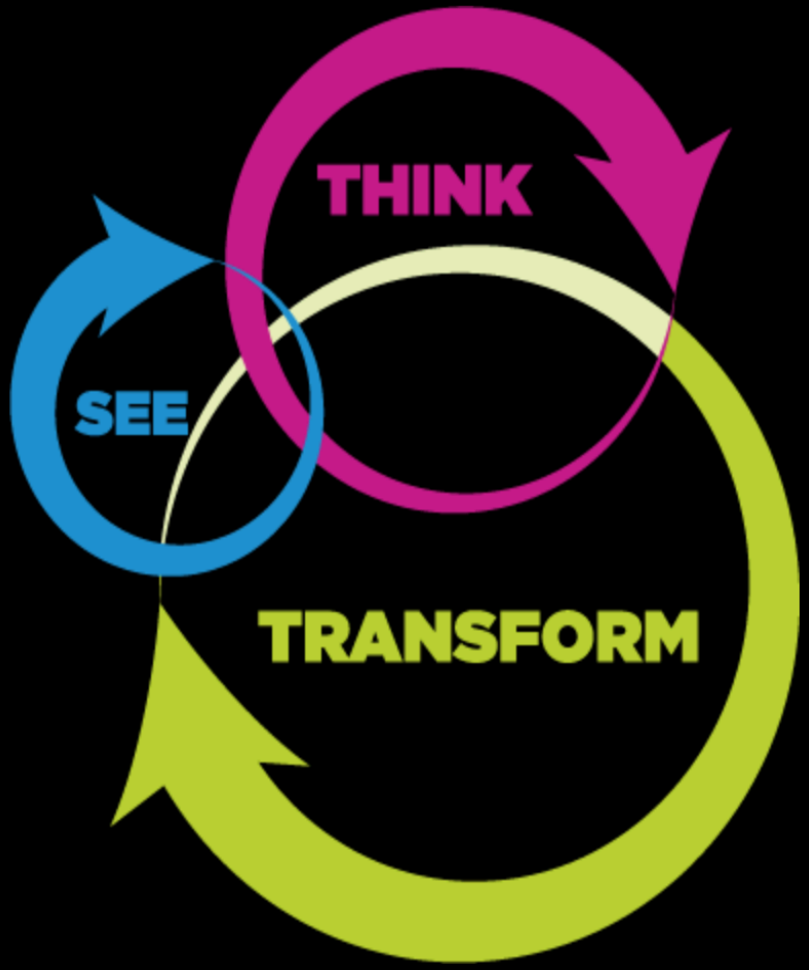

Accounting *IS* Big Data Conference 2017

The Ever-Changing Big Data Ecosystem--Learn the latest

The Accounting Function of the Future-How to be prepared

Gain Insights from 3 Different Company Perspectives-How They See Around the Corner to determine when to move and what are their keys to success in data and analytics

New this year: Hands-on Workshops Friday afternoon

Back by Popular Demand: Young Professionals Panel, New Big Data Cases, and Technology Visionaries Panel

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