TEI / SJSU – High Tech Tax Institute

Tax Automation Discussion

November 14, 2017

Panelists

- Andy Ruggles – Partner, PwC (Moderator)
  National Practice Leader, Tax Reporting & Strategy

- Danyle Ordway – Partner, EY
  Tax Technology and Data Analytics

- John Viglione – Executive VP, Vertex

- Rafiq Jalal – Managing Director, KPMG
  Tax Technology

Agenda

- Trends in tax technology and operations

- Robotics in tax

- Perspective from tax technology vendor (Vertex)

- AI, Analytics and emerging technology

- Getting started

Trends in tax technology

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Tax Technology and Operations - Key trends

Tax Functions are re-evaluating their **target operating model** - is the tax function fit for purpose?

Tax Functions are focused on **reducing cost, increasing value, and managing risk**

Tax transformation is focused on **targeted solutions via proof of concepts** and quick wins, as part of its broader transformation strategy

Automation has rapidly evolved but may **differ across functional** areas

Finance **moving to the cloud** for enterprise systems provides significant opportunity as finance transformations occur

Tax functions are developing capabilities around **Tax Authorities' transparency** requirements → US Tax Reform will have significant impact on today's execution

Robotics is creating a **new digital labor force** for global tax functions

Tax Reporting & Strategy - Tax Ecosystem

Tax	Finance	Third parties

RPA / Digital labor

Automated tax operations management

Enterprise systems

ETL / data hub

Tax applications

Key deliverables

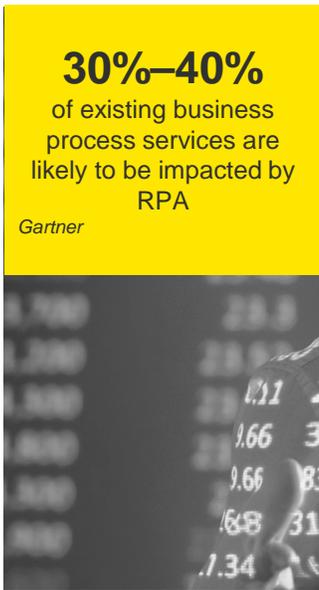Business intelligence and analytics

Robotics in Tax

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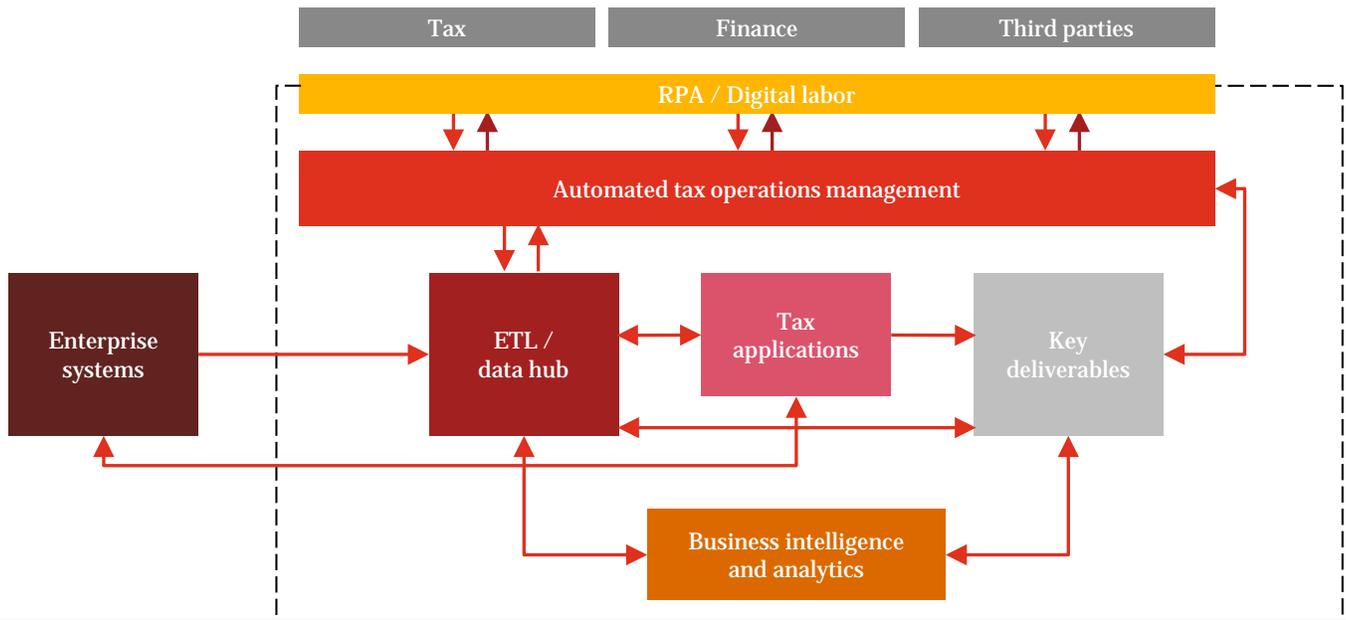
Disrupt or be disrupted?
Headlines capturing attention of executives everywhere

30%–40% of existing business process services are likely to be impacted by RPA
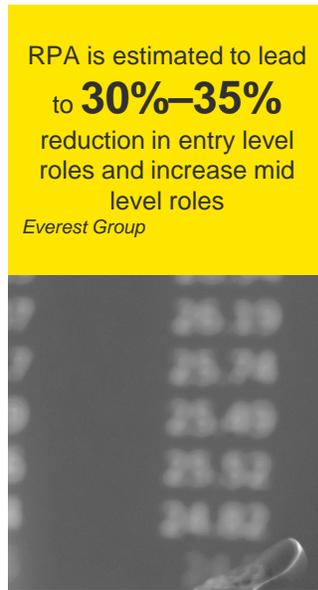*Gartner*

Cost reduction of **35%–65%** for onshore operations and 10-30% for offshore operations
Institute for Robotic Process Automation

