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Being a CPA in the data age

University of T

August 11, 2017

Agenda

- Digitization of Accounting
- Digital Transformation Examples
- Personnel, Skillsets, and Capabilities
- Implementing Digital Transformation
- Questions

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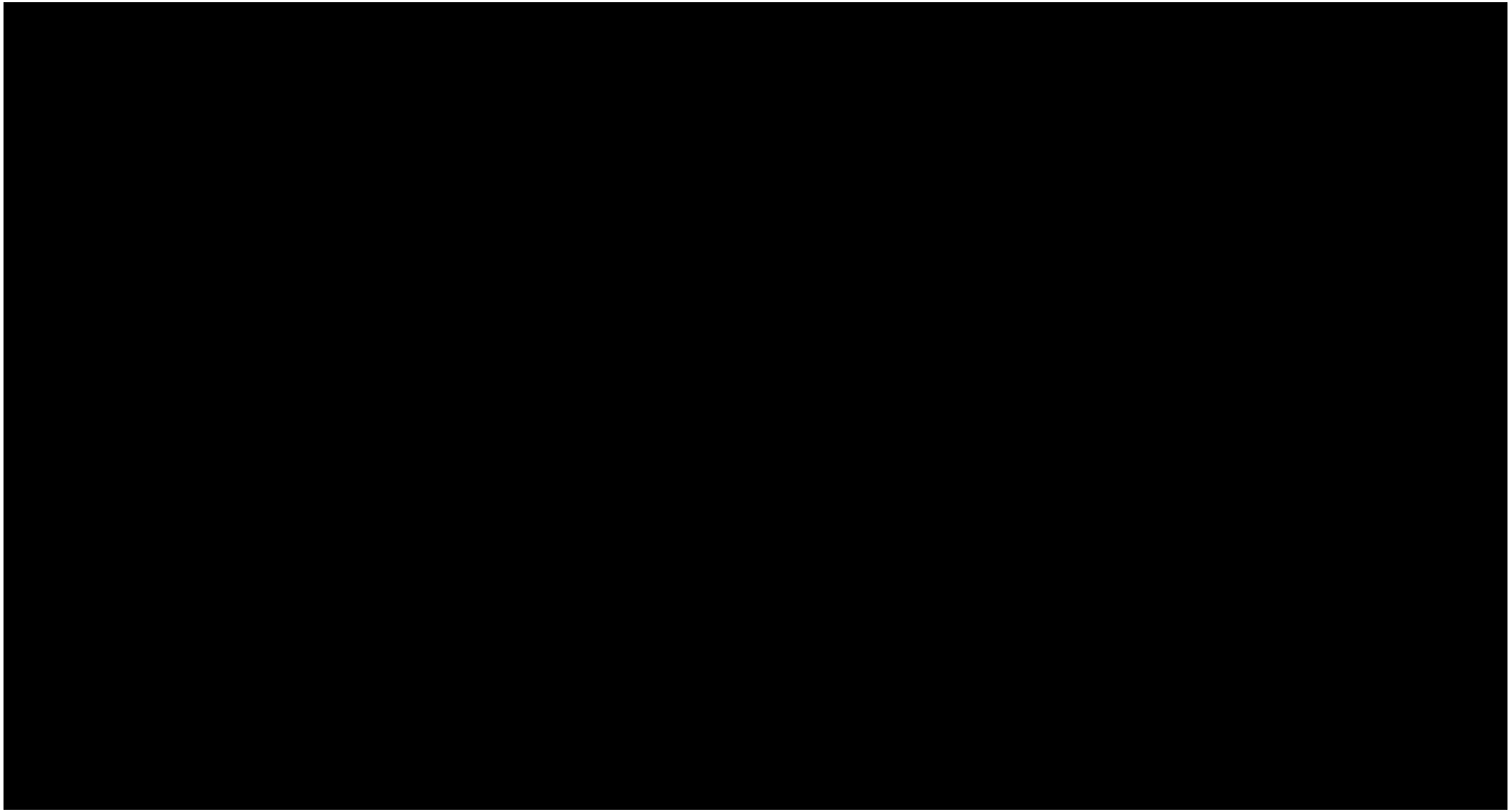
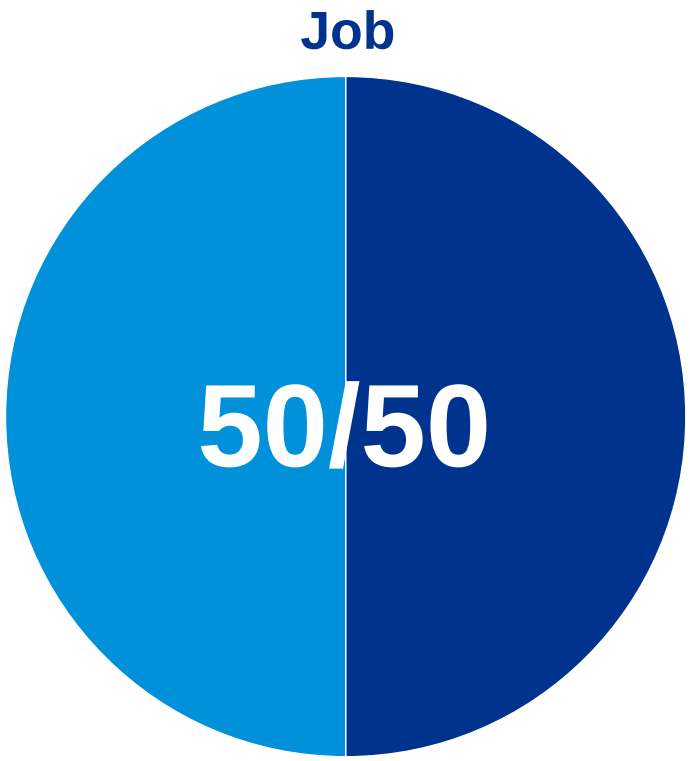
Digitization of accounting

