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Digital innovation – The impact of cognitive technology on business and financial reporting

Part III – Technology innovation webcast series

November 2, 2016

Today's presenters

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Administrative matters for today's call

CPE regulations require that online participants take part in online questions

- Must respond to a minimum of three questions per 50 minutes
- Polling questions will appear on your media player
- Results will be reviewed in the aggregate; no responses will be tracked back to any individual or organization

To ask a question, use the "Ask A Question" box on your media player

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Webcast agenda

- Welcome and recap of prior sessions
- Brief refresher – Explosion of data & digital tools
- What is cognitive and why it is important?
- Enabling cognitive – An audit use case
- Learnings
- Q&A

Technology innovation webcast series

Today's webcast is the third in a four-part series of presentations where KPMG professionals will discuss how powerful techniques, such as advanced data analytics and cognitive intelligence, are being adapted for use in auditing, tax and corporate finance.

Today:

— Part III–November 2: Digital innovation – the impact of cognitive technology on business and financial reporting

Previous:

— Part I–September 8: How Data and Analytics is Transforming Corporate Finance and the CFO's Agenda

— Part II–October 11: Data & Analytics: Transforming the auditor and client interaction

Takeaways from Part 1 of our series

Part 1: How data and analytics is transforming corporate finance and the CFO's agenda

— CEO's have high expectations that their CFO is leading the D&A initiatives within the organization

— CFO's can enable data democratization

— CFO to partner with the CIO to invest in nimble technology layers that enable analytics on top of the ERP backbone

Takeaways from Part 2 of our series

Part 2: Transforming the auditor and client interaction

— Business insights and benefits from a D&A-enabled internal or external audit

— D&A integration across the audit cycle

— Developing trust in data & analytics

— Challenges we face in the 21st century audit

— Addressing the skills gap of the next generation assurance professional

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Brief refresher – Explosion of data and digital tools

How do you derive decision-relevant information from today's explosion of data?

We generate more data in 60 seconds than we used to create in a lifetime*

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

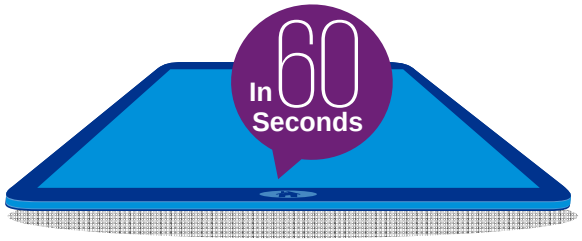
972,000 Daily swipes on Tinder

More than **140** Submissions on Reddit

3,125,000

243,055

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



The Answer:

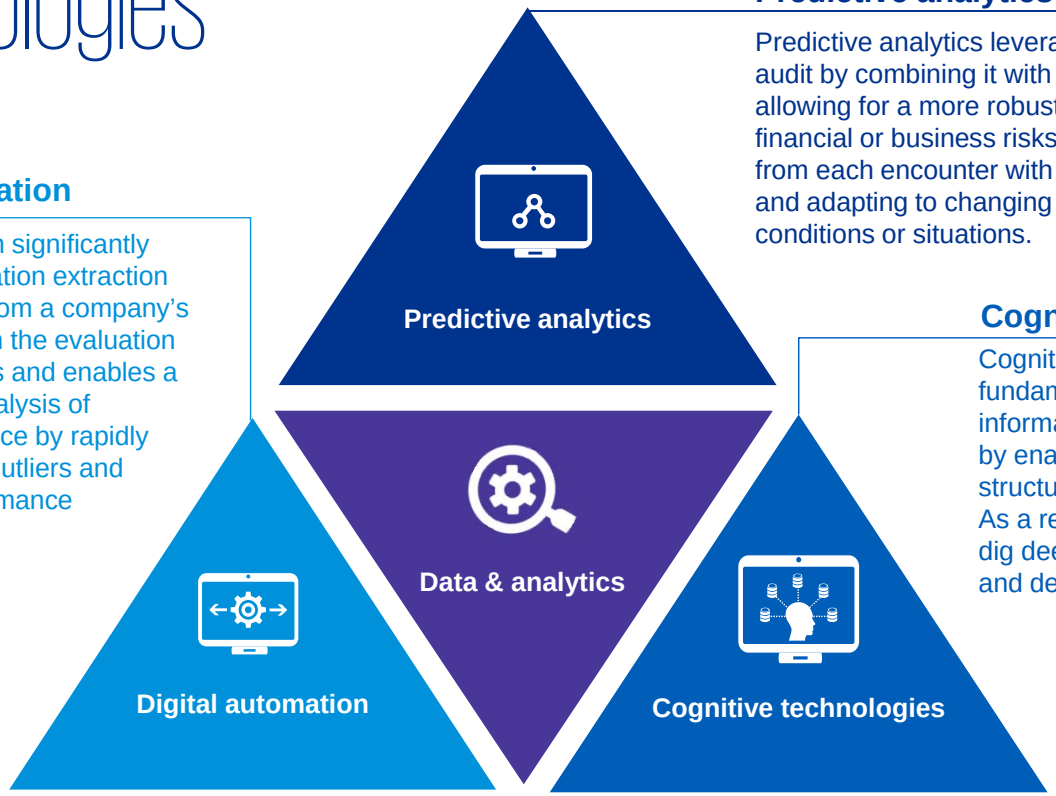
- Digital tools
- Automation
- Robotics
- Data & Analytics
- Cognitive computing