RPA is estimated to lead to **30%–35%** reduction in entry level roles and increase mid level roles
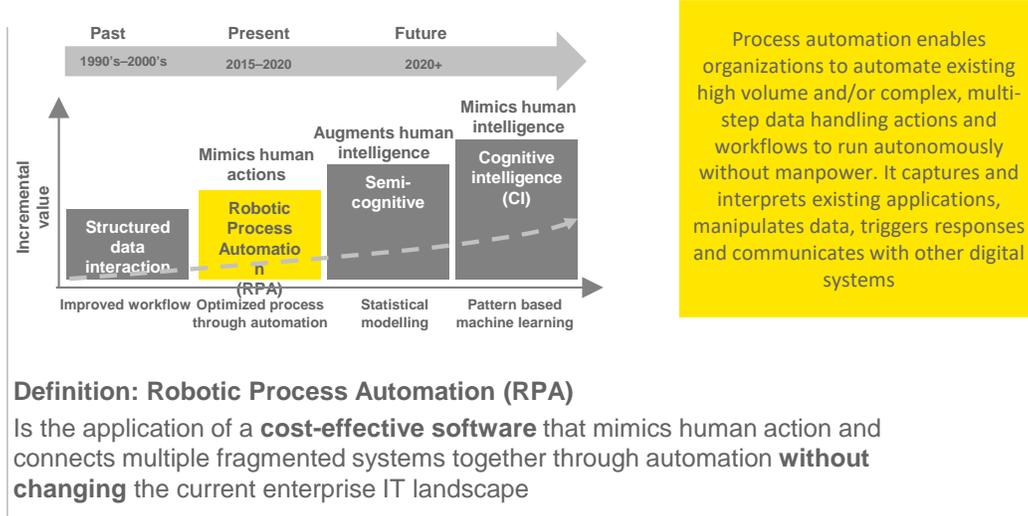*Everest Group*

Estimated that **85%** of a typical firm's **900+** processes can be automated. **110** to **140m** FTEs could be replaced by **2025**
McKinsey & Company

EY

The big picture of Intelligent Automation

Past 1990's–2000's | **Present** 2015–2020 | **Future** 2020+

Incremental value

Mimics human intelligence
Cognitive intelligence (CI)

Augments human intelligence
Semi-cognitive

Mimics human actions
Robotic Process Automation (RPA)

Structured data interaction

Improved workflow | Optimized process through automation | Statistical modelling | Pattern based machine learning

Process automation enables organizations to automate existing high volume and/or complex, multi-step data handling actions and workflows to run autonomously without manpower. It captures and interprets existing applications, manipulates data, triggers responses and communicates with other digital systems

Definition: Robotic Process Automation (RPA)

Is the application of a **cost-effective software** that mimics human action and connects multiple fragmented systems together through automation **without changing** the current enterprise IT landscape

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RPA is an innovative solution for a fully automatic handling of business processes with high volume repetition

What is RPA?

RPA is integrated in an existing IT infrastructure.

As a renewal of the existing IT landscape is not required, a high level of automation can be reached without major effort. RPA uses established control mechanisms and can communicate with all systems. Therefore, no interface has to be created.

"Robots deliver repetitive, deterministic, high-volume tasks efficiently, quickly, and consistently. People build relationships, provide subjective judgement, deliver low-frequency tasks, and manage change and improvement."

RPA simulates an employee.

The software robot has access to diverse applications with an ID or a password. The robot can gather information or change data. Consequently, business and administrative processes can be fully automated.

RPA is software.

RPA is a computer software that runs repetitive, rule-based processes. The software is trained based on functional specifications and can be adjusted at any time.

Case study: Tax provision reporting

The challenge ⚡
- ► Numerous tax provision reports generated from ONESOURCE Tax Provision (OTP) are used by the tax departments during the period close cycle.
- ► Data frequently changes, so the reports must be re-run. Delay in getting the reports to the department has adverse effect on meeting the critical close cycle deadline.
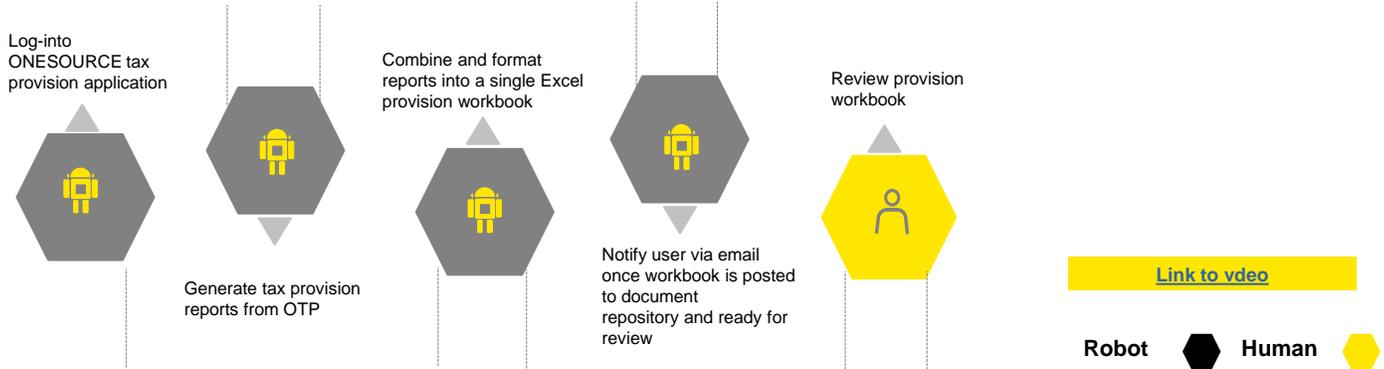
Why automation 💡
- ► During critical quarterly and annual close periods, tax professionals constantly need to run and format reports during the review of the provision, interim provision and estimated payment data.
- ► This is time-consuming and the reports are prone to errors, if they are done manually.