Explosion of Data



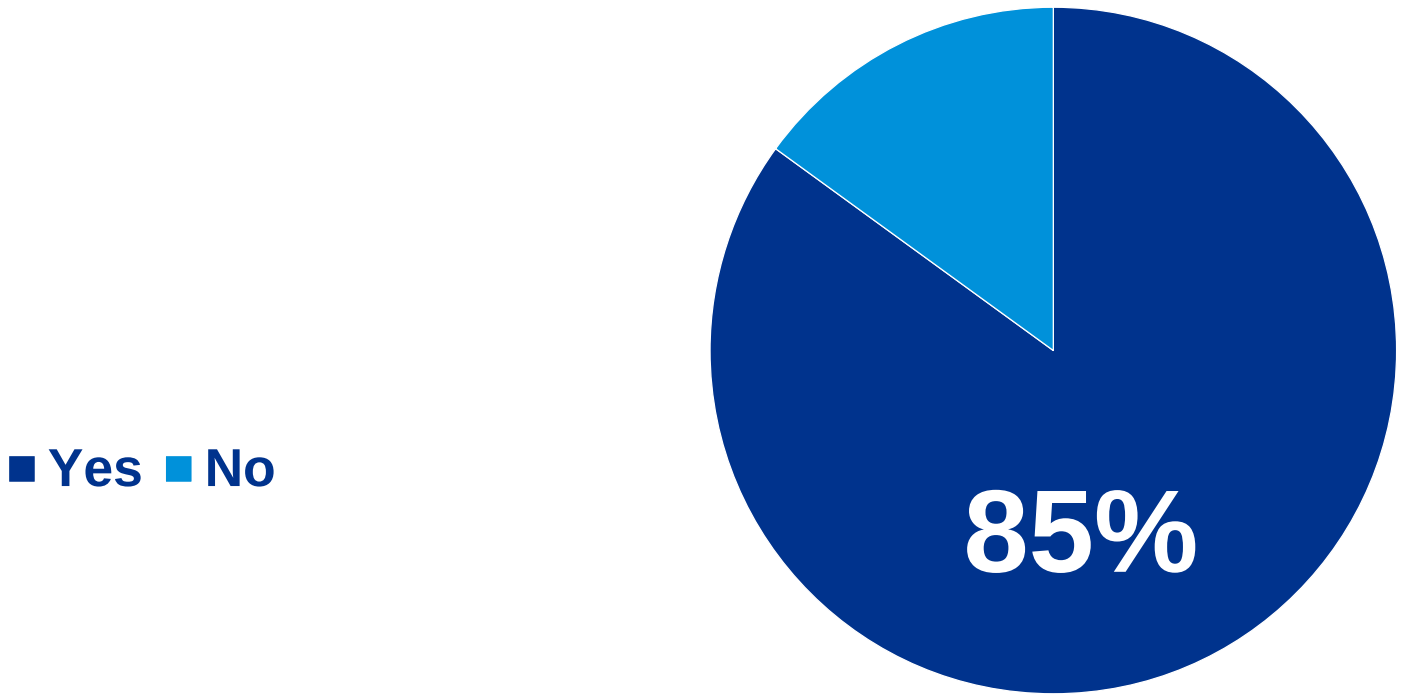
Risk of U.S. jobs being computerized in next two decades



"The Future of Employment: How Susceptible are Jobs to Computerization"