*Source: *Go-Global*

The application of D&A and cognitive technologies

Digital automation

Digital automation significantly enhances information extraction and processing from a company's systems. It aids in the evaluation of larger data sets and enables a more granular analysis of underlying evidence by rapidly pinpointing data outliers and process or performance anomalies.



Predictive analytics

Predictive analytics leverages data captured in the audit by combining it with industry and/or market data allowing for a more robust understanding of potential financial or business risks. The technology can learn from each encounter with new information by sensing and adapting to changing circumstances and varying conditions or situations.

Cognitive technologies

Cognitive technologies will fundamentally affect how audit information is used and understood by enabling the analysis of both structured and unstructured data. As a result, auditors will be able to dig deeper into financial information and deliver a more detailed audit.

New advanced technologies and cognitive techniques can empower a comprehensive D&A strategy by enabling strategic automation and creating a greater capacity for finance professionals to enact organizational changes based on actionable insights.

Polling question #1

Is your organization already using, or have near term plans to use, cognitive technology?

A. Yes

B. No

C. Don't know

D. Not applicable

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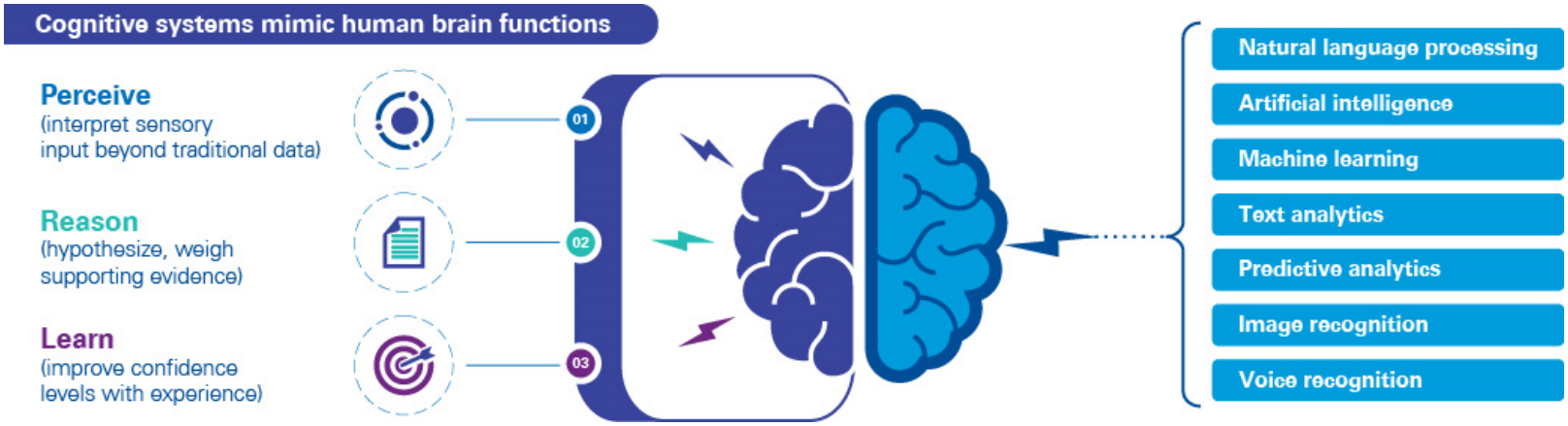
What is cognitive and why is it important?

