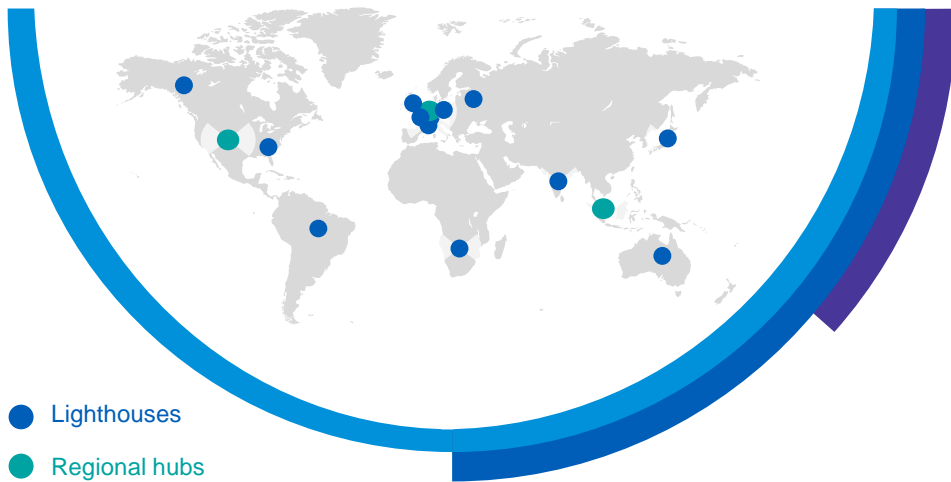


# KPMG Lighthouse

## Center of excellence for data-driven technologies



The KPMG Lighthouse network combines our data-driven technologies and capabilities with our deep-rooted domain expertise to accelerate innovation, drive speed and relevance and ensure global scale for data-driven solutions. KPMG Lighthouse teams leverage data, analytics and artificial intelligence technologies to build and deliver solutions that transform the business of our clients.

3bn+	12,500+	7,000+	1,700+	600+	7	4	2
USD global revenue	KPMG experts around the world	delivered client engagements per year	data scientists	pre-built solutions	Insights Centers	strategic partnerships with Google, IBM, Microsoft and Oracle	global platforms <ul style="list-style-type: none"><li>• KPMG Ignite</li><li>• KPMG Sofy</li></ul>



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Advanced data management  
Data engineering  
Data mining  
Big data

### Data and analytics

Data visualization  
Smart data transformation  
Analytical modelling  
Analytical enterprise  
Advanced analytics  
Deep learning  
Algorithm assurance  
Pattern recognition

### Intelligent Automation

Virtual agents  
Cognitive automation

### Artificial Intelligence

Optimization and simulation  
Knowledge-based systems  
Natural language processing  
Voice / image recognition  
Reasoning  
Machine learning  
Robotic process automation  
Decision modelling

# KPMG Lighthouse

## Our unique offering

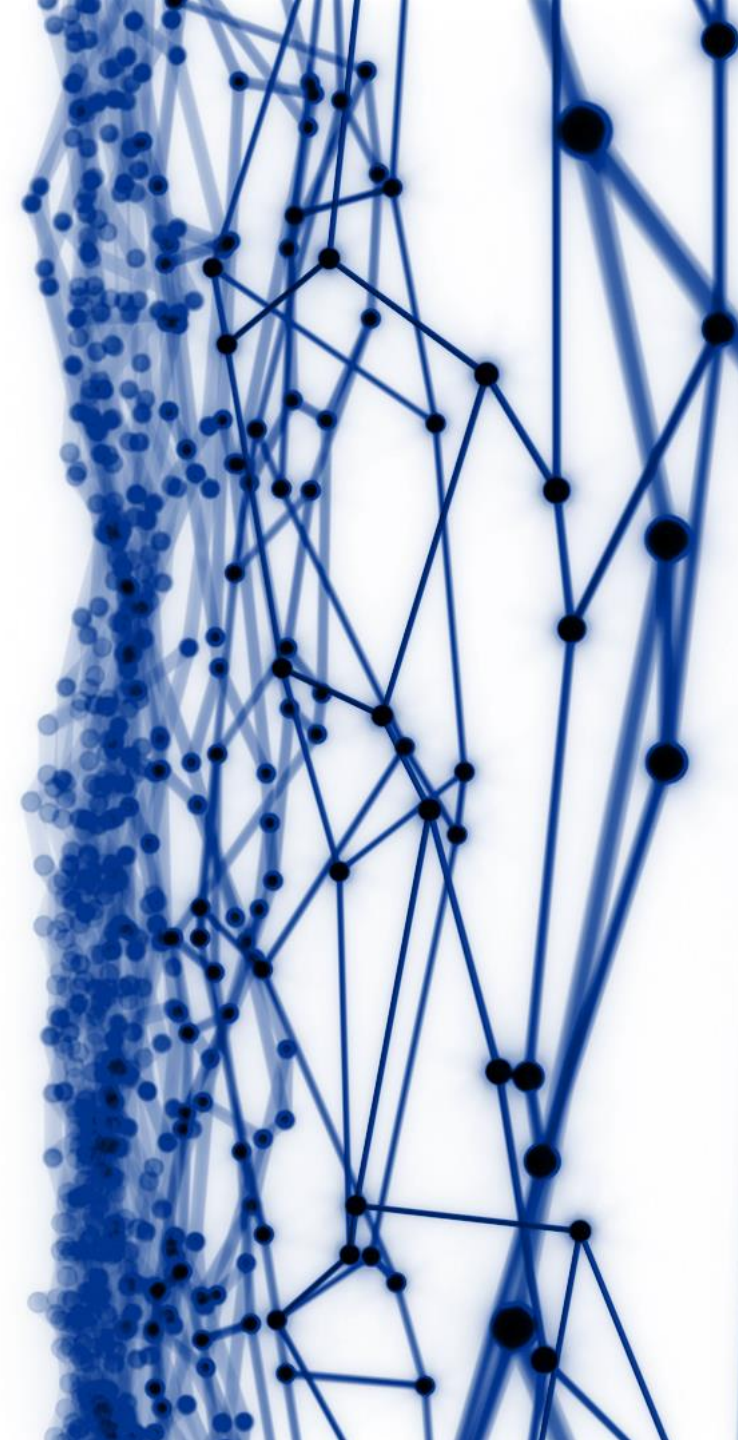


Delivering data-driven  
solutions that transform  
businesses

Supporting the C-suite	Taking a business-first perspective	Leveraging deep industry and process knowledge	Taking an AI-first approach	Delivering trusted analytics solutions and services	Leveraging platforms for analytics and artificial intelligence	Creating competitive advantage	Accelerating global innovation
With full-scale transformation services powered by data-driven and AI-enabled solutions	Focused on solving complex business issues with analytics, rather than a technology-first approach	Defining problems, articulating and building domain solutions, and delivering end-to-end services	Across the full spectrum of the value chain, creating analytics and automation solutions that are transforming business and operating models	So business leaders can rely on the analytics, and trust that their data is safe	To scale global innovation, development and deployment of customized solutions	By unlocking the value of our clients' data and supplying unique sources of external data	Driving innovation at the pulse of emerging technologies such as Internet of Things (IoT) and blockchain



# KPMG Lighthouse Center of Excellence for data-driven technologies



# KPMG Lighthouse

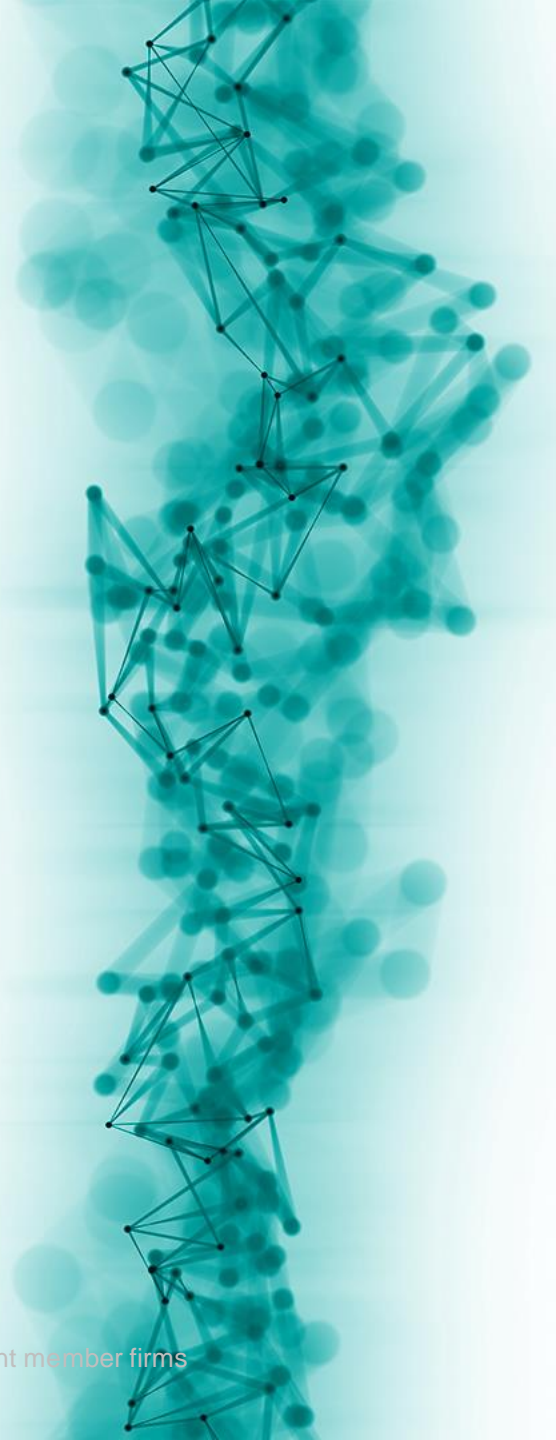
## Data-driven technologies and capabilities

**Helping clients transform their business by unlocking business value and addressing their growth, risk and cost strategies.**

We help our clients successfully transform their business by combining data-driven technologies and capabilities with KPMG's integrated global network and deep domain expertise.