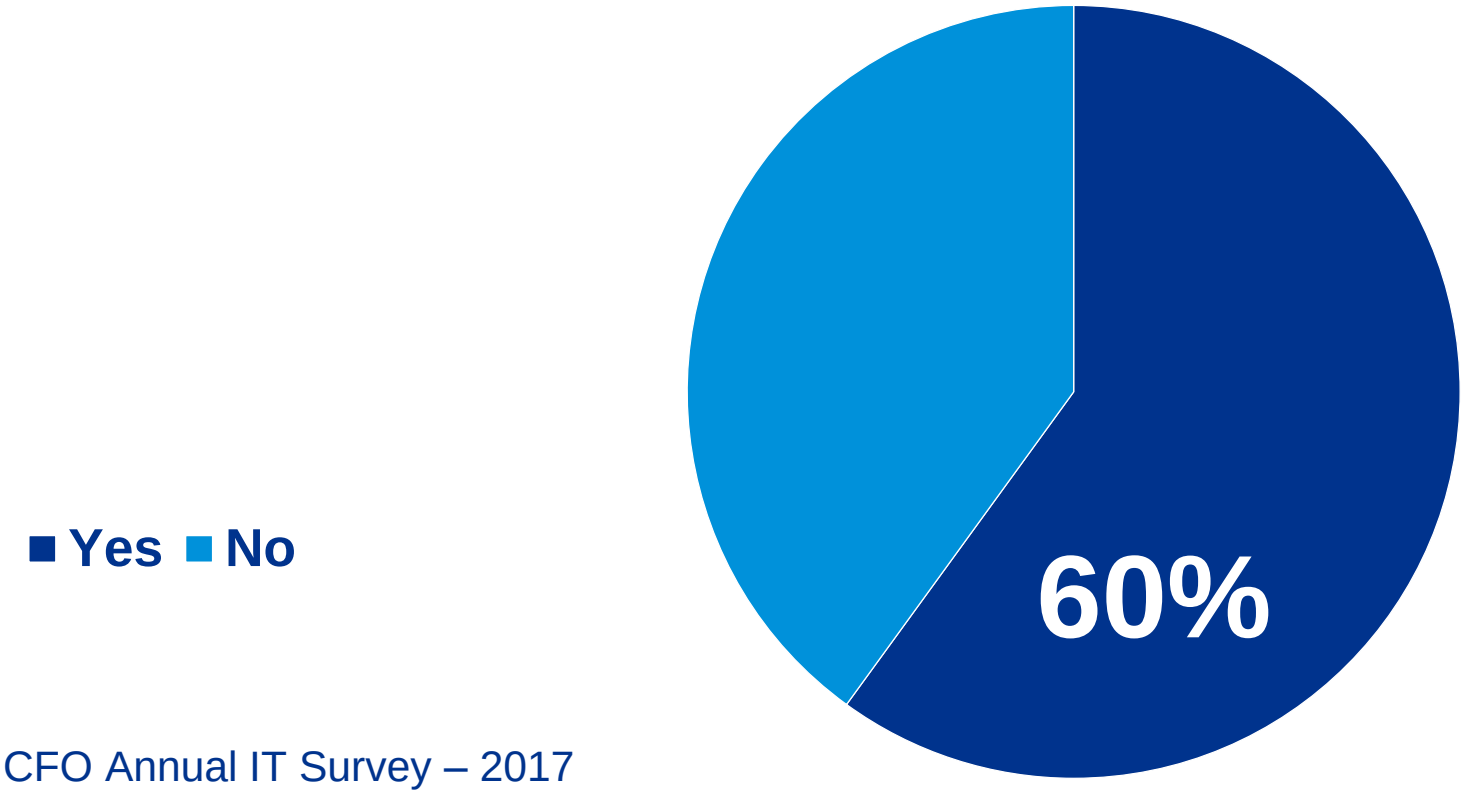
C Frey and M. Osborne (2013)

CEOs say applying financial data to achieve profitable growth is the greatest strategic value of a CFO



Forbes Insights and KPMG International
CEO November 2015 Survey

CFO’s plan to improve the analytical skill set of their existing finance team in the coming year



CFO Annual IT Survey – 2017
“Data and Analytics: The CFO’s Evolving Role

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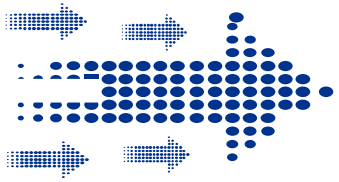
Digital transformation examples

Examples of available technologies

Data sources



Extraction Transformation and Load (ETL)	Data storage & database systems	Advanced analytics	Cognitive	Visualizations
—Kettle —Microsoft SQL —Informatica	—Microsoft SQL Server —Postgre SQL —Hortonworks —Cloudera	—R Studio —Alteryx —GitLab —Elastic Search —SAS —Python	—IBM Watson —Microsoft Cortana —IP Soft —Genpact —Automation Anywhere	—Pentaho —QlikView —Tableau —Spotfire —D3.js

Example areas for digital transformation

Investor relations

Leverage analytics to help explain to analysts the underlying drivers of past business performance, e.g., impact of weather on sales.