What is cognitive technology?

— A major element of artificial intelligence and self-learning systems that uses data mining, pattern recognition and natural language processing to simulate human thought processes

— Powered by machine learning algorithms that continually acquire knowledge and, as it learns, becomes capable of anticipating new problems and modeling approaches in response



The analytical capabilities of cognitive technology are well-suited to the expanding data volumes and automated analytical processes prevalent in today's audit environment.

Polling question #2

Do you believe Cognitive Technology offers value to your organization?

A. Yes

B. No

C. Not applicable

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Enabling cognitive – An audit use case

Commercial Mortgage Loan Audit (CMLA) prototype

Overview

— Objective is for IBM Watson to process documentation for each loan, along with relevant external information and KPMG IP

— Through training of IBM Watson, key elements impacting the loan risk rating are identified

— Utilizing proprietary loan risk assessment process, IBM Watson determines the risk grade

— Each loan grade is accompanied by:

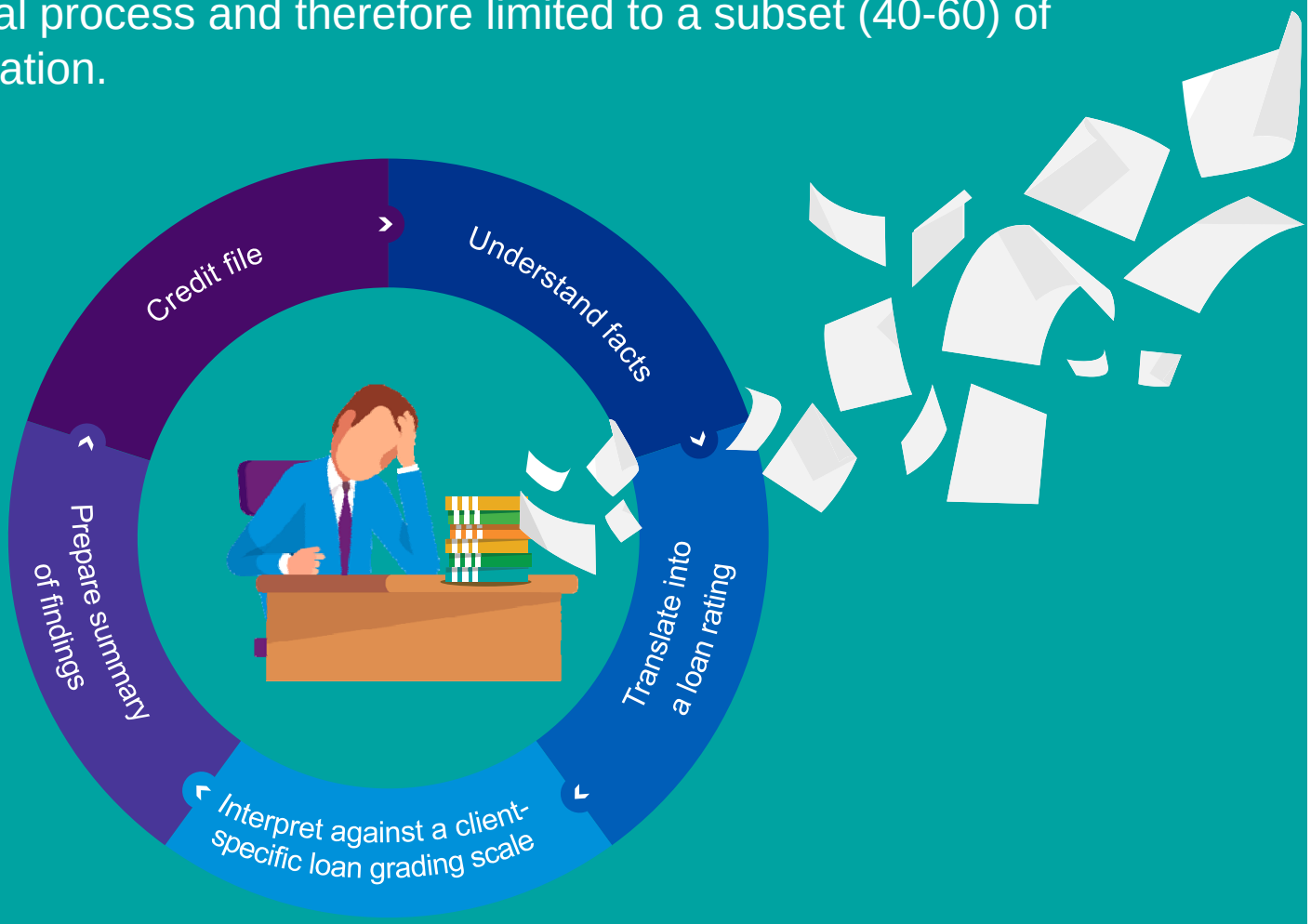
- Confidence level assessment
- Supporting information, extracted from credit files and market sources