What we did ⚙️
- ► Used Blue Prism RPA tool to generate tax provision reports from ONESOURCE Tax Provision.
- ► The key steps below:

Outcome 📈
- ► Significant time savings, increased speed, accuracy and efficiency (less manual keying of data)
- ► Teams spent more time on review and less time on preparation (better leverage of knowledge worker skills)
- ► Reduced labor cost
- ► Reduced human errors

Log-into ONESOURCE tax provision application

Combine and format reports into a single Excel provision workbook

Review provision workbook

Generate tax provision reports from OTP

Notify user via email once workbook is posted to document repository and ready for review

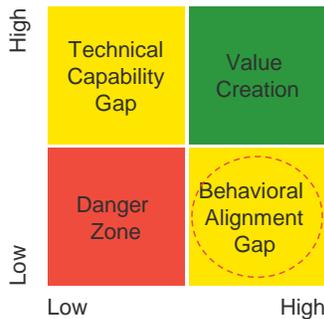**Link to vdeo**

Robot ⬡ **Human** ⬡

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Winning with data and analytics
Investing in the human element

Behavioral alignment
(Analytics 'consumption')
- ► Culture and leadership
- ► Organization and process design
- ► Learning and development
- ► Incentives/rewards

	Low	High
High	Technical Capability Gap	Value Creation
Low	Danger Zone	Behavioral Alignment Gap

Low ——————————— High

Technical capability
(Analytics 'production')
- ► Data science
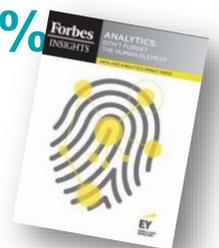- ► Data quality
- ► Infrastructure and tools

Select survey findings:

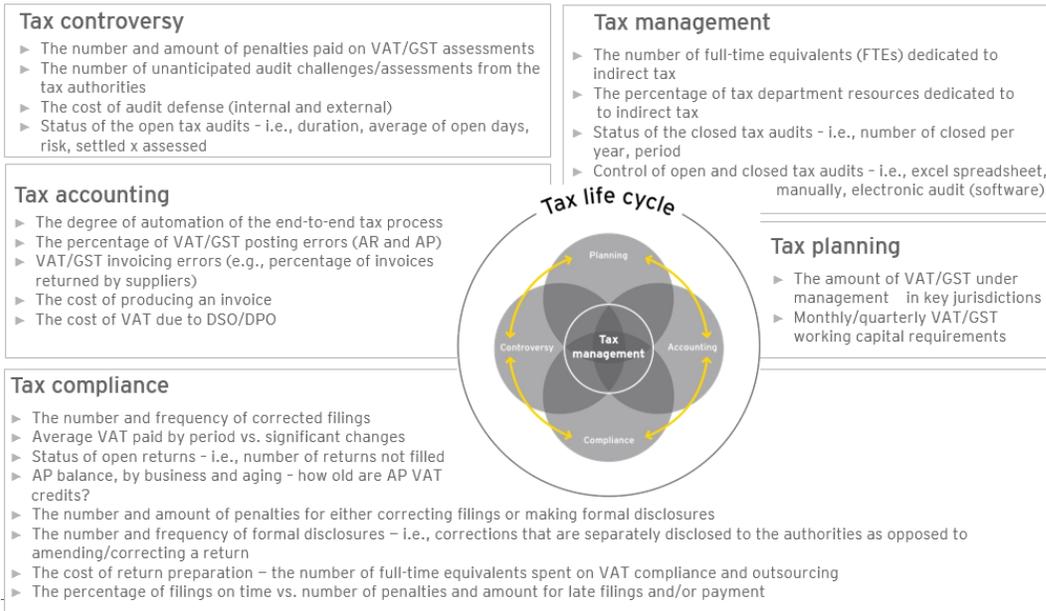% of organizations that agree analytics is changing the nature of competitive advantage? **78%**

% of organizations that are investing $5 **66%**

% of organizations that describe their analytics maturity as leading? **12%**

% of organizations that agree that change management is a significant barrier to realizing value? **89%**

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Content Management & Data Analytics
KPIs – Overall discussion

Tax controversy
► The number and amount of penalties paid on VAT/GST assessments
► The number of unanticipated audit challenges/assessments from the tax authorities
► The cost of audit defense (internal and external)
► Status of the open tax audits – i.e., duration, average of open days, risk, settled x assessed

Tax management
► The number of full-time equivalents (FTEs) dedicated to indirect tax
► The percentage of tax department resources dedicated to indirect tax
► Status of the closed tax audits – i.e., number of closed per year, period
► Control of open and closed tax audits – i.e., excel spreadsheet, manually, electronic audit (software)

Tax accounting
► The degree of automation of the end-to-end tax process
► The percentage of VAT/GST posting errors (AR and AP)
► VAT/GST invoicing errors (e.g., percentage of invoices returned by suppliers)
► The cost of producing an invoice
► The cost of VAT due to DSO/DPO

Tax planning
► The amount of VAT/GST under management in key jurisdictions
► Monthly/quarterly VAT/GST working capital requirements

Tax life cycle

Planning

Controversy — **Tax management** — Accounting

Compliance

Tax compliance
► The number and frequency of corrected filings
► Average VAT paid by period vs. significant changes
► Status of open returns – i.e., number of returns not filled
► AP balance, by business and aging – how old are AP VAT credits?
► The number and amount of penalties for either correcting filings or making formal disclosures
► The number and frequency of formal disclosures – i.e., corrections that are separately disclosed to the authorities as opposed to amending/correcting a return
► The cost of return preparation – the number of full-time equivalents spent on VAT compliance and outsourcing
► The percentage of filings on time vs. number of penalties and amount for late filings and/or payment

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Digital tax maturity model
Data and analytics