Financial planning

Develop predictive models using internal and external data to create more accurate forecasts, and planning models.

Customer knowledge

Identify consumer tastes and trends by monitoring data and social media activity and build into your product development and revenue plans.

Compliance

Use data to better monitor for changes that will impact the company's compliance obligations and related business processes.

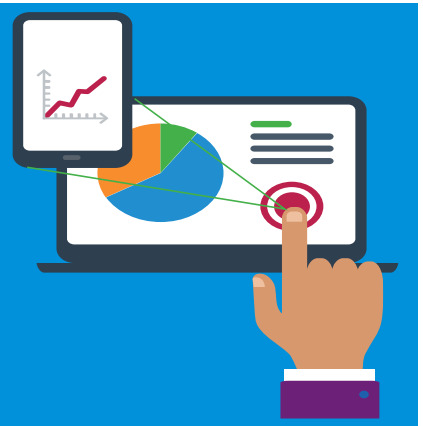
Journal entry analysis

Great entry point into using data & analysis

- Most financial personnel are familiar with the GL system
- Extracting data from the GL system is a common occurrence
- Entire population subject to analysis
- “Jumping” from GL entries to actionable insights via D&A feels like a small step

Actionable insights include

- Cross-entity comparisons
- Volume of automation vs. manual intervention
- Compliance with policies/controls
- Assessment of non-typical journal entries
- Global reach



Journal entries analysis

Generate highly customizable analyses for identification of inappropriate journal entries.

— Journal entries recorded on weekends, holidays, or unusual times outside of business hours that may indicate fraudulent activity

— All journal entries recorded by a preparer or approver, can be analyzed

		Filter weekend	Values		
		Saturday		Sunday	
Automated or manual entry	User name	Document number – distinct count	Amount in document currency – sum	Document number – distinct count	Amount in document currency – sum
Automated		69,791	2,083,786	5,744	1,042,157
Manual	EC241F8E-315	53	1,907,300		
	0954B949-649	5	15,608	2	3,070
	E8DEE2FC-1AF			1	740
	EC241F8E-315	32	3,558,601	316	673,069
Manual Total		**90**	**5,481,509**	**319**	**676,879**
Grand Total		**69,881**	**7,565,295**	**6,063**	**1,719,036**

Account number	Account category	Dr amount	Cr amount	Local currency	User name	Posting date	Entry date	Auto or manual?
A6B98EB7-D	Trade receivables third party	1,097,300	-	USD	EC241F8E-315	2013-09-30	2013-10-05	Manual
99AC9424-6	Non current assets	-	1,097,300	USD	EC241F8E-315	2013-09-30	2013-10-05	Manual
99AC9424-6	Non current assets	1,097,300	-	USD	EC241F8E-315	2013-09-30	2013-10-05	Manual
A1A21AX7-B	Cash	-	1,097,300	USD	EC241F8E-315	2013-09-30	2013-10-05	Manual

Benefits to the company

—Assess manual vs. automated entries for automation and standardization

—Leverage investment in ERP/integrated accounting systems

—Support control effectiveness

—Identify problems while small

—Full population/real time

Revenue 3 way match

Evaluates 100% of sales activities for each period by matching transactions in revenue to relevant information per the customer purchase order, shipping document, and sales invoice

A three-way match for goods based on key information: quantity per the customer purchase order is agreed to the shipping document and sales invoice and pricing per the customer purchase order is agreed to the sales invoice

Revenue 3 way match – Results

124 transactions for a total of $17,613,913 were identified with price differences

94.5% of transactions analyzed contained no price differences

$922,422 total "extended" difference or 0.3% of total amount tested

Price difference analysis					
Price risk category	**Revenues subject to 3 way match**	**# of transactions**	**% (amount)**	**% (number)**	**Extended difference**
No difference	303,232,241	1640	94.5%	92.9%	0
PO > invoice price	14,438,076	73	4.5%	4.2%	823,682
PO < invoice price	3,175,837	51	1.0%	2.9%	98,740
Total	**320,846,154**	**1764**	**100.%**	**100.0%**	**922,422**

Revenue 3 way match – Results

489 transactions for a total of $89,942,047 were identified with quantity differences

72% of transactions analyzed contained no quantity differences

$19,543,001 total "extended" difference or 6.1% of total amount tested

Quantity difference analysis					
Quantity risk category	**Revenues subject to 3 way match**	**# of transactions**	**% (amount)**	**% (number)**	**Extended difference**
No difference	**230,904,107**	**1,275**	**72.0%**	**72.3%**	**0**
PO < Invoice quantity	0	0	0%	0%	0
PO > Invoice quantity	89,942,047	489	28.0%	27.7%	19,543,001
Total	**320,846,154**	**1764**	**100.0%**	**100.0%**	**19,543,001**