Unlimited Potential

— Future applicability to virtually any risk assessment platform and in any industry, relying on unstructured data and human judgment
— Watson training can be used in other projects and Natural Language Processing (NLP) training moved to other technologies
— Ability to enable straight through processing, after sufficient training

CMLA - Journey to cognitive automation

Present: manual process and therefore limited to a subset (40-60) of entire loan population.



CMLA – Journey to cognitive automation

Future: Larger, more complete data sets from specific loan portfolios and ability to process entire client loan portfolio

Extract facts from credit file and other sources	Understand facts	Assign weights to facts	Translate into a loan rating	Auditor reviews potential exceptions
Loan Amount: $10M Purpose: re-finance Collateral: A properties Appraised Value: $100M Third-party information	Payment History: Weak PSOR: Strong Collateral: Strong Guarantor: Weak	Weighting scale 100 90 80 70	KPMG and client scales aligned AAA AA A	Loan # / KPMG rating / Client rating 1 B B 2 C B 3 AAA AAA Evidence

Using third-party unstructured data

Client data can be enriched with third-party unstructured information

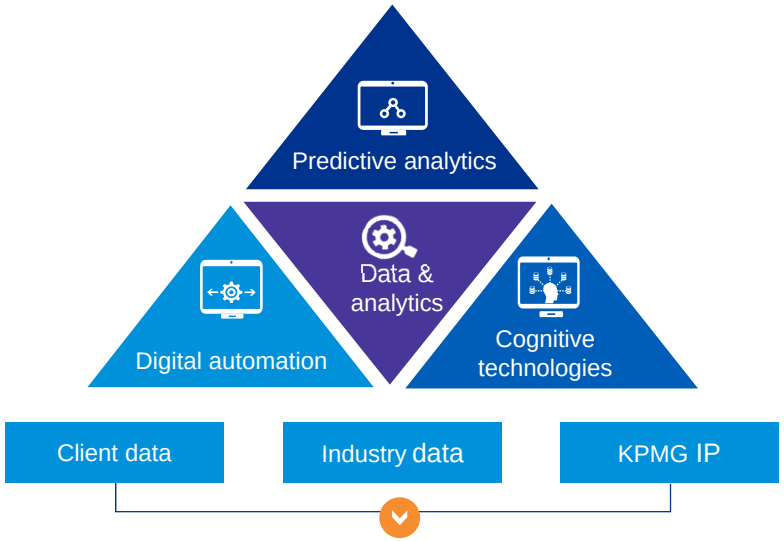
- **Sentiment analysis**
- **Statistical information**
- **Comparison analysis**

News and other information can be mined for relevant and timely perspectives

- **Bankruptcy information**
- **Market news**
- **Regional information**

Innovation drives powerful insights

Audit innovation ecosystem



Financial executive agenda

- Audit quality
- Financial performance
- Controllership
- Operations/Data/Business Intelligence
- Regulation
- Tax
- Reporting
- Financial risk management
- Capital and liquidity