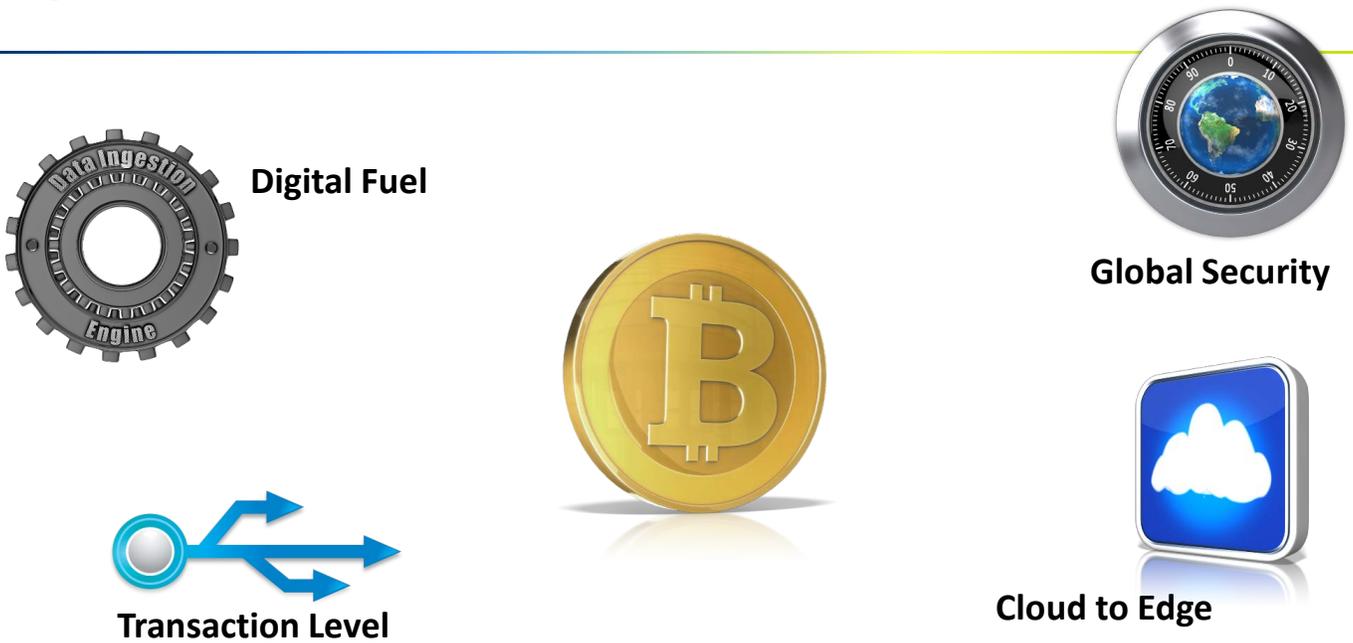|	Basic - 1	Developing - 2	Established – 3	Advanced – 4	Leading - 5
Does the tax function have tax sensitive data at the right level?	Financial systems do not provide ease of access to tax sensitized data and reporting and retention. There is no tax data management strategy in place.	Financial systems are limited in meeting tax data and reporting needs. Inefficient and manual manipulation is needed to collect, reconcile and adjust for each tax process.	Financial systems provide tax sensitized data and reporting; however, mix of automated and manual effort to collect, reconcile and adjust the data into a useable format for each tax process.	Financial systems provide tax sensitized data and reporting; however, mix of automated and manual effort to collect, reconcile and adjust the data into a centralized and re-useable format that is leveraged across tax processes.	All tax sensitized data and reporting is easily sourced from financial systems and leveraged across tax processes leveraging big data technology with automated feeds into tax systems and tools, supporting analytics and dashboards.
Does the tax function utilize data analytics to manage risk and deliver value?	Ad hoc analysis performed on a limited basis and with very little re-usability period over period.	No formal data analytics but regularly perform comparisons to prior period, variance analysis, etc. in Excel workpapers.	Formal data analytics strategy in place with standard Excel templates in place. Supports some discrete tax planning, reporting, compliance and audit processes.	Formal data analytics strategy and use of visualization tool(s) in which the user can interact. Enables standard set of analytics across most tax processes with drill down capability.	Formal data analytics strategy, including plans for machine learning and other cognitive technologies leveraging historical data. Enables advanced analytics with some predictive capabilities.

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Perspectives from Vertex / tax technology vendor