Conflicting authorization in purchasing transactions

Potential risk where 7 users posted $10 million in transactions with conflicting authorizations: goods/service receipt entry, A/P invoice entry, and payment approval

Show Selections

MeasuresSC3 — AmountOfTransactions
GroupingSC3 — Individual Scenario
AccountStatu — ActiveUsers

Start Date	End Date	Extraction Date
01/05/2013	11/30/2013	01/10/2014

Select Business Unit: 4000
Select Currency: USD
Intercompany: Only IC; Only non-IC
Select Analysis Period: Start Date 01/05/2013; End Date 11/30/2013
Availa… ensions: User; Users; Produ…; Reven…; Custom… … tment … Posting

Testing Result Overview

Show/Hide Transactions … ils

Scenario	Vendor master maintenance	PO created	Goods / service receipt entry	A/P invoice entry	A/P invoice approval	Payment approval	Number of Did Do Users	Number of Did Do Transactions	A… t of Did Do sactions
1	X	X	X	X	X	X	2	3	260
2		X	X		X	X	6	143	12,507,284
3	X	X	X	X			3	6	401,767
4	X				X	X	5	4,265	7,164,445
5				X		X	7	1,764	10,051,738
6					X	X	6	165	16,846,344
7	X						5	288	31,170,840
8		X	X		X		12	5,323	440,486,841

After investigating the underlying transactions and discussing with the client, we may conclude there is little or no risk here.

Scenario	User Name	Employee Name	Department	Vendor Number	Vendor Name	Purchase Doc Number	…oc Number	Invoice Number	Invoice Value
5	SCHULZET	Thomas Schulze	IDES	1101	ABC Dienstleistungs GmbH	4500017204000	5000012071	5105608752	6483.15
5	SCHULZET	Thomas Schulze	IDES	1101	ABC Dienstleistungs GmbH	450001723700	5000012121	5105608772	6483.15
5	SCHULZET	Thomas Schulze	IDES	1101	ABC Dienstleistungs GmbH		12001	5105608733	16034.1
5	SCHULZET	Thomas Schulze	IDES	1101	ABC Dienstleistungs GmbH		12012	5105608744	6681.55

The business may wish to streamline authorizations and eliminate a potential control deficiency related to the number of individuals with conflicting duties.

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Managing claims

The challenge:

Two insurance carriers identified that a significant number of claims result from the policies underwritten by their independent agents. How do they identify the culprits and reduce the amount of claims?

Carrier A approach

- Used data to analyze specific claims metrics to identify patterns around policies underwritten by independent agents.
- Used the metrics to rate the agents and created a plan to focus on monitoring and mentoring the agents that are performing poorly

Carrier B approach

- Terminated their independent agents that underwrote the policies which resulted in significant claims

Carrier A outcome

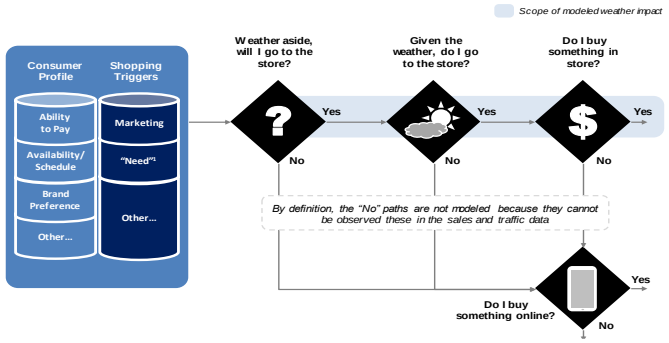
- Number of claims was reduced
- Revenue decreased slightly due to higher scrutiny of specific metrics
- Most independent agents improved while others left voluntarily

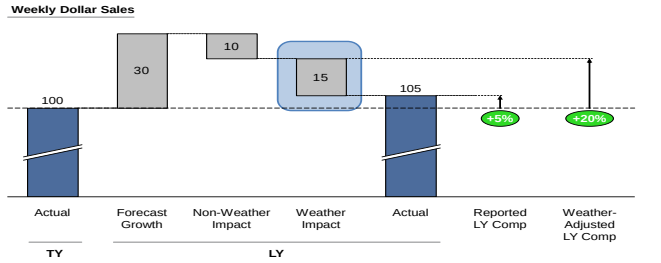
Carrier B outcome

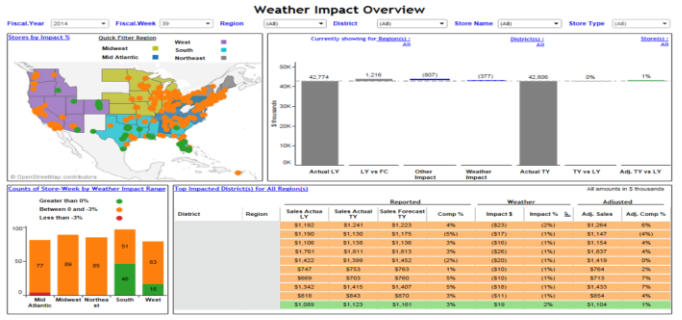
- Number of claims was reduced
- Revenue decreased significantly
- Company liquidated