**People keep our approach human.**

**Our business-first ecosystem builds client-led solutions.**

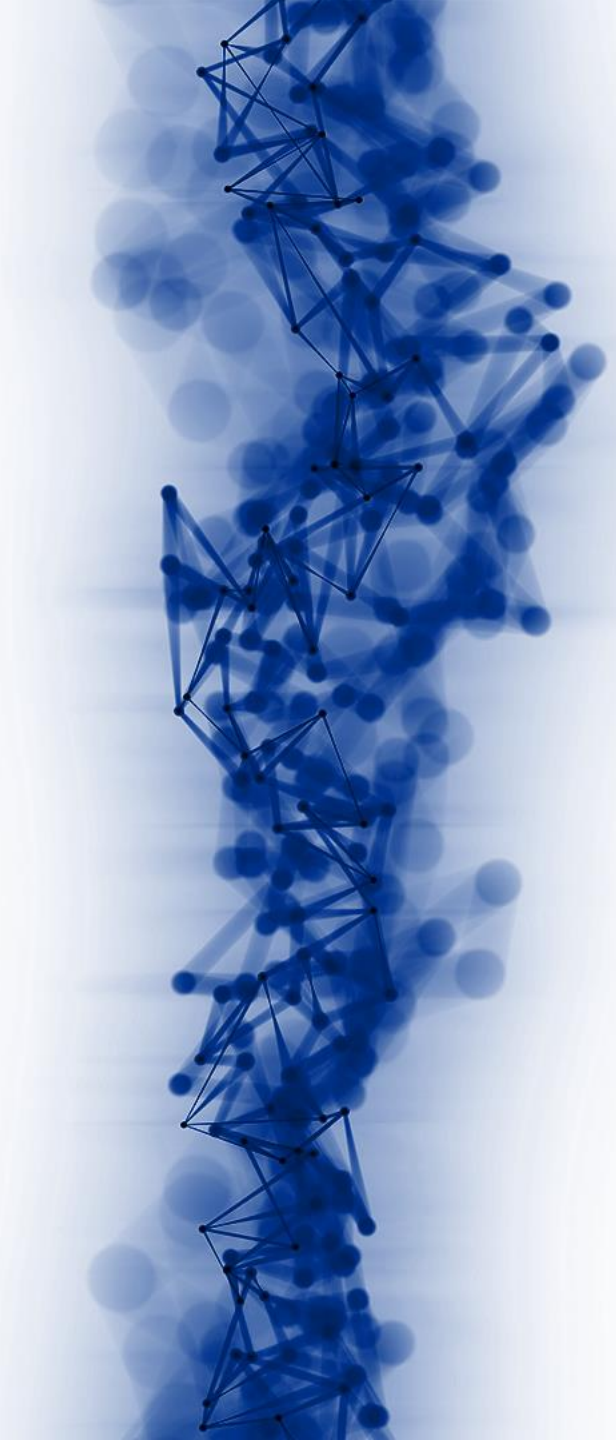




# Contents

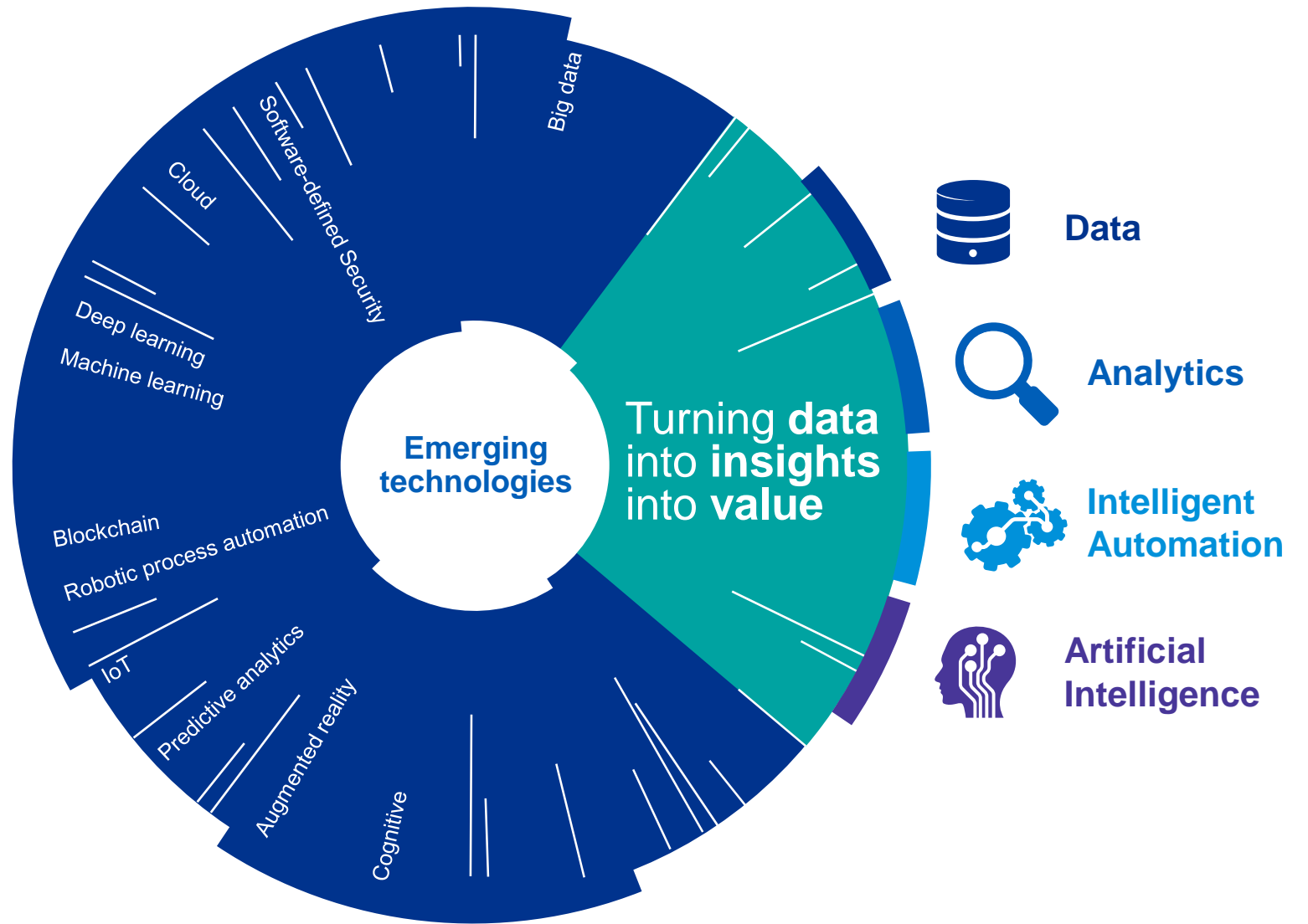


# Delivering results

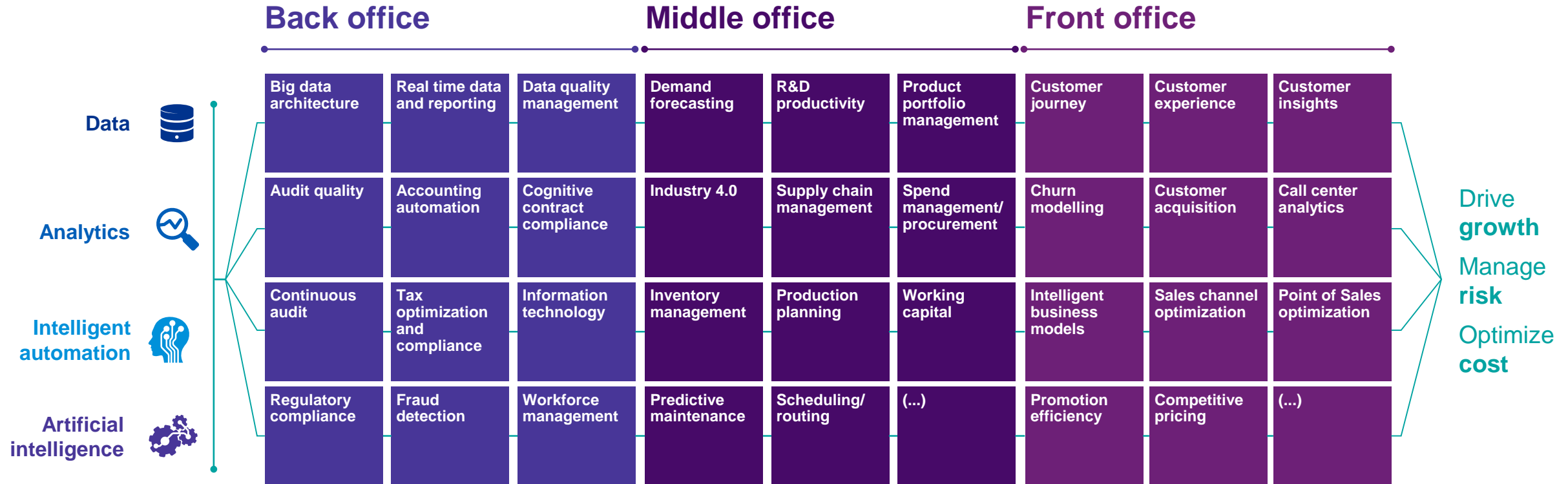


Disruption  
or reinvention

**Helping unlock the  
future of your  
business**



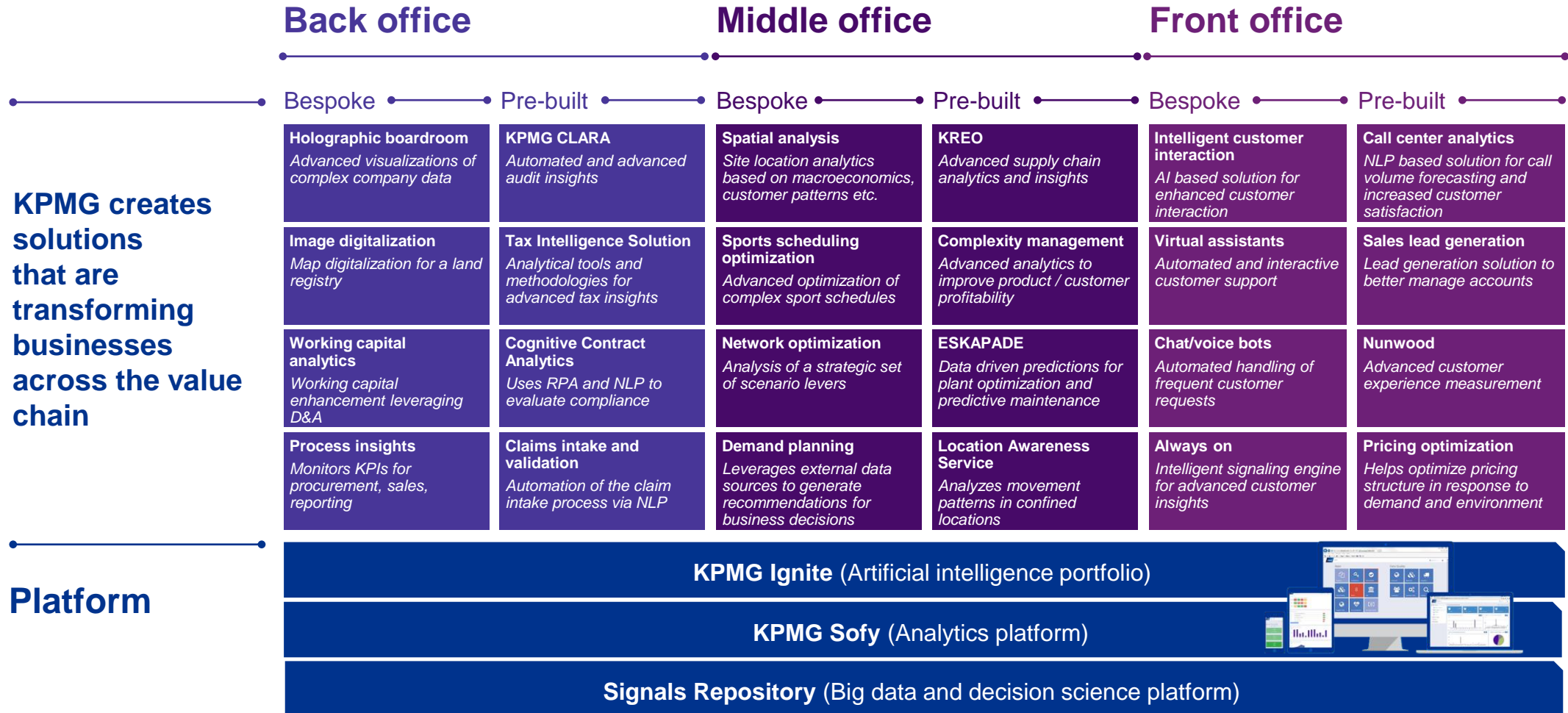
# A business-first approach



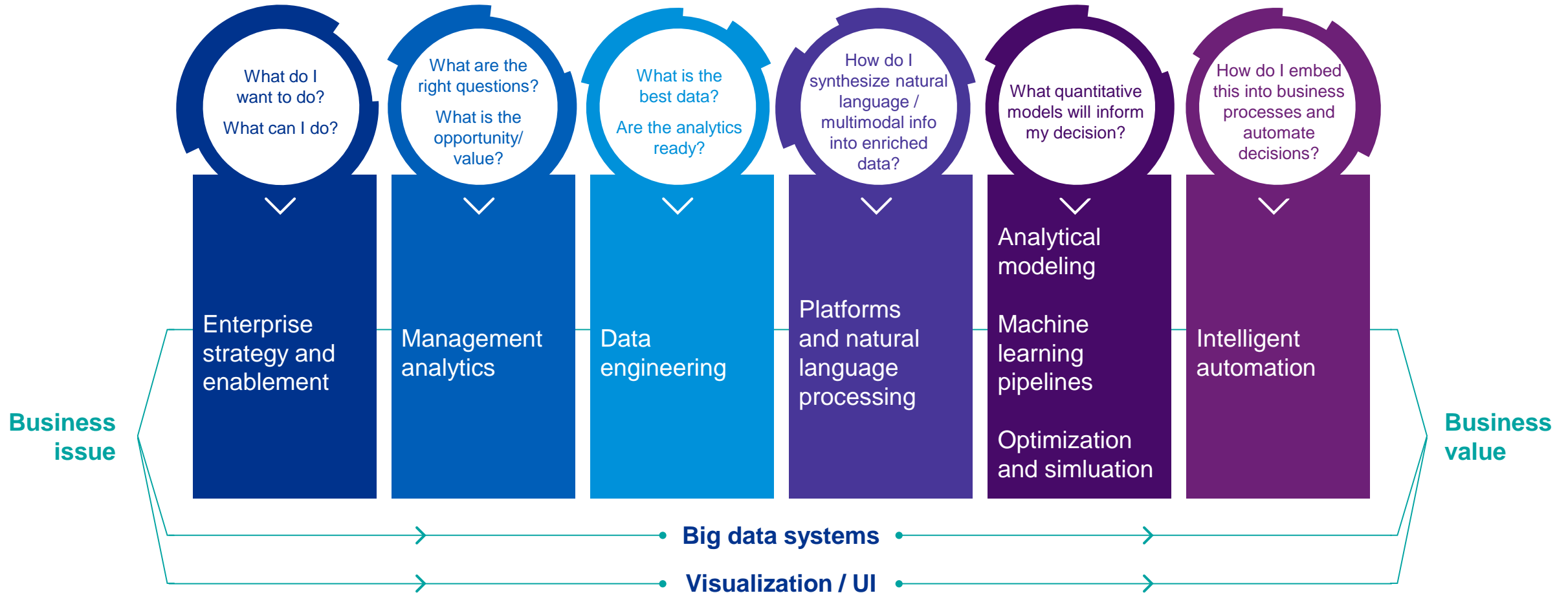
**Starting from the business issue, KPMG applies data-driven technologies to the core processes of the business to drive growth, manage risk and optimize cost.**



# Customized solutions to drive competitive advantage

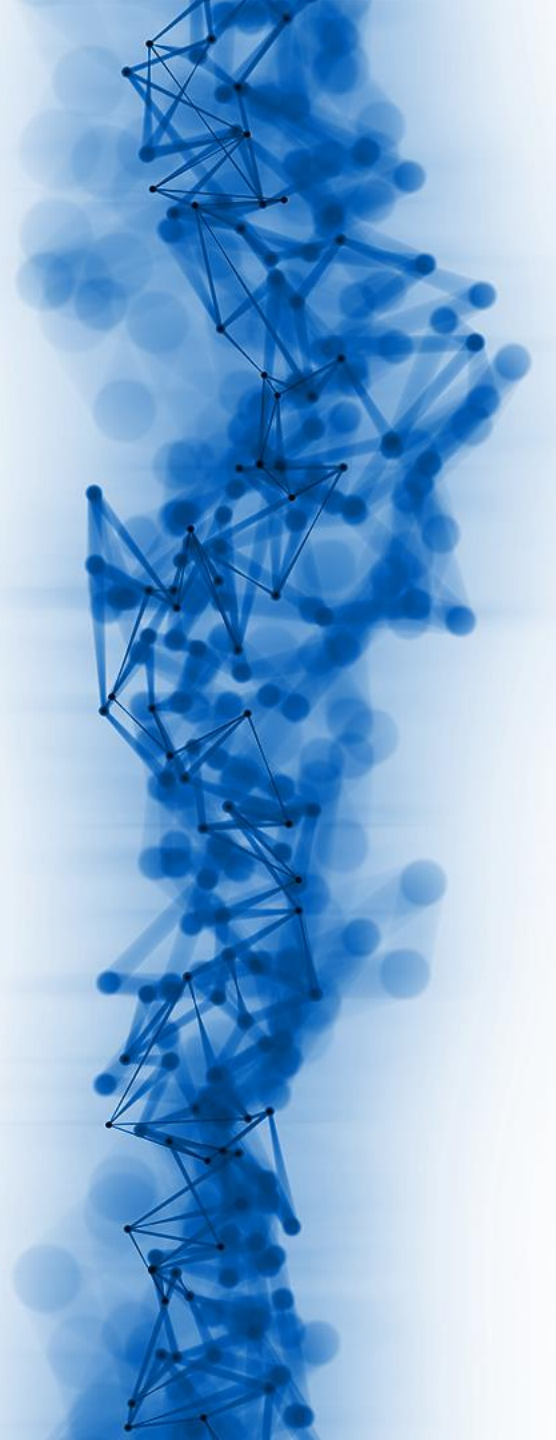


# Providing data-driven services for digital transformation



**KPMG works alongside clients throughout their digital transformation journey**

# Trusted approach



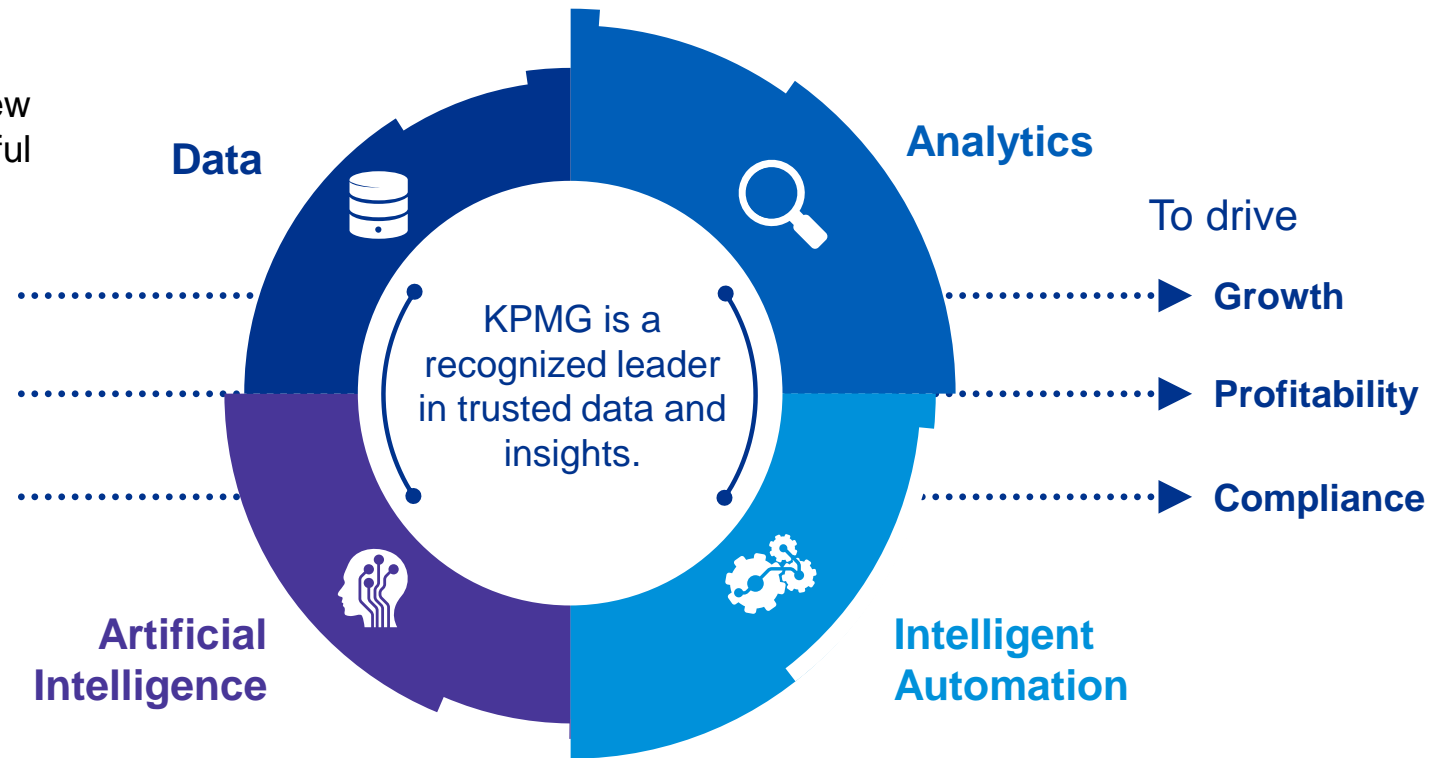
# Embracing new technologies

**Artificial intelligence is taking data, analytics and intelligent automation capabilities to the next level**

Data, analytics and intelligent automation are fundamental to everything that we do to gain new insights and help drive successful business outcomes.

We leverage artificial intelligence to **enhance**, **accelerate**, **automate** and **augment** business decisions and processes that drive growth and profitability.

We **embrace** the potential of data-driven technologies and understand it must be carefully cultivated to become a trusted core capability.



# Driving business outcomes

**As algorithms take over, we know what it takes to be successful**

**A model is only as successful as the data that underpins it.**

We start with the basics and help create differentiated competitive advantage by unlocking the value of clients' data and tapping into varied sources of external data.