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// VERTEX®

Tax Technology Design Considerations

Digital	Transparent	Intelligent
Inclusive	*Discoverable*	*Augmentative*

VERTEX

Digital

Digital Fuel

Global Security

Cloud to Edge

Transaction Level

VERTEX
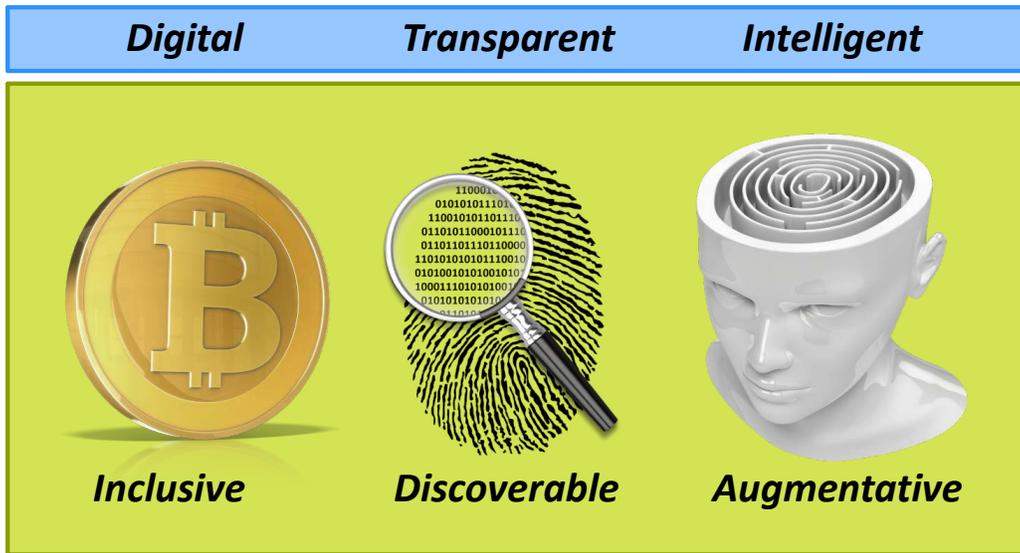
Transparency

Cooperative Compliance

Event Driven

Trust

Social

19

VERTEX

Intelligent

Analytics

RPA

Machine Learning

Narrow AI

SCAN FOR TAX

20

VERTEX

Tax Technology Design Considerations

Digital	Transparent	Intelligent
Inclusive	Discoverable	Augmentative

VERTEX
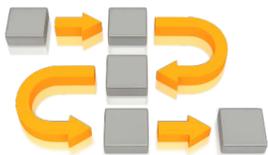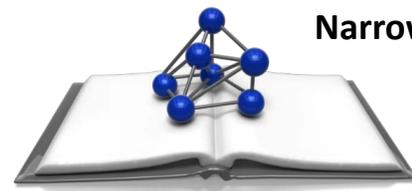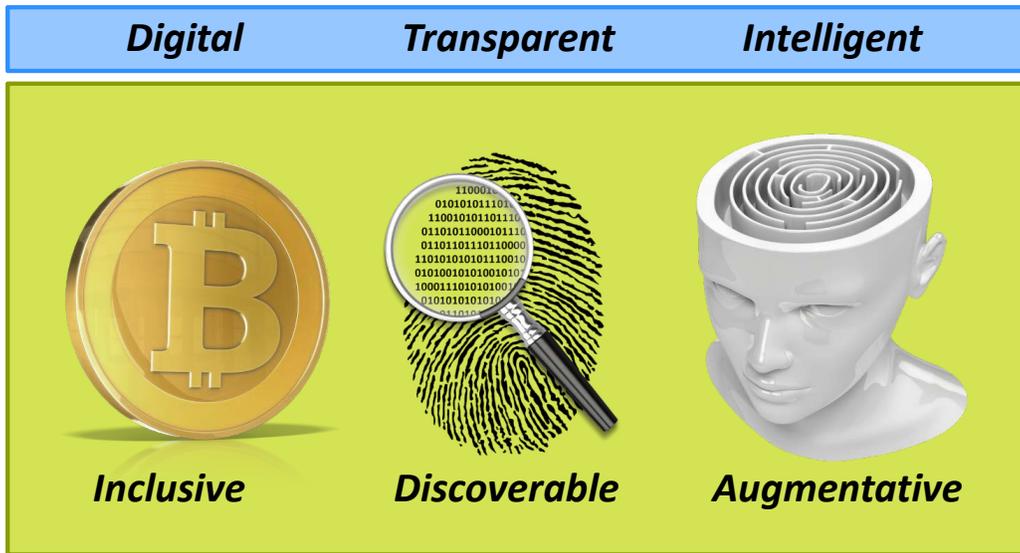
Emerging technology – AI, Blockchain, and Data

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Data in the tax function

Financial Statements	General Ledger Detail	Purchase & Sales Invoices	Tax Adjustment Schedules	Tax Rates, Rulings and Applicable Guidance
Purchase Orders	Fixed Asset Tracking	Inventory Management	CbyC Tax Detail	Pre & Post-Reorg Data
Returns and Workpapers	Transfer Pricing Detail	Compensation & Benefits	Audit, adjustment and amended return history	Customer and Purchase Exemption Certificates
Tax Schedule	Payment and Credit History	Company business activities documentation	KPIs & Reports	Etc.

23

Tax is complicated

24

Database

A database is an organized collection of data. It is the collection of schemas, tables, queries, reports, views and other objects. The data are typically organized to model aspects of reality in a way that supports processes requiring information.

Example 1: Relational Database

Activity code	Activity name
23	Patching
24	Overlay
25	Crack sealing

Date	Activity code	Route no.
01/12/01	24	1-95
01/15/01	23	1-495
02/08/01	24	1-66

Key = 24

Activity code	Date	Route no.
24	01/12/01	1-95
24	02/08/01	1-66

SQL Server   Hive
Oracle   PostgreSQL
MySQL

Example 2: NoSQL Database

Key-value

Column-family

Graph

Document
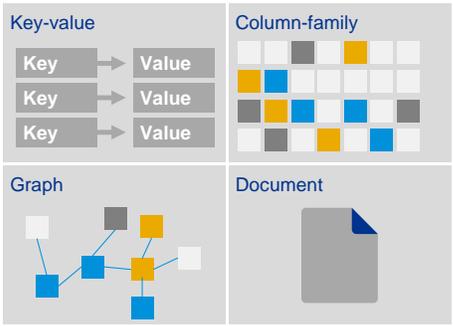
Redis   Cassandra
Neo4j   Mongodb

Analytics

Analytics is the systematic application of **any range of data analysis techniques** designed to **find and explain meaningful patterns in data.** Organizations apply analytics to business data to **describe, predict, and improve** business performance.
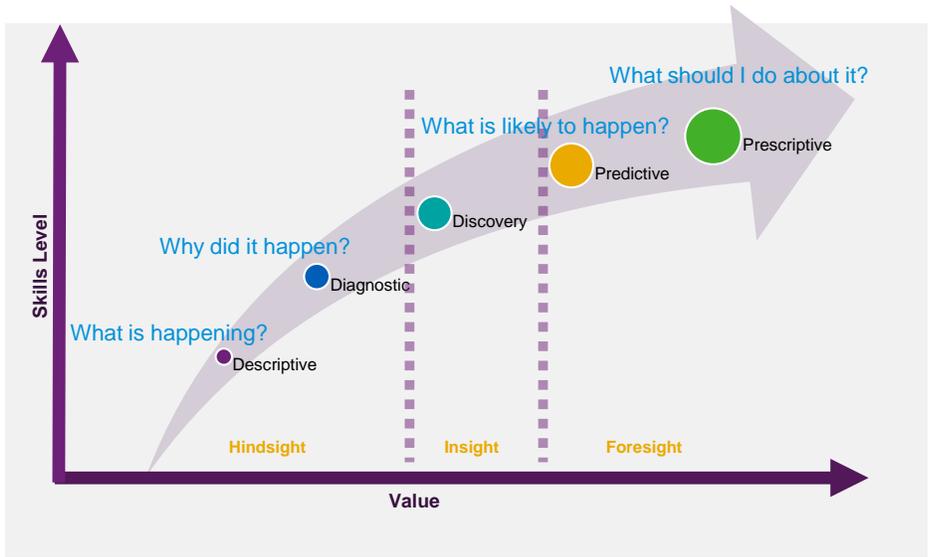
What should I do about it? — Prescriptive