Impact of weather patterns

The challenge	— Model the impact of discrete weather behavior at individual locations on weekly store sales performance.
KPMG response	— Create a model that statistically linked weather observations geo-mapped to individual store locations with differences between forecast and actual store sales. — Calculate the impact of weather on sales for a given week and adjusted rates for same-store weekly sales comps.
Benefits to retailer	— Ability to estimate how weather contributes to deviations from its sales forecasts each week. — Identification of where non-weather-related factors influenced sales and operational performance. — Better understanding of customer buying pattern.

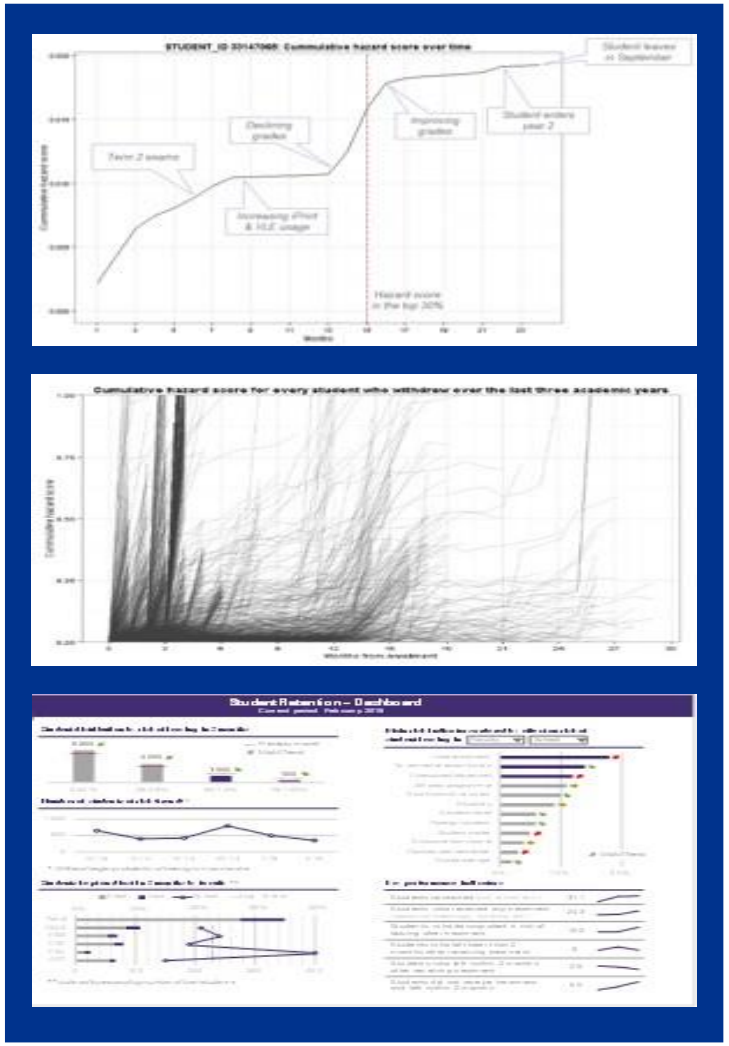






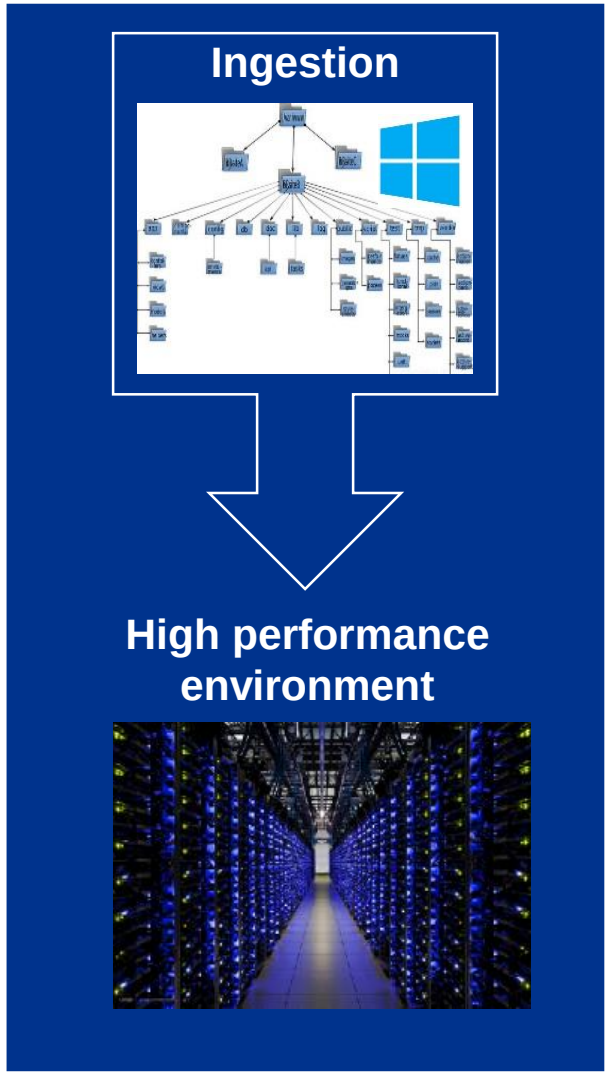
Predicting student withdrawals

The challenge	— A leading university wanted to reduce students leaving before graduating by approaching at-risk students with targeted remedial actions to prevent their withdrawal.
KPMG response	— Developed a survival analysis model that combined advanced analytics, various data sources, along with machine learning, to identify characteristics of students likely to leave the university prematurely. — Model examined over 1,500 initial data signals, pulls data from relevant sources, and provides a hazard score for each student. — Model enables the university to intervene on a timely basis with customized interventions to improve student retention.