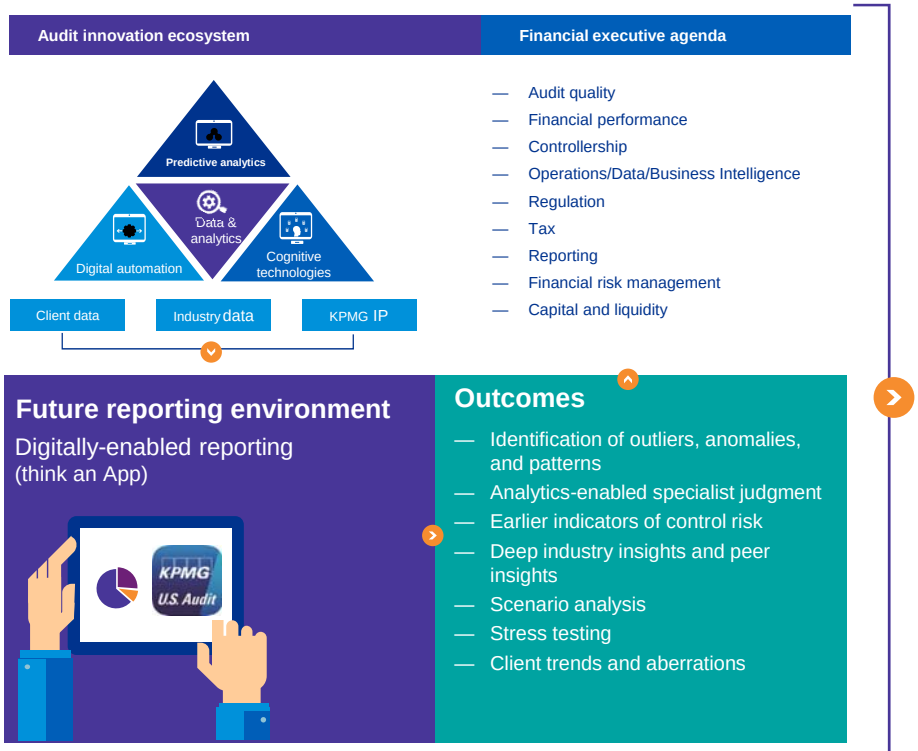
Future reporting environment

Digitally-enabled reporting
(think an APP)

Outcomes

- Identification of outliers, anomalies, and patterns
- Analytics-enabled specialist judgment
- Earlier indicators of control risk
- Deep industry insights and peer insights
- Scenario analysis
- Stress testing
- Client trends and aberrations

Reporting – Making it consumable



Reporting Capabilities

— Dashboard reporting
— Drill-down capability
— Geography, LOB, segment, etc.

Example Content

— Audit status
— Audit insight
  - Where we agree
  - Where we disagree and why
— Insight/perspective
  - Trends based on client data
  - Industry and peer insights
  - Macroeconomic/credit insights
  - Sentiment analysis
  - Instrument-specific insights

Polling question #3

As new capabilities become available, are you supportive of your audit firm using advanced data analytics and cognitive technology to augment their audit approach?

A. Yes

B. No

C. Not applicable

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Learnings

Digitization of data

Acquiring digital data is, arguably, the most important step in embarking on the use of Cognitive technology

— Electronic data does not always mean digital data. While digital data is machine readable, electronic data is typically not readable without some manipulation

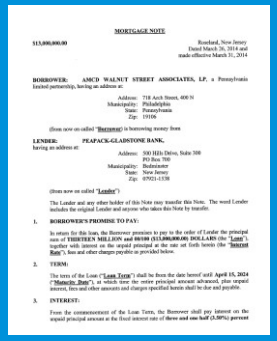
— Optical Character Recognition technology is used to deal with non-digital data

- This approach is sub-optimal as it results in some loss of fidelity

Strategically, the goal should be to ultimately store all data in its native format. Both structured and unstructured.