**Real value often only comes with scalability, repeatability and effective deployment.**

KPMG's knowledge and capabilities are designed to accelerate development and bring data-driven technologies to scale. Algorithms are designed to enable humans. Data-driven technologies are embedded into clients' day-to-day business to drive real impact.

**We understand that algorithms and models have little or no value unless they are anchored in a strong understanding of the business context.**

New and enhanced insights can only be delivered by advanced analytical techniques that are grounded in a deep business understanding. KPMG professionals apply relevant domain knowledge across functions to help our clients succeed.

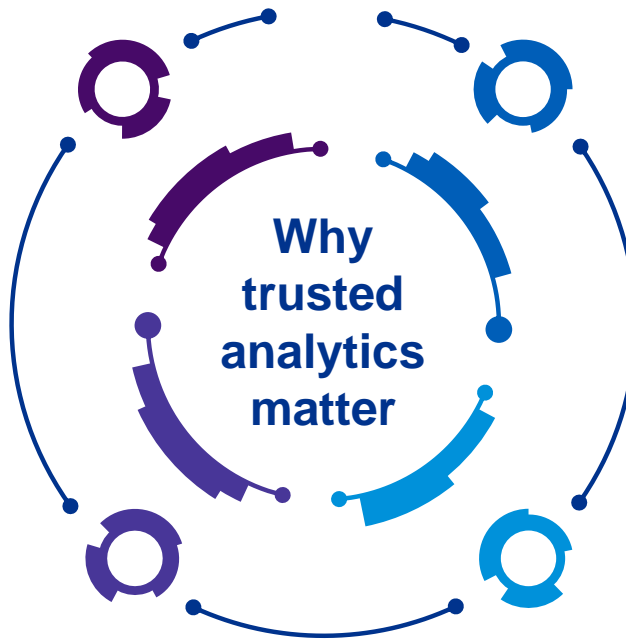


# Why trust matters

**Trust in analytics is becoming a defining factor in an organization's success**

Data-driven technologies can unlock market opportunities and create significant disruption for organizations around the world.

As artificial intelligence sweeps through almost every industry, trusted analytics become a defining factor in an organization's success or failure.



The trust gap grows: C-suite executives question the trustworthiness of data and analytics and this trust gap is not reducing with experience or time.

As more and more decisions are made by machines, companies should implement tighter governance arrangements for analytics to maintain trust and leverage the full potential of data-driven technologies.

# Building trust in AI-enabled analytics

Effective analytics are grounded in four anchors of trust



## Like human, like machine

KPMG professionals believe that in today's analytical enterprise the governance of machines is as important as the governance of people. Governance of machines must be integrated across the organization to cultivate trust.