What is likely to happen? — Predictive

Discovery

Why did it happen? — Diagnostic

What is happening? — Descriptive

Skills Level

Hindsight   Insight   Foresight

Value

Big Data

Big data is a broad term for data sets so large or complex that traditional data processing applications are inadequate.
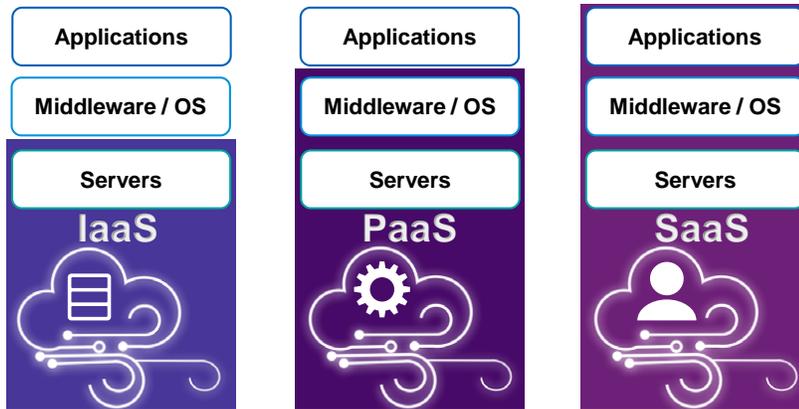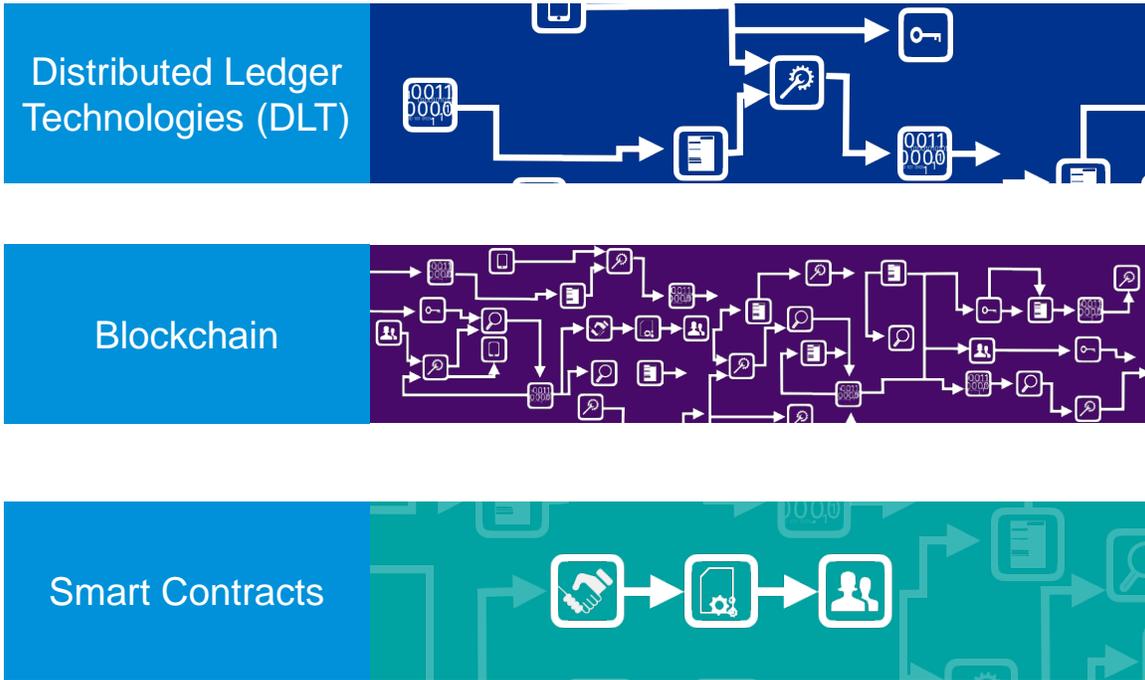

Value
Google processes 2.3 million searches every second. How to explore the trending search topics?

Volume
World Wide Web has 4.8 billion pages.

Veracity
How to merge data drawn from text, images, audio, video and complete missing pieces through data fusion?

Velocity
Facebook processes 105 terabytes of data every half an hour.

Variety
Data types can be numbers, words, images, maps, networks, etc…

Challenges
!

Big Data's benefits is typically characterized by the 5 Vs, however each benefit presents a unique challenge.

Cloud Computing

Cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics, and more—over the Internet ("the cloud").

Cloud ≠ Data Center

Applications	Applications	Applications
Middleware / OS	Middleware / OS	Middleware / OS
Servers	Servers	Servers
IaaS	**PaaS**	**SaaS**

Distributed Ledger Technologies (DLT)

Blockchain

Smart Contracts

Intelligent automation

1800s

Steam, water, mechanical production equipment

1900s

Division of labor, electricity, mass production

1960s

The Information Age - Electronics, IT, Mass Communication, Internet

Today

AI, nanotech, biotech, cyber-physical systems, digital labor
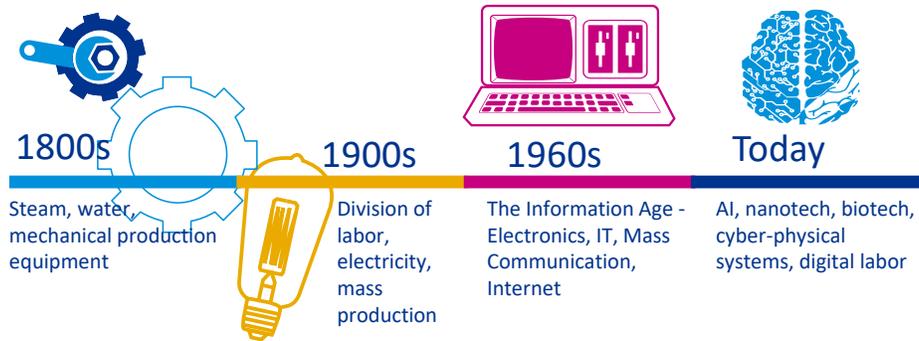
The "4th industrial revolution" (cyber-physical systems) is beginning…and its impact is profound

according to the World Economic Forum founder, Klaus Schwab

Intelligent automation impact

$**152B+** The expected market size for intelligent automation by 2020*

ROI between 600 – 800%*

45% of activities individuals currently perform in the workplace can be automated using existing technologies*

* Bank of America Merrill Lynch, November 2015
* London School of Economics, The IT Function and Robotic Process Automation, October 2015
* McKinsey & Company, Four Fundamentals of Workplace Automation, November 2015