Benefits to university	— Improved student retention = increased tuition revenues — Enhanced brand through higher graduation rates — Changes to curriculum, faculty, classroom and housing needs



Automated intelligence

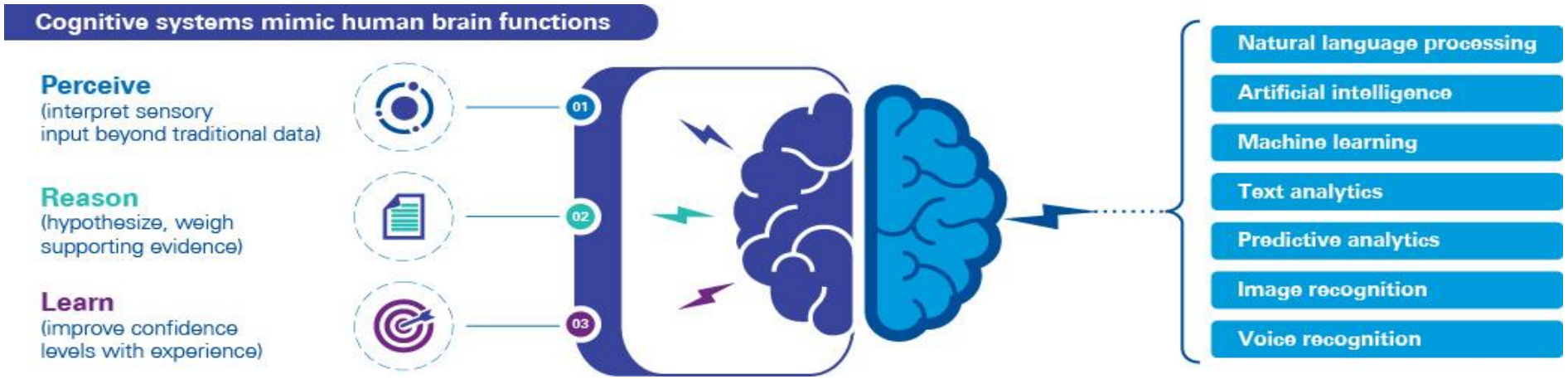
The challenge	— Company sells $5B of assets but needs to review 2 million documents to ensure that sensitive documents are held back while documents of the sold assets go to the acquirer. — Challenges in the form of complex file structure and document types, plus highly specialized technical and proprietary content (a.k.a. unstructured data)
KPMG response	— Leveraging its Athena Document Cognitive Automation Framework for: - Acquisition, scanning, and ingestion of 2 million documents - Three-Tiered strategy to classify documents as going to Seller vs. Acquirer - Document Risk Scoring for review by Seller subject matter experts - Reporting, Visualization, and Interactive Refinement
Benefits to seller	— Cost Reduction - $28 vs. $.49 per document — Efficiency - 8 FTE/12 months vs. 4 FTE/4 months — Coverage - sample vs. 100% — Clear audit trail of documents to be disclosed/retained, and reasons for the determinations.



What is cognitive technology?

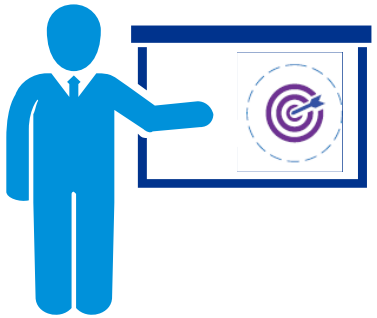
— A major element of artificial intelligence and self-learning systems that uses data mining, pattern recognition and natural language processing to simulate human thought processes

— 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.