## Four anchors of trust

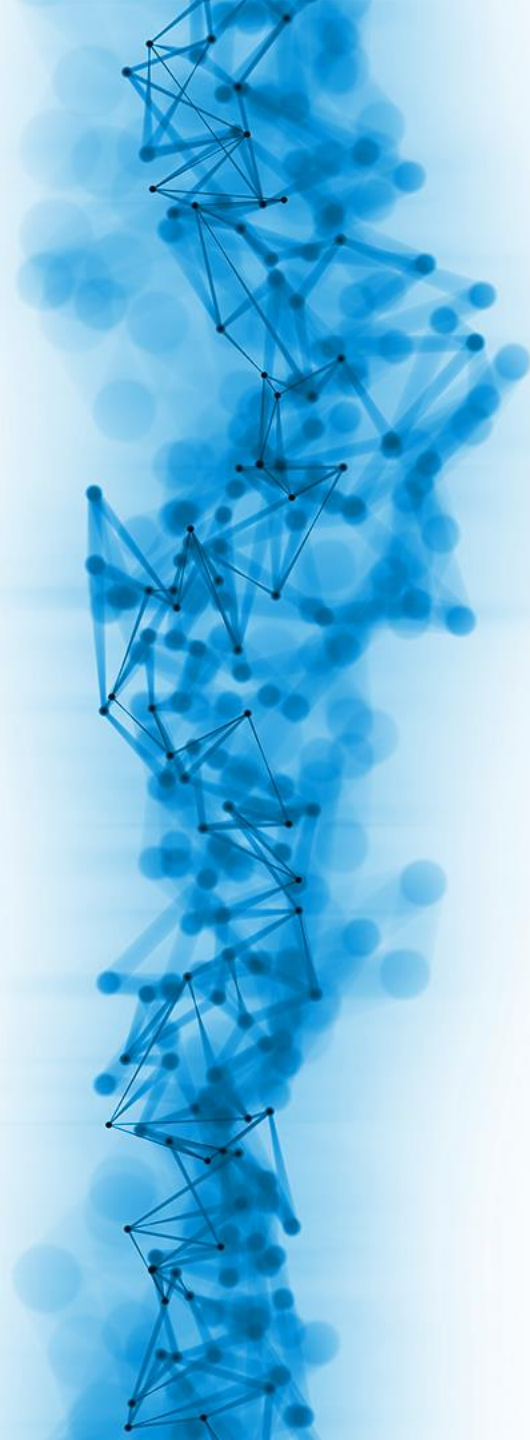
We believe that trust in analytics is founded on four key anchors — quality, effectiveness, integrity and resilience. Companies should take a systematic approach to trust that spans the lifecycle of analytics.

## Holistic framework

At the core of trusted analytics are rigorous strategies that aim to maximize trust. AI-enabled analytics must be cultivated throughout their lifecycle until they become a trusted core competency, from design through to the ongoing management and integration of machines.

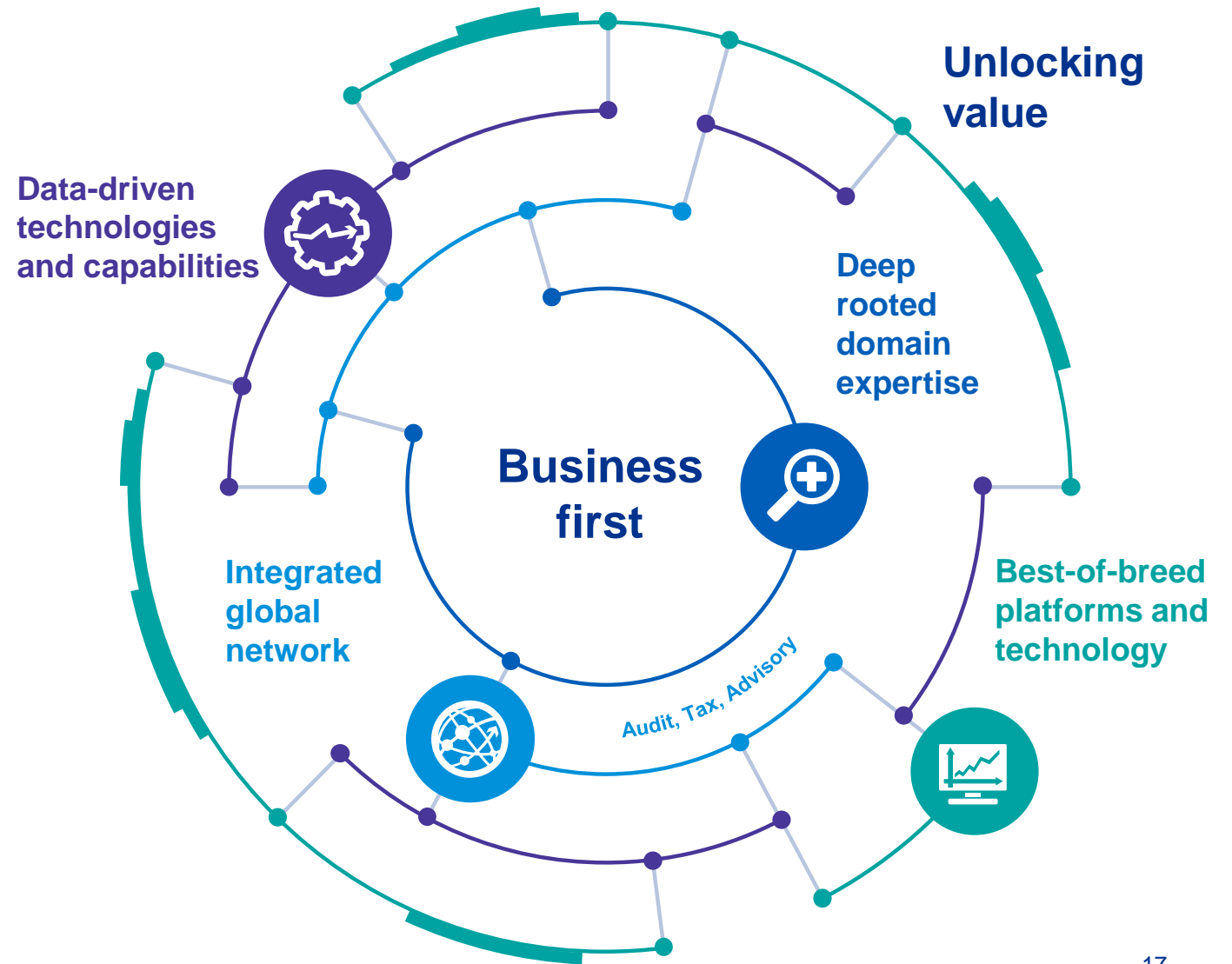


Creating value  
through our  
data-driven  
capabilities



# An ecosystem built for success

## KPMG's capability portfolio:



# Data-driven capabilities transform businesses

## Data

Our professionals help create competitive advantage by unlocking the value of our clients' data and tapping into unique sources of external data.

## Analytics

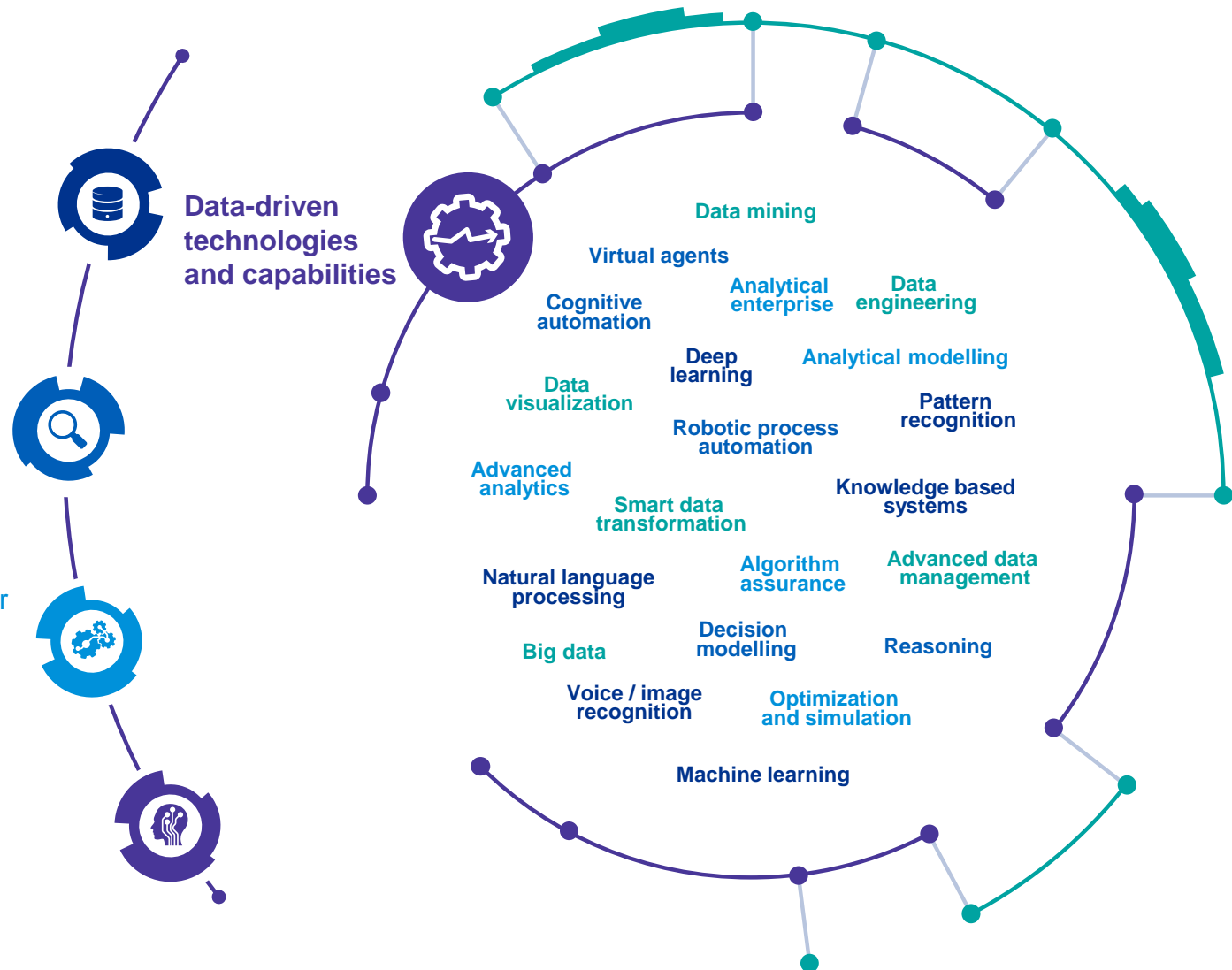
We have developed trusted solutions to help business leaders gain new insights and make better and faster business decisions with confidence.

## Intelligent automation

Our capabilities help clients to accelerate their automation strategies and bring knowledge and practical experience at scale.

## Artificial intelligence

Our professionals leverage AI to enhance, accelerate, automate and augment decisions while keeping the 'human in the loop'.





# Turning data into competitive advantage



## What it is

Data, in the context of computing, refers to distinct pieces of digital information. Data exists in multiple structured (e.g. formatted data bases), semi-structured and unstructured (e.g. social media streaming data) format and comes in a variety of forms, such as numbers, text, images, voice. Today's key data management challenges in identifying and capturing the right data and managing quality come with the '3Vs' – the volume, the variety and the velocity of data.



## Unlocking the value

Data-driven technologies can only be as good as the data that supports them. We help create competitive advantage by unlocking the value of our clients' data and tapping into unique sources of external data.

KPMG's capabilities in advanced data management are designed for large amounts of data and complex combinations of data sources and data models.

KPMG provides the data understanding to make an organization 'AI-ready'. Starting from the business issue, our professionals help clients to identify and leverage the right internal and external data sources. We apply advanced technologies to transform and visualize data to provide advanced insights and make faster, relevant and real-time business decisions.

# Creating insights that lead to valuable outcomes



## Analytics

### What it is

Analytics refers to quantitative techniques and processes used to enhance productivity and provide business gain. Analytics are applied to various sources of structured and unstructured data to identify, extract, interpret and visualize meaningful patterns to provide advanced insights. Analytics range from simple descriptive reporting to predictive and prescriptive algorithms that leverage the full potential of artificial intelligence.

Analytical  
enterprise

Advanced  
analytics

Analytical  
modelling

Optimization  
and simulation

Algorithm  
assurance



### Unlocking the value

Complex analytics underpin the most important decisions we make as individuals, businesses and societies.

Our portfolio of services focuses on the latest data science and computing techniques to help solve our clients' specific business needs. A combination of analytics experience, trustworthy data, and industry/functional knowledge frame the problem and develop continuously self-improving solutions.

By leveraging artificial intelligence, we have developed trusted solutions to help business leaders gain new insights and make better and faster business decisions with confidence.