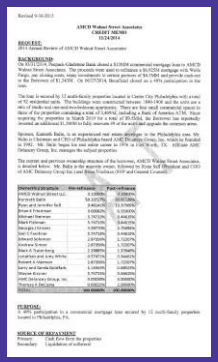
Prototype - Sample loan documents for ingestion

Promissory note
(approx. 10-50 pages of text)



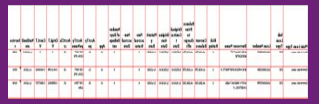
Appraisal
(approx. 150-200 pages of text, tables, pictures)

Annual loan review
(approx. 5-20 pages of text and tables)



Subledger information
(approx. 2-3 pages of screenshots)

Loan trial balance
(Excel file of thousands of fields)



Depending on the industry or specific need, nearly any structured and unstructured data can be processed.

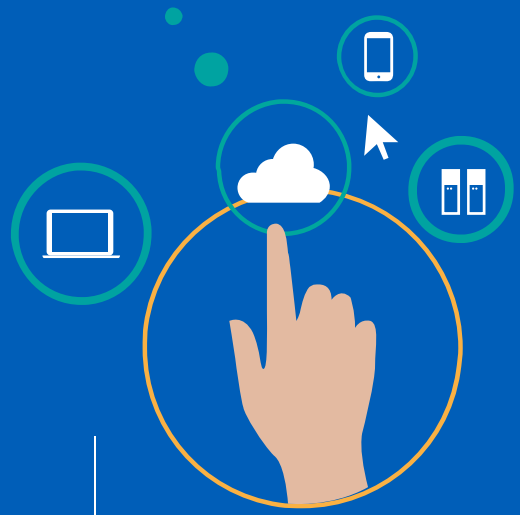
Applying NLP to extract key information

- **Loan amount**
- **Guarantor**
- **Appraised value**
- **Interest rate**

…. all attributes that are relevant

Using Natural Language Processing (NLP), in combination with our subject matter knowledge and intellectual property, it is possible to train Watson to extract all relevant information with high accuracy.

Machine learning



Data extracted from credit file

Supporting rules

Machine Learning Algorithm

Predictive Model

Loan risk rating and confidence

This cycle is iterative, as Watson will keep learning and improving the model, based on human feedback on accuracy

Machine learning insights

Multiple approaches to machine learning allow for a wide array of choices. For finance industry applications, a balance between utility and accuracy is of critical importance.

— Data and specific application will define best approach
  - Supervised learning vs. unsupervised learning
  - Time and resources may be a limiting factor

— Machine learning model to select
  - Simple model (such as decision tree) – possibly higher utility through the ease of understanding and traceability
  - Deep learning or similar approaches – very likely much more expensive and harder to explain how it arrived at an answer

— Very large volumes of data are required
  - As the number of inputs increases, the need for more cases goes up considerably
  - Model selected will also drive the amount of data needed

Polling question #4

Do you consider Cognitive Technology a must-have for your organization?

A. Immediately

B. Within 5 years

C. Within 10 years

D. Not a must have

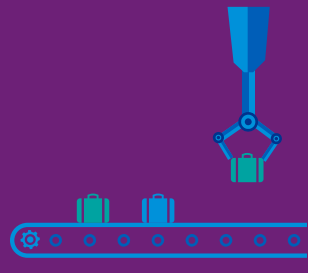
E. Not applicable

Insights from our cognitive journey to date

- Align your technology solution (automation, robotics, cognitive) 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 (such as charts and graphs) continues to be a challenge for cognitive tools to process
- Digital capabilities can help drive quality, provide an enhanced user experience and unleash deeper insights into the data available in today's digital world

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.



Changing the way business is done

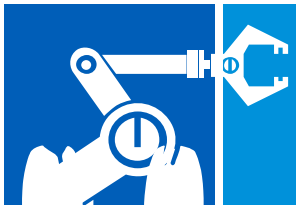
The explosion of data in all aspects of business has fostered unprecedented advances in data capacity and digital processing power which will transform the way data is used and understood.

$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 30 percent.** *Bank of America Merrill Lynch*

Recent research from the *London School of Economics* suggests a **return on investment** in robotic technologies of between 600% and 800% for specific tasks.

600% to **800%** **ROI**



McKinsey research suggests that smart robots will replace more than **100 million knowledge workers** – or one-third of the world's jobs – by 2025.