ACT like a human	RULES	LEARN	REASON	THINK like a human
	Basic process automation	**Enhanced automation**	**Cognitive automation**	
	– Macro-based applets	– Built-in knowledge repository	– Artificial intelligence	
	– Screen level and OCR data collection	– Learning capabilities	– Natural language recognition and processing	
	– Workflow automation	– Ability to work with unstructured data	– Self-learning (sometimes self optimizing)	
	– Process mapping	– Pattern recognition	– Processing of super data sets	
	– Self executing	– Reading source data manuals	– Predictive analytics/hypothesis generation	
		– Natural language processing	– Evidence-based learning	
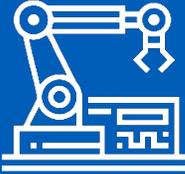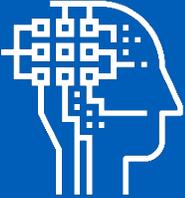
Business implications

Cost Efficiency
Estimates suggest that a software robot is approximately 1/3 of the cost of an offshore FTE. Intelligent automation savings are estimated to be between three and ten times the cost of implementing the automation

Productivity/ Performance
Software robots work 24/7, and 365 days a year; do not take vacations; and perform tasks at digital speeds

Consistency/ Predictability
Expected reduction in mistakes, accidents, regulatory violations and fraud

Quality/ Reliability
Software do what you tell them to do – when properly configured they do not make mistakes and thereby eliminate human error

Employee Satisfaction & Innovation
Eliminating mundane and repetitive tasks frees up human talent to innovate and create
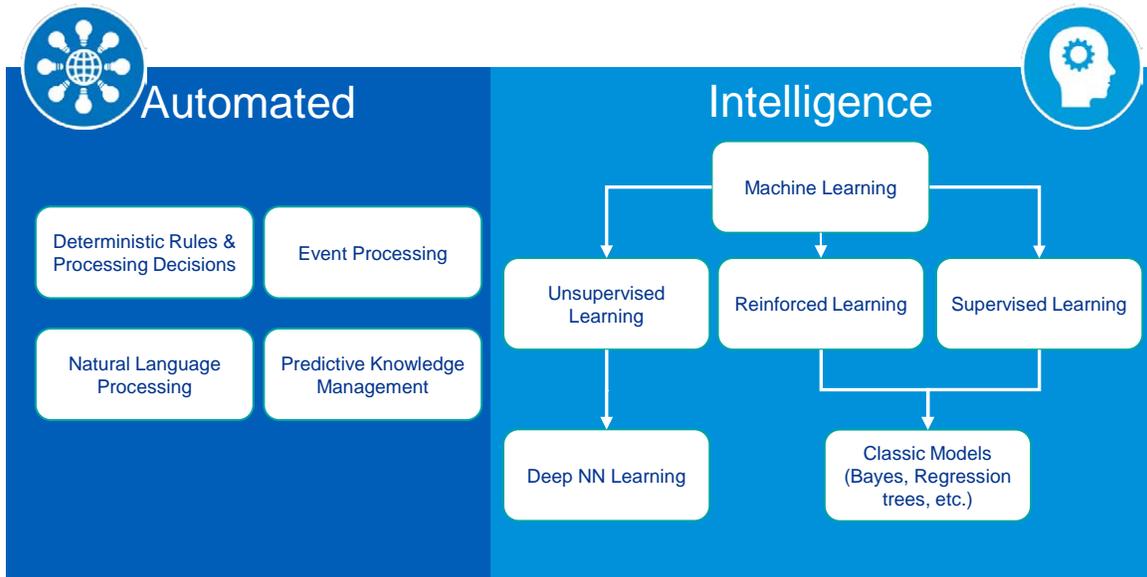
Scalability
Software robots scale instantaneously at digital speeds to respond to fluctuating workloads. There is also no overtime, no hiring challenges and no training.

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AI

AI refers to 'Artificial Intelligence' which means making machines capable to perform intelligent tasks like human beings. AI performs automated tasks using intelligence.
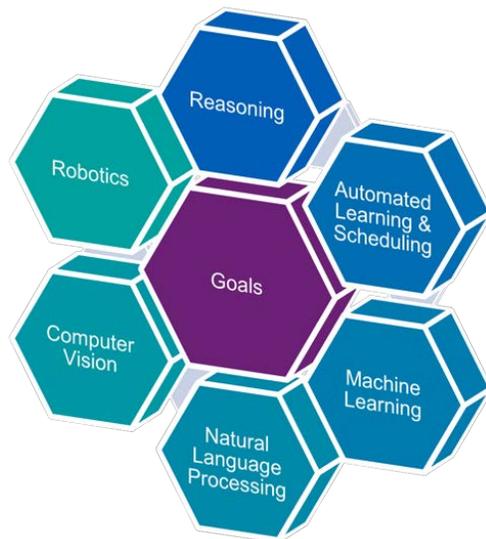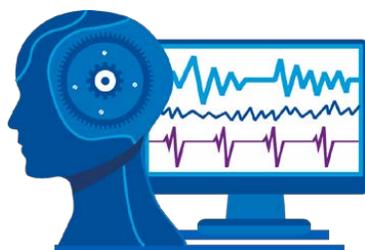
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Areas of AI

Automated	Intelligence

Automated

Deterministic Rules & Processing Decisions	Event Processing
Natural Language Processing	Predictive Knowledge Management

Intelligence

Machine Learning

Unsupervised Learning → Deep NN Learning

Reinforced Learning

Supervised Learning → Classic Models (Bayes, Regression trees, etc.)