# Accelerate business outcomes through Intelligent Automation



## Intelligent automation

### What it is

Intelligent automation is more than basic automation and robotic processes underpinned by data. Applications for data-driven technologies include automation and digitizing of business operations through knowledge augmentation and decision enhancement of highly skilled professionals such as executives, accountants, attorneys and scientists. In their most advanced form, these technologies will interpret vast amounts of data from multiple structured and unstructured sources, evaluate evidence and use specific algorithms and ontologies to simulate human reasoning and automate decisions based on a mix of evidence and probability.

Robotic process  
automation

Decision  
modelling

Reasoning

Cognitive  
automation

Virtual  
agents

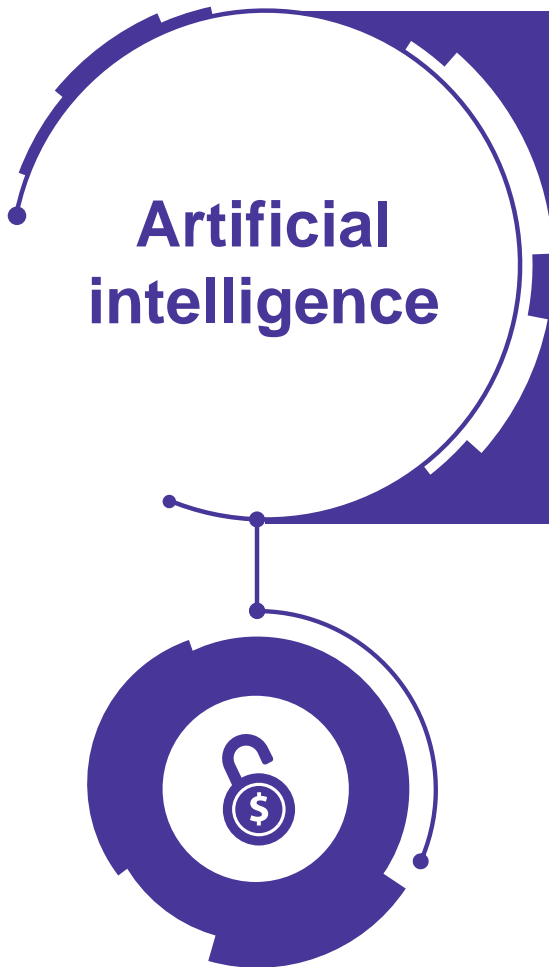
### Unlocking the value

Underpinned by artificial Intelligence, RPA and data and analytics, intelligent automation will redefine business and operating models as well as offer new ways to build competitive advantage.

KPMG's intelligent automation capabilities were built to help clients unlock the value of AI to accelerate their strategies for automation to bring knowledge and practical experience to unprecedented levels.

At the same time, KPMG professionals can help clients analyze company core values to help determine how to harness new technologies in ways that match organizational goals as well as align to ethical goals.

# Artificial intelligence reinvents business models



## What it is

Artificial intelligence is a collection of advanced technologies that allows machines to sense, discover, comprehend, reason, act and learn.

- AI can take multiple types of data: unstructured, images, voice, etc.
- AI uses a large landscape of algorithms and tools to perform, for example, machine learning and natural language processing.

Pattern  
recognition

Knowledge-  
based systems

Deep  
learning

Voice / image  
recognition

Machine  
learning

Natural language  
processing

## Unlocking value

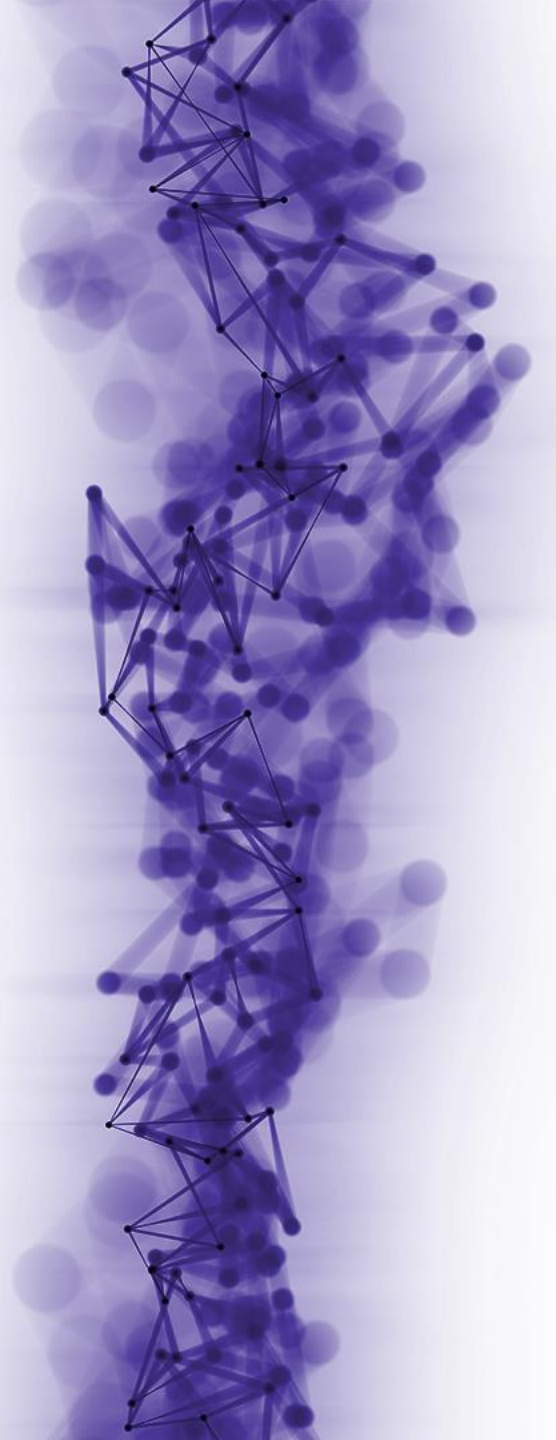
AI is fundamentally reinventing how businesses operate, compete and thrive. KPMG professionals help clients lower labor costs, increase workforce capacity, increase quality and ultimately deliver more insights - more consistently.

The AI ecosystem enhances, **accelerates**, **automates** and **augments** decisions that drive growth and profitability. AI combined with deep industry and analytics expertise helps clients embrace intelligent technologies **confidently and responsibly**.

**AI is not something you buy, it is something you build.**

- Delivering the promise of AI is not possible without having ‘humans in the loop’.
- AI has no perspective, no point of view, no purpose. It requires humans to train, to test and to tune.
- AI must be cultivated, until it becomes a trusted core capability.