*Sources: *BOA – Merrill Lynch; London School of Economics; McKinsey & Co.*

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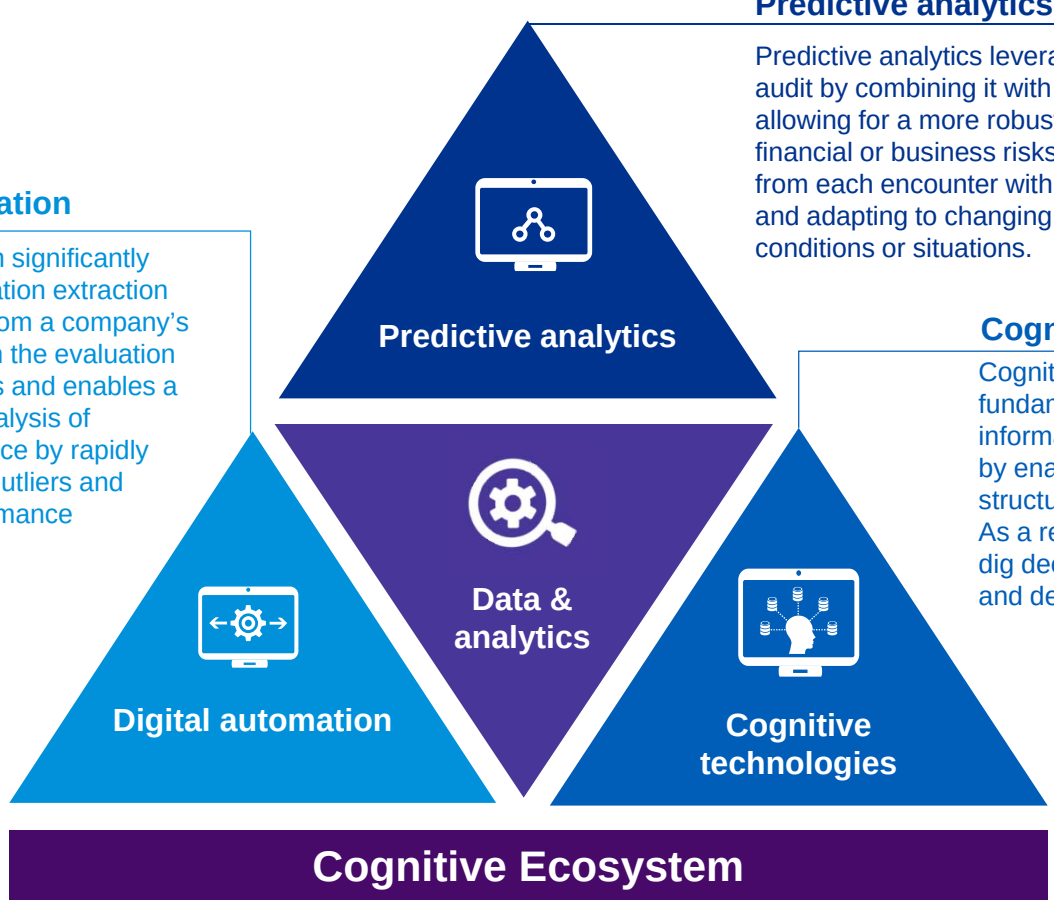

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Questions?

Technology innovation webcast series

Upcoming:

— Part IV–December 1: Tax technology

Previous:

— Part I–September 8: How Data and Analytics is Transforming Corporate Finance and the CFO's Agenda

— Part II–October 11: Data & Analytics: Transforming the auditor and client interaction

For more information

Ongoing regulatory change appears inevitable. And keeping an eye on those changes that might affect your business can feel overwhelming. That's where the technical accounting professionals with KPMG's Financial Reporting Network (FRN) can help. We not only keep a close watch on the latest regulatory and other developments, we report on them and interpret what they might mean for you.

From technical publications like Defining Issues and Issues In-Depth to timely live Webcasts and the CPE credits they provide, our FRN website should be the first place to look for up-to-the- minute financial reporting changes.

Visit us at kpmg.com/us/whats-happening

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