Benefits of Cognitive Technology



1. **Extracting key attributes from unstructured data**
2. **Training the cognitive system to perform judgmental activities**
3. **Engaging machine learning to enhance items 1 and 2 above**

CMLA prototype summary

Credit file loan grading approach

Today: Limited sample of bank's loan portfolio (40 – 150 loans)

Extract facts from credit file → Understand facts → Interpret against a client-specific loan grading scale

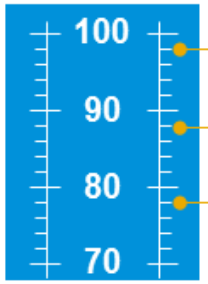
Future: Larger, more complete data sets from specific loan portfolios

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



KPMG and client scales aligned

AAA
AA
A

Loan #	KPMG rating	Client rating
1	B	B
2	C	B
3	AAA	AAA

Evidence

Applying these new technologies allows our auditors to assess larger data populations against complex and judgmental metrics in a highly automated and effective manner.

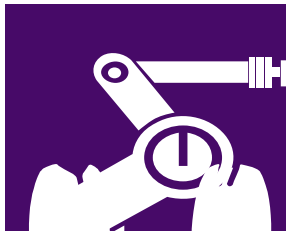
Robotics changing the way business is done

$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% and **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

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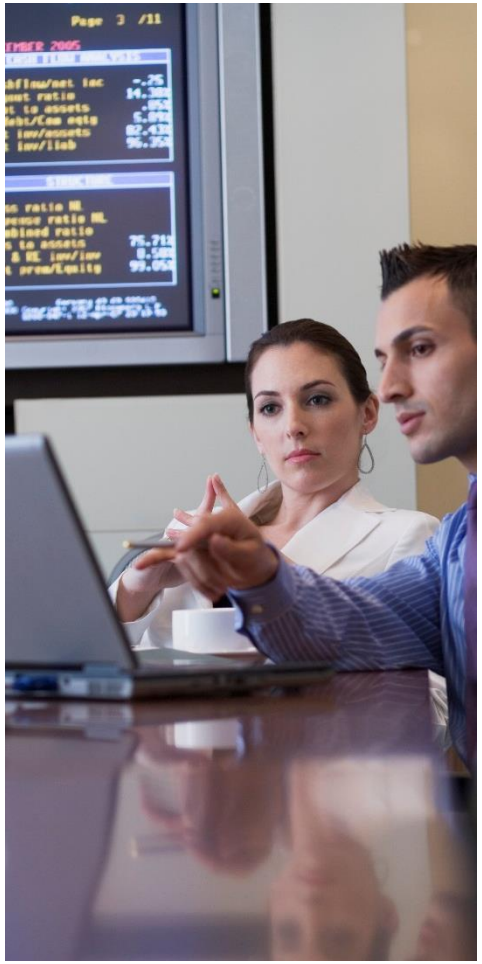
Personnel, skill sets and capabilities

Accountant for the data age



- Is prepared for how the profession has evolved and will evolve in the future
- Is empowered with data and analytics skillsets
- Maintains a firm foundation in accounting, auditing, tax, financial reporting and business acumen
- Is innovative
- Embraces change
- Applies advanced technologies with ease

Knowledge areas for data age accountants

- Common challenges and risks
- Collection, cleaning and analysis of data
- Database design
- Common ERP capabilities
- Technology and options for visualizations
- Decision making in the Data Age
- Use of predictive, prescriptive and regression analysis
- Commitment of time and patience
- Modeling patterns of data, outliers and anomalies

KPMG Master of Accounting with Data and Analytics Program

The first-of-its-kind Program is being developed at:

- The Ohio State University Max M. Fisher College of Business
- Villanova School of Business
- Additional partner universities will be added

Connecting with academia to build accountants for the data age

KPMG master of accounting with data and analytics program

Demonstrates the importance placed by the profession on a quality education

Closes the gap between academic preparation and accounting career readiness

Encourages more students to obtain a graduate education before entering the accounting profession

Influences the broader academic and student community to pursue an advanced curriculum that includes data and analytics

Accelerates "time to impact" for new accounting professionals

Sets the tone for academic innovation in accounting

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Implementing digital transformation

Considerations to implement digital transformation

— **Connect strategic decision-makers with operational owners and D&A practitioners** by partnering with business units and functions to change mindsets and identify and drive most valuable opportunities in analytics

— Utilize your unique position to own the strategy for maximum data sharing in order to **drive data democratization**

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

Digitalization is not easy

Missing Skills – Data Access – Data Quality – Disparate Systems – Data to Insights – Silver Bullet Mentality

Time & patience