# Global ecosystems and infrastructure

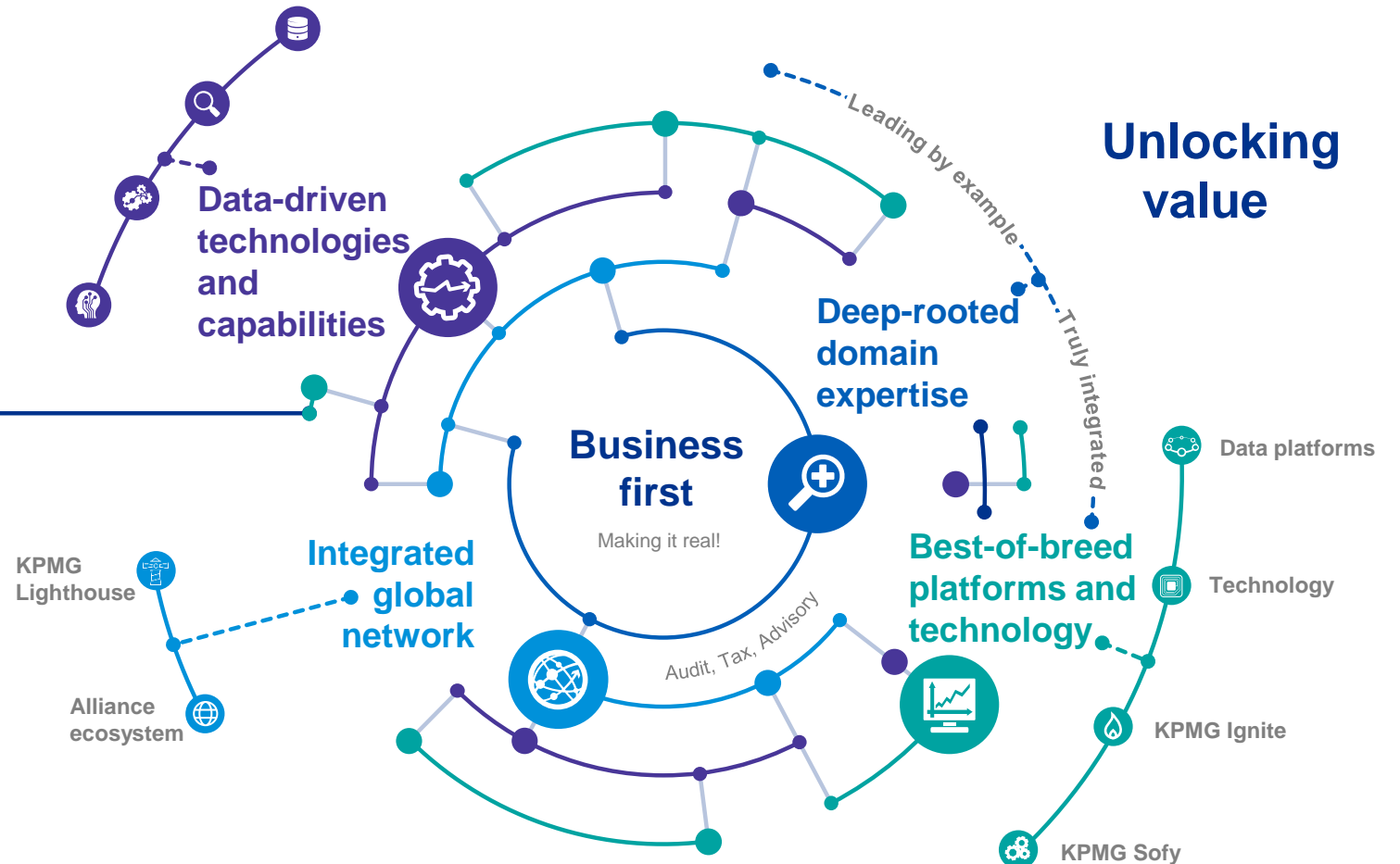




# A global ecosystem

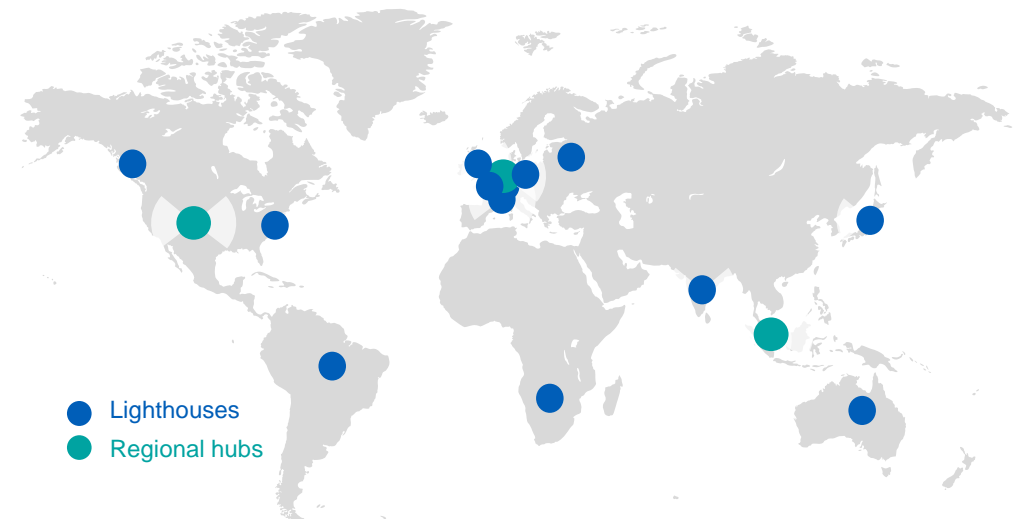
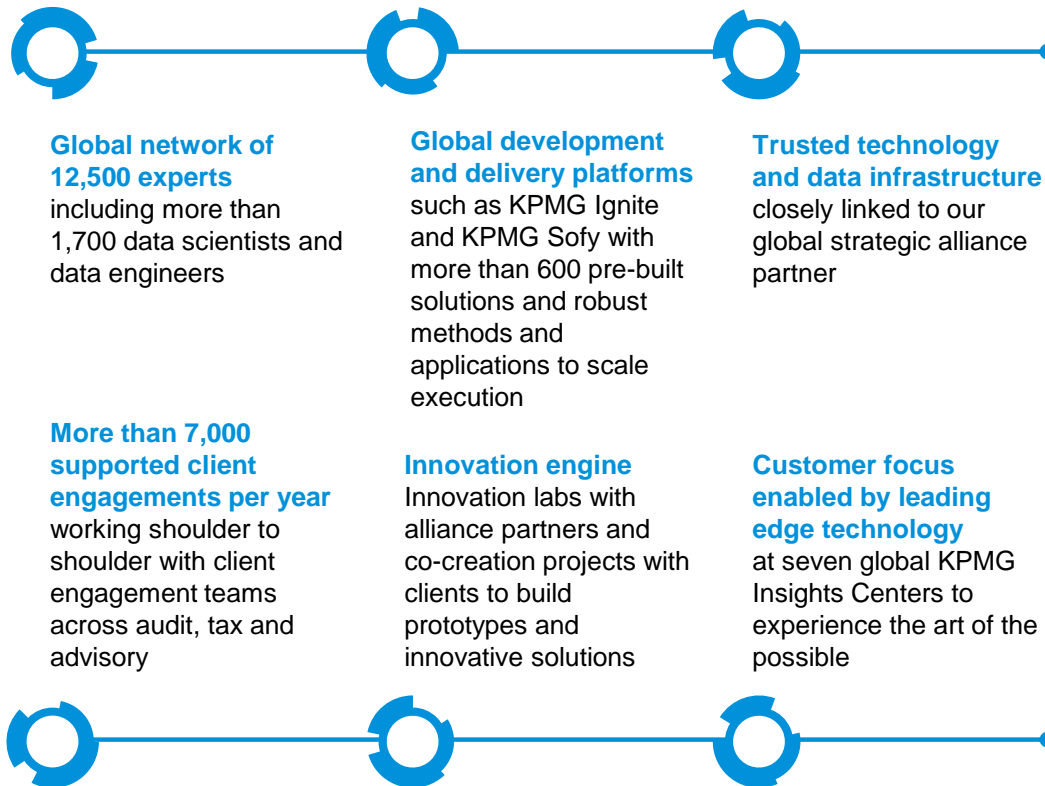
## A business-first approach

KPMG's interconnected ecosystem can help unlock the potential of data-driven technologies in a more efficient and trusted way.



# KPMG Lighthouse

**Global KPMG Lighthouse is KPMG's Center of Excellence for Data, Analytics, Intelligent Automation, Artificial Intelligence and other data-driven technologies.**



Clients benefit from the global Lighthouse network which drives speed and relevance, accelerates innovation and brings together KPMG's portfolio of data-driven capabilities and technologies. KPMG Lighthouse teams leverage data, analytics and AI to build and deliver solutions to help clients in their business transformation journeys.

# KPMG Lighthouse teams

The Global Lighthouse is a dedicated team of 12,500 professionals across the globe

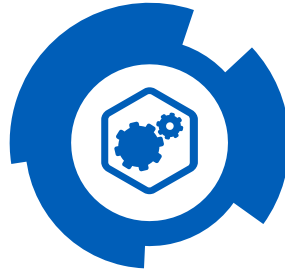


## Data scientists

Strong experience in analytics, statistics, data mining, machine learning, natural language processing and/or mathematics.

Problem-solving ability through the use and/or development of algorithms, models, testing, etc.

Generally MS or PhD-level math, statistics, or engineering.



## Software engineers

Strong experience with large scale and/or distributed processing methodologies such as Hadoop, Storm, Spark, and many others.

Sophisticated ability to rapidly ingest, transform and mine data.

Ability to evaluate, design, build, test and manage 'big data' architectures.



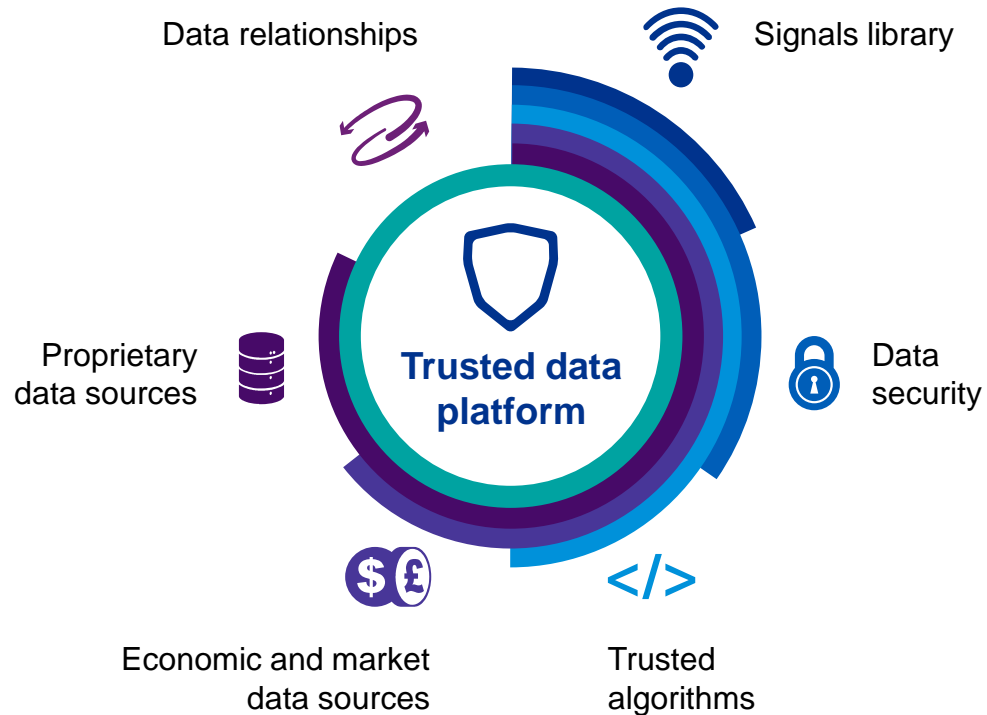
## Consultants

Strong business consulting acumen and statistical background, combined with real-world experience in applying analytics to solve business issues.

Practical understanding of advanced analytics methods and 'big data' software; client solutioning expertise.

# Enhanced data platforms

KPMG's data platforms integrate new data sources in a trusted way



## For example:

Data partnerships provide access to valuable data and help KPMG professionals pre-integrate the data into the insights services. These vary by region and country. For example, KPMG in the US maintains data partnerships with Blue Health Intelligence, Centers for Medicare and Medicaid Services, Dun & Bradstreet, Exact Data and Thompson Reuters.

The Signals Repository captures different kinds of traditional and non-traditional data, such as 'SoLoMo' (Social, Local, Mobile) data, demographic and geographic information, household data, population movements, economic activity, weather and crime rates. These signals are pre-vetted and monitored for changes in quality and impact.

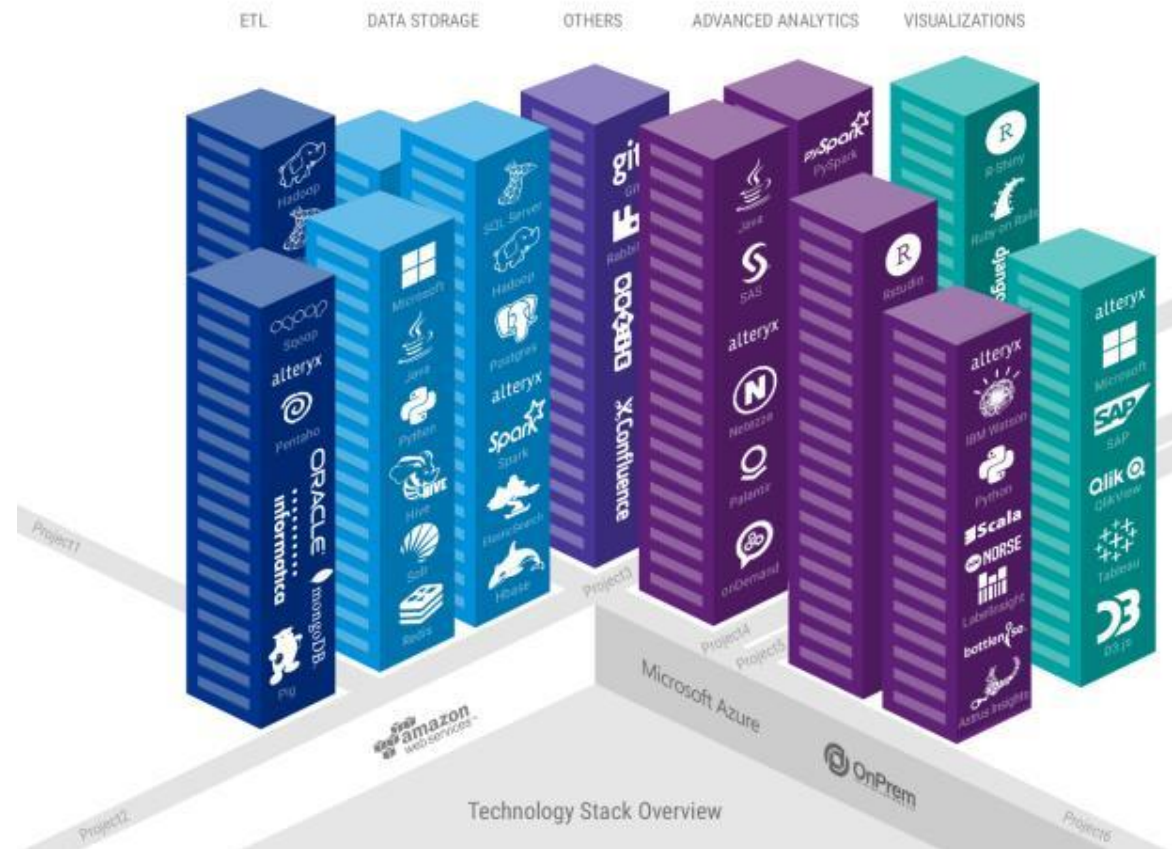
Data cooperation models augment, enrich, provision and manage data and achieve additional insights for clients.

Exchange platforms provide secure mediation and brokering of low-level data while protecting the most sensitive data for some of the largest companies in the world.

A vertical line with three interlocking rings. The rings are arranged vertically, with the top ring slightly offset to the left, the middle ring centered, and the bottom ring slightly offset to the right. The rings are interlocked in a way that they appear to be part of a continuous chain. The line starts and ends with a small dot.



The ability to scale up or down, deploy simultaneously and integrate across technologies allows us to anticipate client needs and deploy technology at the speed of business.