Key points

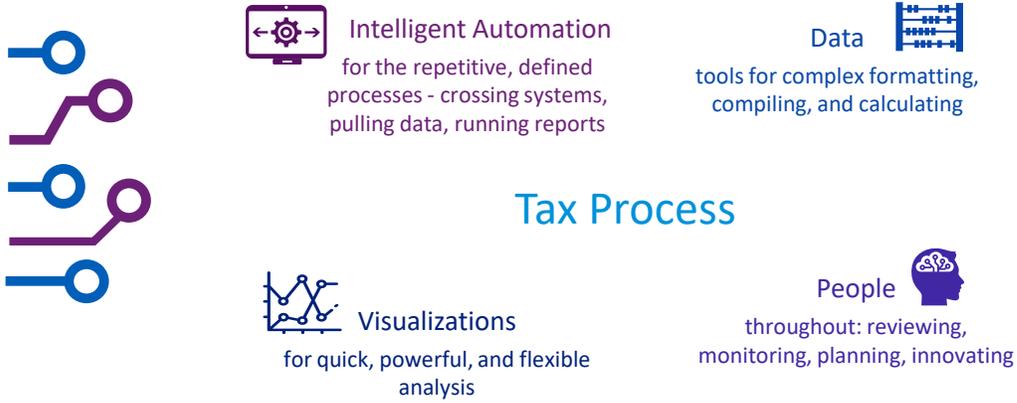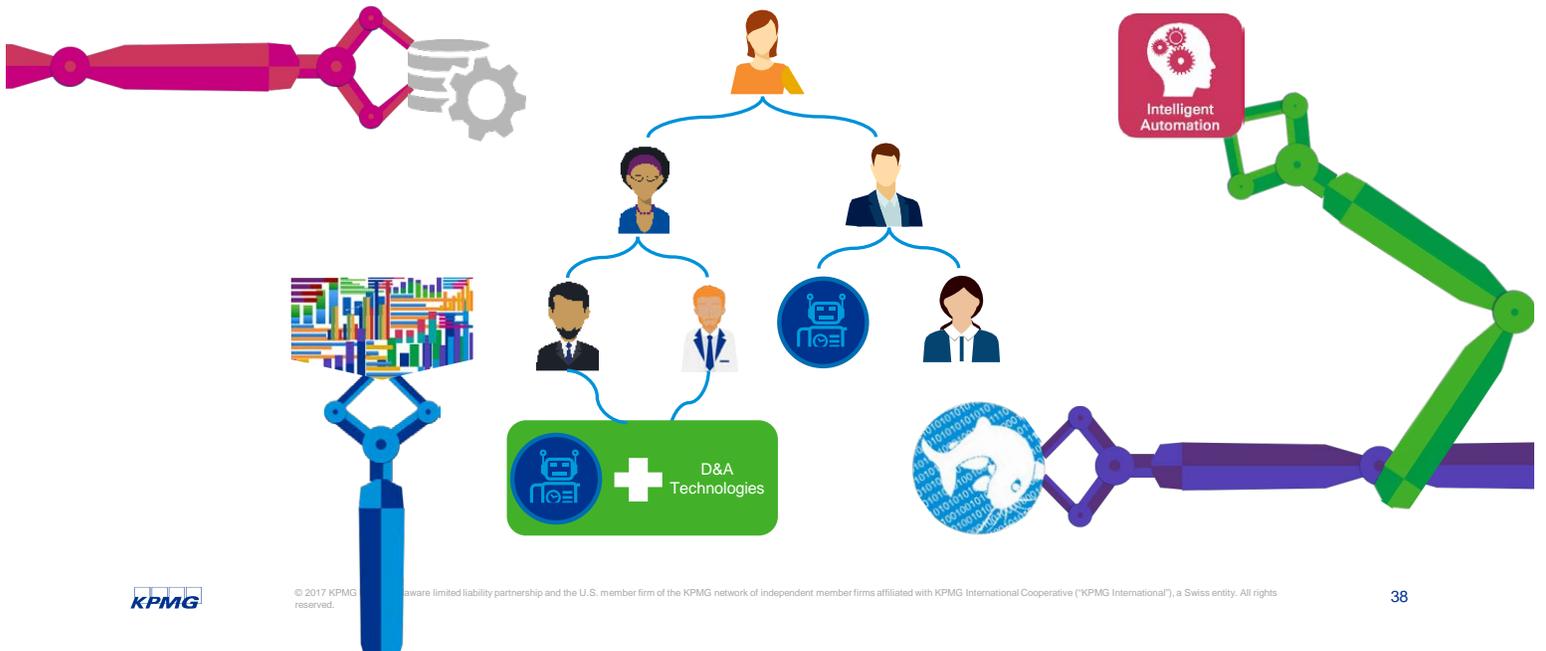|	
Data, data and more data	The need for large volumes of data is paramount. All cognitive systems trained through consumption of large volumes of data, to see patterns and connections. This takes time and effort, prior to system being ready for production.
	Quality of data becomes critical. When dealing with documents that originate on paper and are then scanned, the quality of scanning will directly impact how the system can recognize text and read it. This is a catalyst for change and will add another lever for the industry to move towards electronic records, similar to how the medical profession has moved to Electronic Medical Records.
Cognitive Systems can (and will) make mistakes	Much like a human being, the system learns through experience and gets increasingly better with time. However, just like a human being, it is often impossible to reach an answer with 100% certainty. Cognitive systems will provide the confidence level of its answer and it will be up to us to determine the usefulness of the evidence.
Extendible, but incrementally so	Because training of a **cognitive system** is a tremendous effort, it is almost always the right approach to use as narrow of a field as possible. This limits the amount of training required and allows the system to show benefits much sooner.

A combined approach for tax

Intelligent Automation
for the repetitive, defined processes - crossing systems, pulling data, running reports

Data
tools for complex formatting, compiling, and calculating

Tax Process

Visualizations
for quick, powerful, and flexible analysis

People
throughout: reviewing, monitoring, planning, innovating

37

How will your tax function evolve?

D&A
Technologies

Intelligent
Automation

38

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Considerations in getting started

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Tax Department Service Model Spectrum

Internal ················· External

In-house tax function	Selected outsourcing	Co-sourcing arrangements	Fully outsourced compliance	Managed Services
Significant investment of time and capital	Outsource strategic components of the tax function where either capacity or internal knowledge does not exist	Collaborate with external resources on certain tax functions	Fully leverage service providers in fulfilling tax compliance obligations	Realize cost savings by consolidating tax expenditures to one dedicated service provider while retaining "in-house" approach
Sole reliance on internal resources and expertise	Minimize in-house tax department to critical or highly sensitive areas	Leverage outside expertise on specific tax technical areas	Allow internal resources to perform higher value activities such as strategic planning	A tax function of the future model that comprehensively delivers tax needs
Limited resources available for internal consulting project	Leverage external technology platforms to reduce internal spend	Retain in-house tax expertise to manage co-sourcing operations and assist with acute tax issues and consulting	Reduce significant risks associated with global tax compliance	World-class talent utilizing leading tax technologies
Inability to leverage external technology applications				

Getting Started

- Strategy design – what is the best starting point?

- Business case – what are best practices?

- Getting started – what are organizations doing?

Tax Function of the Future series

To download our publications in the Tax Function of the Future series visit:

pwc.com/us/futureoftax