# Powerful platforms for data-driven solutions

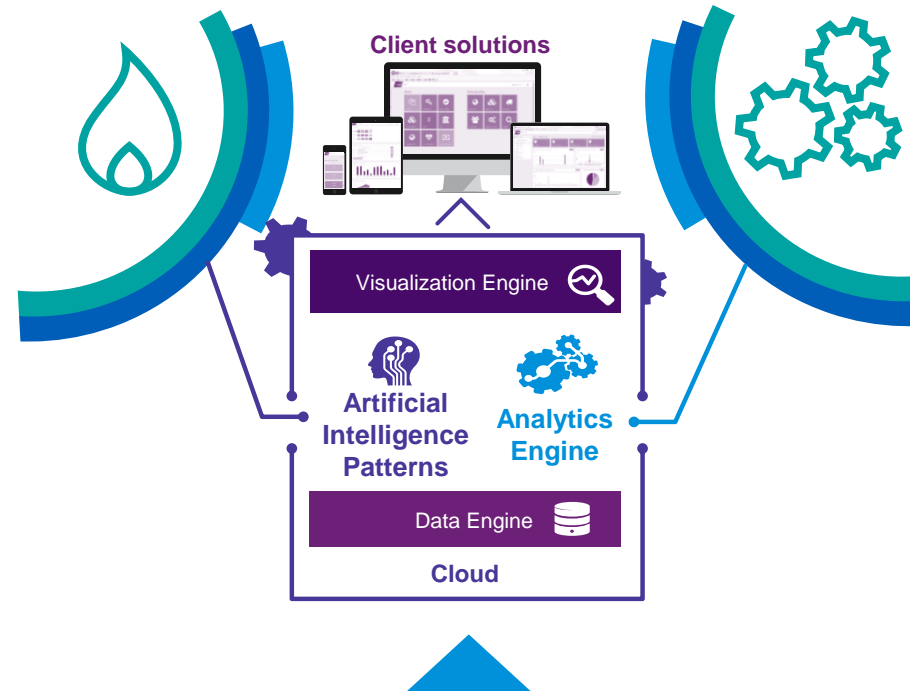
Client solutions built on scalable and robust technology platforms

## KPMG Ignite

**KPMG Ignite** is the KPMG's portfolio of **artificial intelligence** capabilities. It includes domain expertise, integrated open source tools and KPMG-developed IP, frameworks and patterns.

The KPMG Ignite platform ingests various types of data components from different sources and applies Artificial Intelligence-based automation patterns to create intelligent workflows to solve business problems more efficiently.

**Cognitive contract management**  
**Customer interaction analytics**  
**Virtual assistants and chatbots**



## KPMG Signals Repository

The KPMG Signals Repository continuously captures more than 10,000 signals of traditional and non-traditional data that can be used by AI and machine learning technologies to drive improved decisions and actions.

## KPMG Sofy

**Sofy** is KPMG's **analytics platform** that delivers distinct KPMG IP as a scalable and robust technology solution to clients. It powers an integrated suite of modular business apps using latest KPMG best practice and standardized components.

The Azure cloud-based technology platform operates on an integrated data hub to maximize synergies and leverages the latest analytics methodology to provide real-time business insights and trigger action.

**Procurement analytics**  
**Tax analytics**  
**Process monitoring**  
**Risk management**

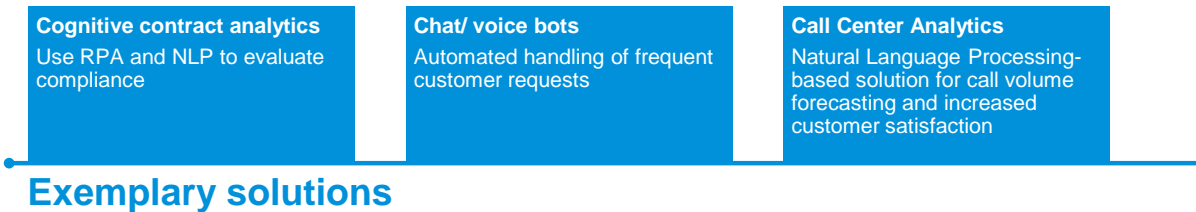
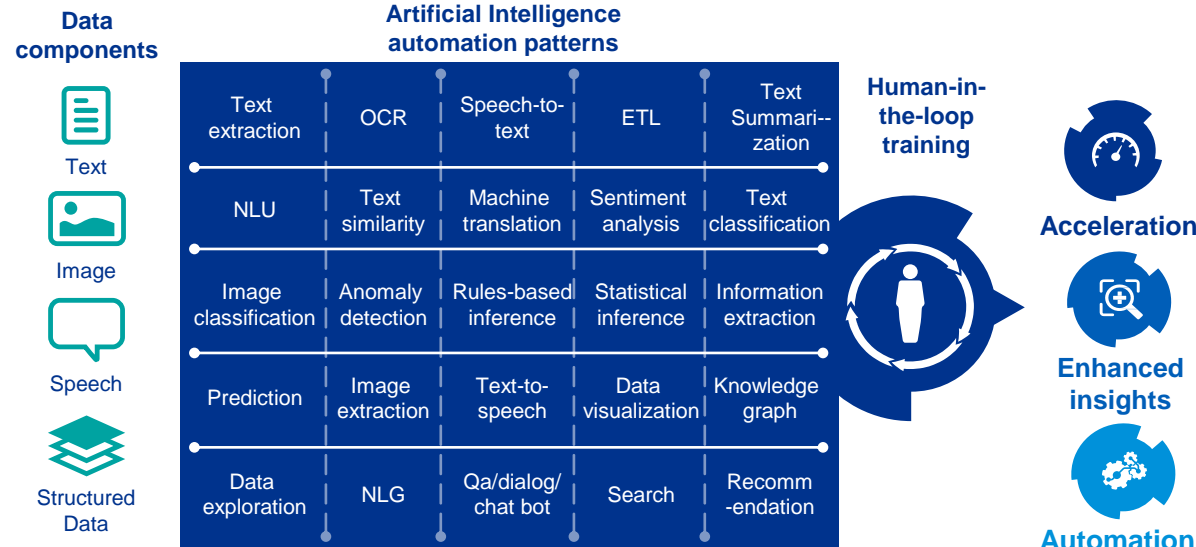
## KPMG's portfolio of Artificial Intelligence capabilities

### What it is...

**KPMG Ignite** is the KPMG's portfolio of artificial intelligence capabilities. It includes domain expertise, integrated open source tools and frameworks, strategic technology partnerships, KPMG-developed IP, frameworks and patterns, as well as research and experimentation

KPMG Ignite ingests various types of data components from different sources and applies AI-based automation patterns to create intelligent workflows to solve business problems. The patterns each cover an AI capability, from sentiment analysis, text classification and image to text.

### Platform features



### Value delivered

- Increases accuracy through 100 percent coverage versus traditional sampling approaches
- Reduces cost and development time needed to produce insights
- Enables humans to be precise and manage consistency
- Leverages the knowledge and experience of the very best subject matter experts
- Increases transparency through audit logs that show how data has been processed

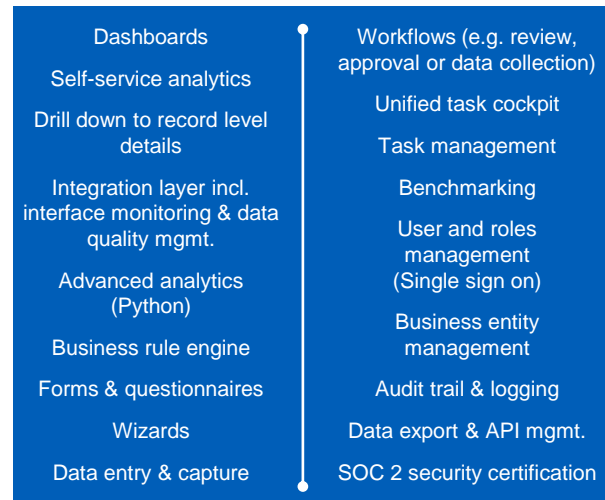
## KPMG's scalable analytics platform

### What it is...

**Sofy** is KPMG's analytics platform which delivers distinct KPMG IP in a scalable and robust technology solution to clients. It powers an integrated suite of modular business apps using the latest KPMG best practice and standardized components.

The Azure cloud-based technology platform operates on an integrated data hub to maximize synergies. Sofy leverages the latest analytics methodology to provide real-time business insights and trigger action based on transactional data. The simulation and root cause analysis features provide a powerful toolset to explain processes.

### Platform features



Feedback and workflow status

Unified platform

KPMG algorithms & analytics

External data providers

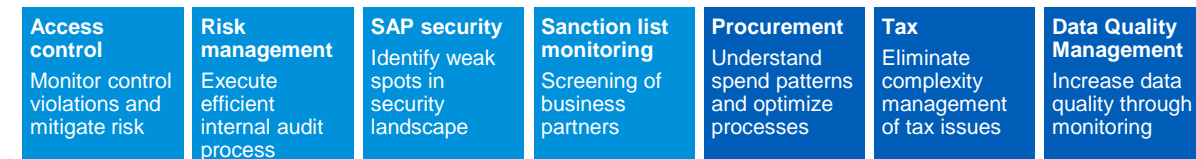
Integrated data hub

Client information systems

### Value delivered

- The Sofy implementation process is simple and straightforward. Sofy can be implemented in just a few days.
- Sofy leverages built-in rule sets, based on KPMG IP, experience and best practices.
- Sofy leverages built-in customization, visualization and feedback functionalities, adaptable to clients' needs
- Clients can benefit from pre-built content and integrated technology, which facilitates rapid customisation to individual client needs.

### Digital Risk



### Exemplary solutions

# KPMG Signals Repository

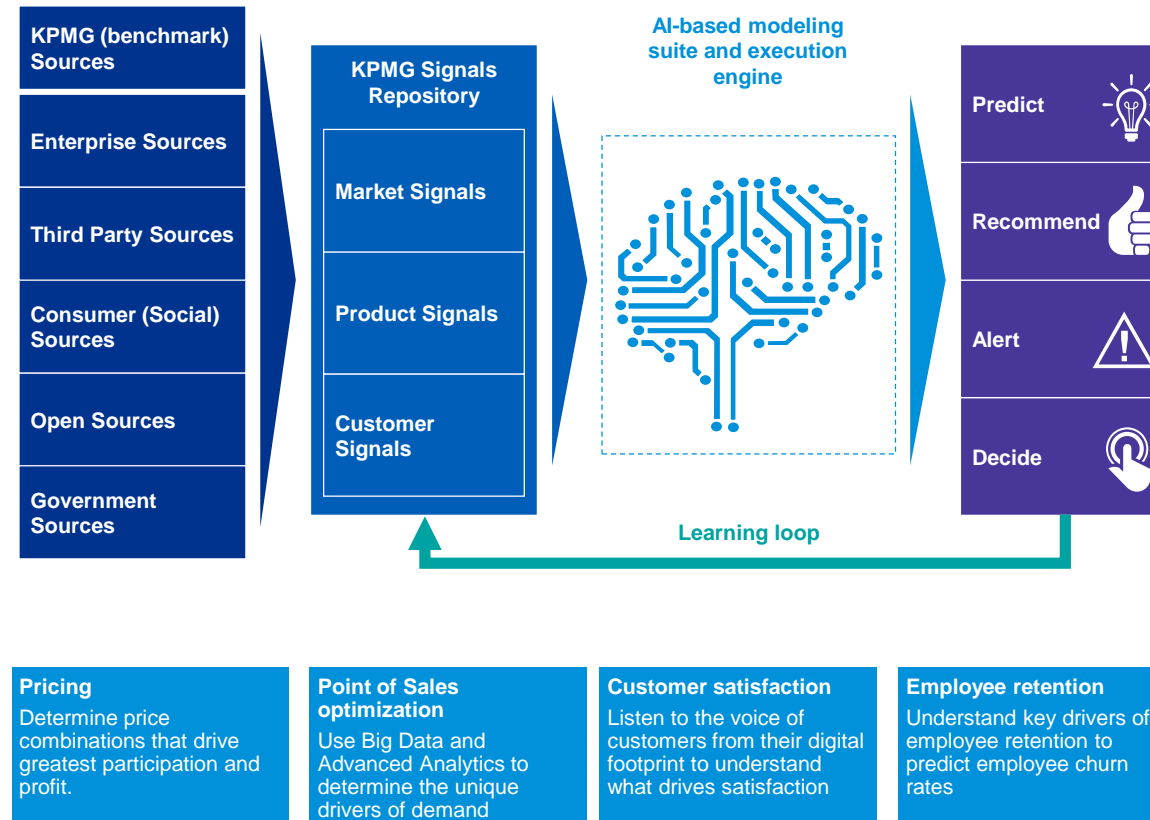
## KPMG's big data and decision science platform

### What it is...

The KPMG Signals Repository is an active platform that continuously harvests a broad variety of signals from Public and Private sources. Based on latest decision science, it effectively creates a Big Data Fabric from exogenous and endogenous data that can be used by AI and machine learning technologies to drive improved decisions and actions.

Within the Signals Repository, structured and unstructured data is transformed into complex expressions, then subsequently engineered into features within models. The breadth and specificity of Signals drive unprecedented accuracy in predictions and business execution outcomes.

### Platform features



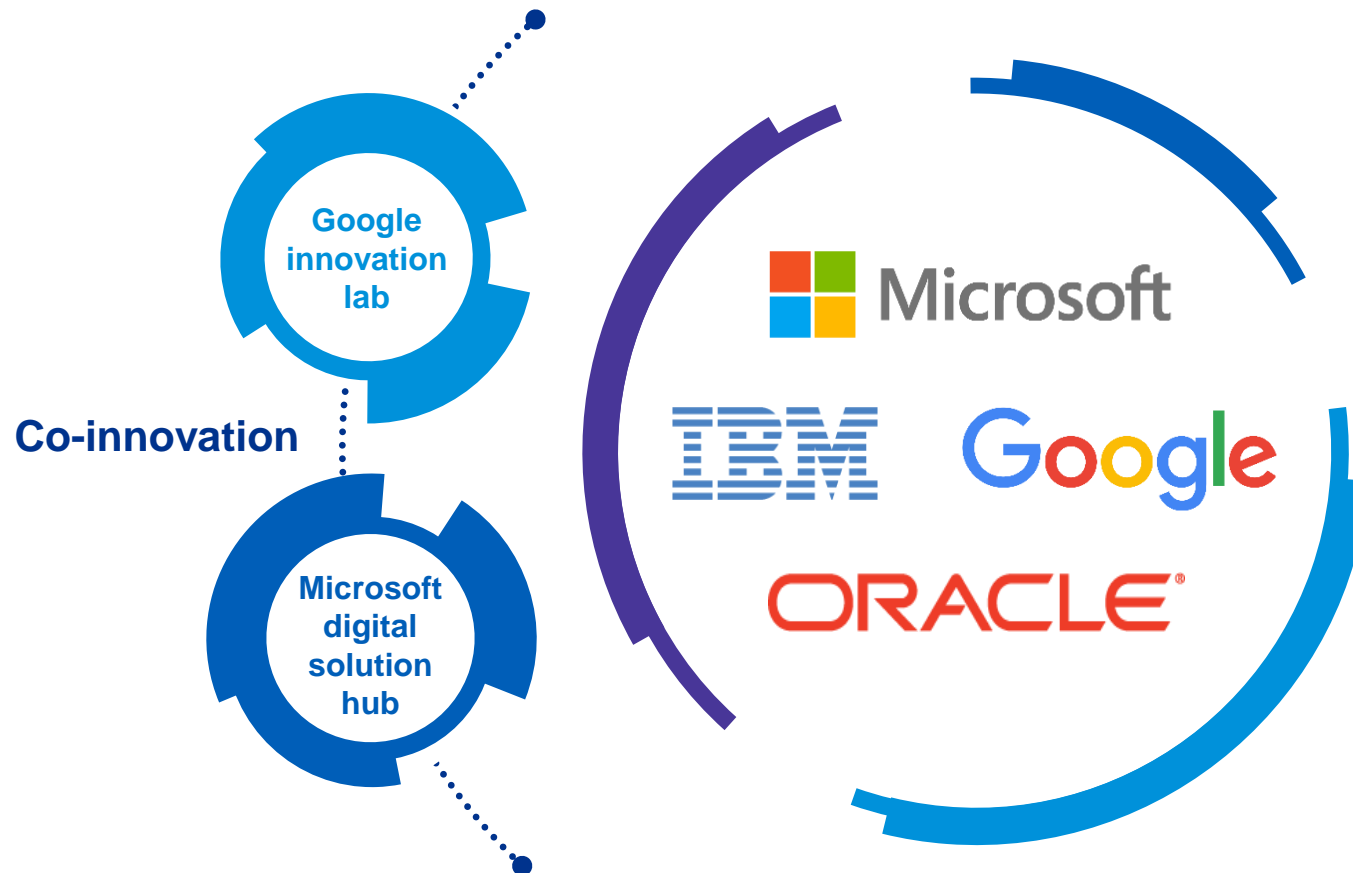
### Exemplary solutions

### Value delivered

- More than 10,000 signals of traditional and non-traditional data, like "SoLoMo" (Social, Local, Mobile)
- Signals are continually monitored for changes in quality and impact
- Automated, self-serve access to the created compendium of signals to improve business decisions
- Leverages Big Data to augment or automate Decision-making and generate material business results

# Alliance ecosystem

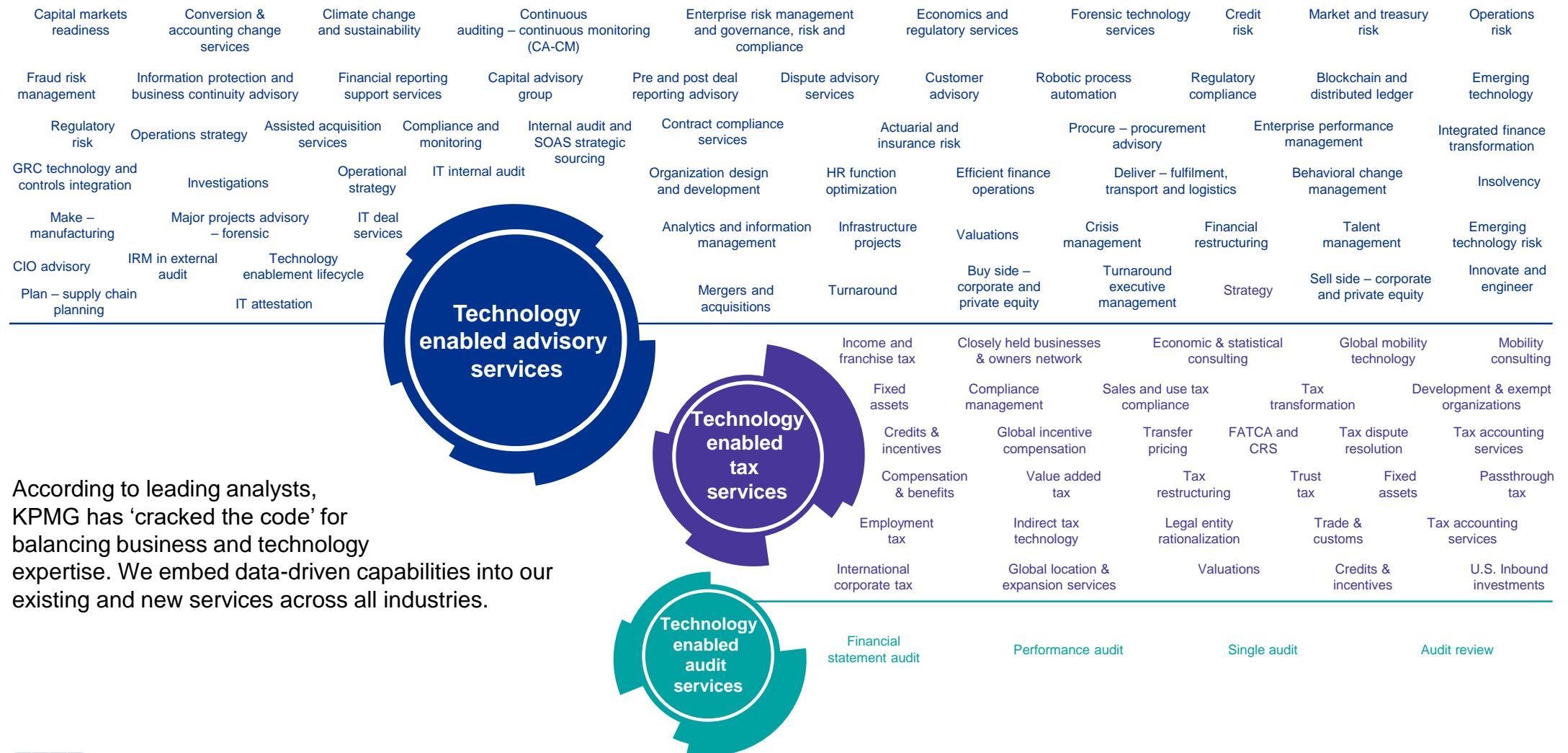
The latest tools and methodologies, delivered by business-focused, technology-agnostic advisors



KPMG works with leading alliance partners to accelerate business performance, amplify client value and scale global delivery capabilities.

KPMG has strategic technology partnerships across the emerging technology landscape, including Microsoft, Oracle, IBM Watson and Google. We co-innovate with our partners to supplement our solutions with cutting-edge data and analytics and artificial intelligence applications and platforms to help clients digitally transform their enterprise.

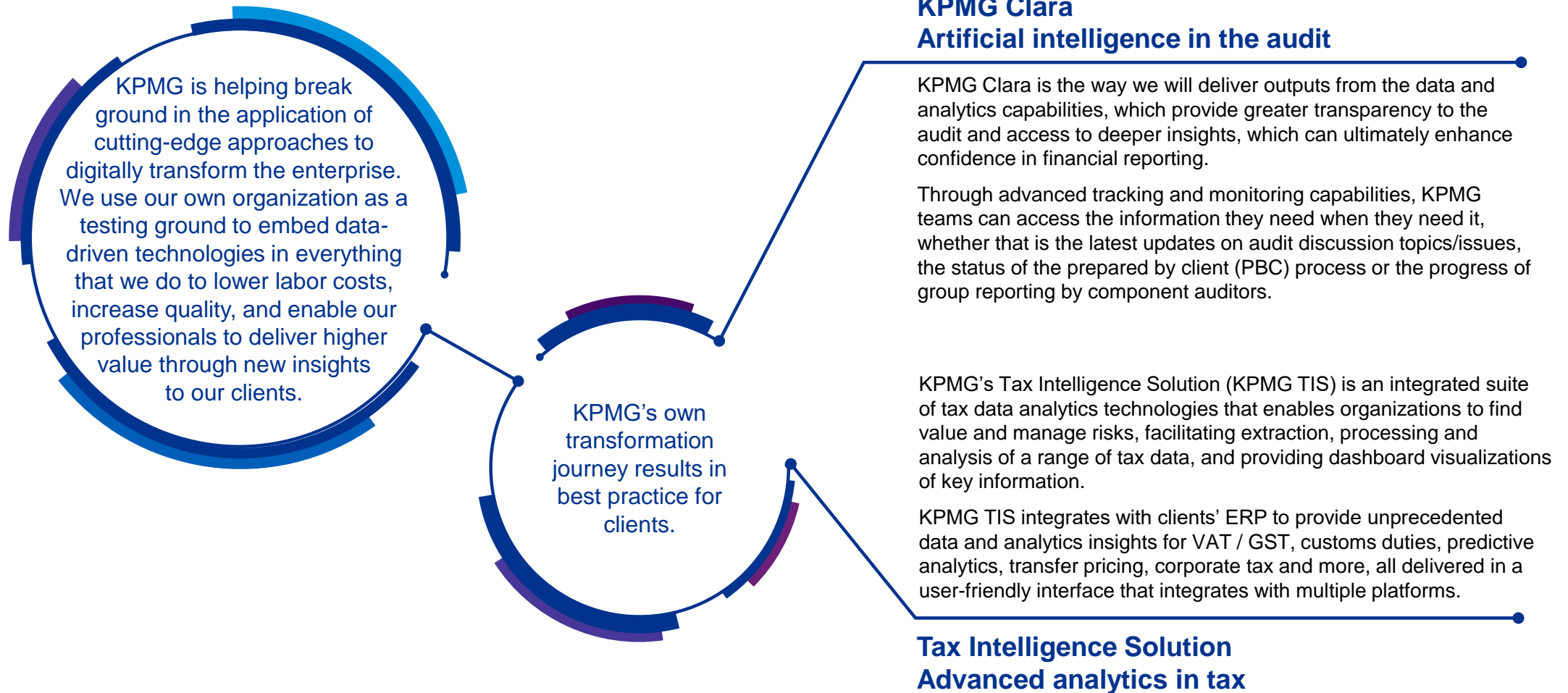
# Embedded data-driven technologies



According to leading analysts, KPMG has ‘cracked the code’ for balancing business and technology expertise. We embed data-driven capabilities into our existing and new services across all industries.



# Leading by example



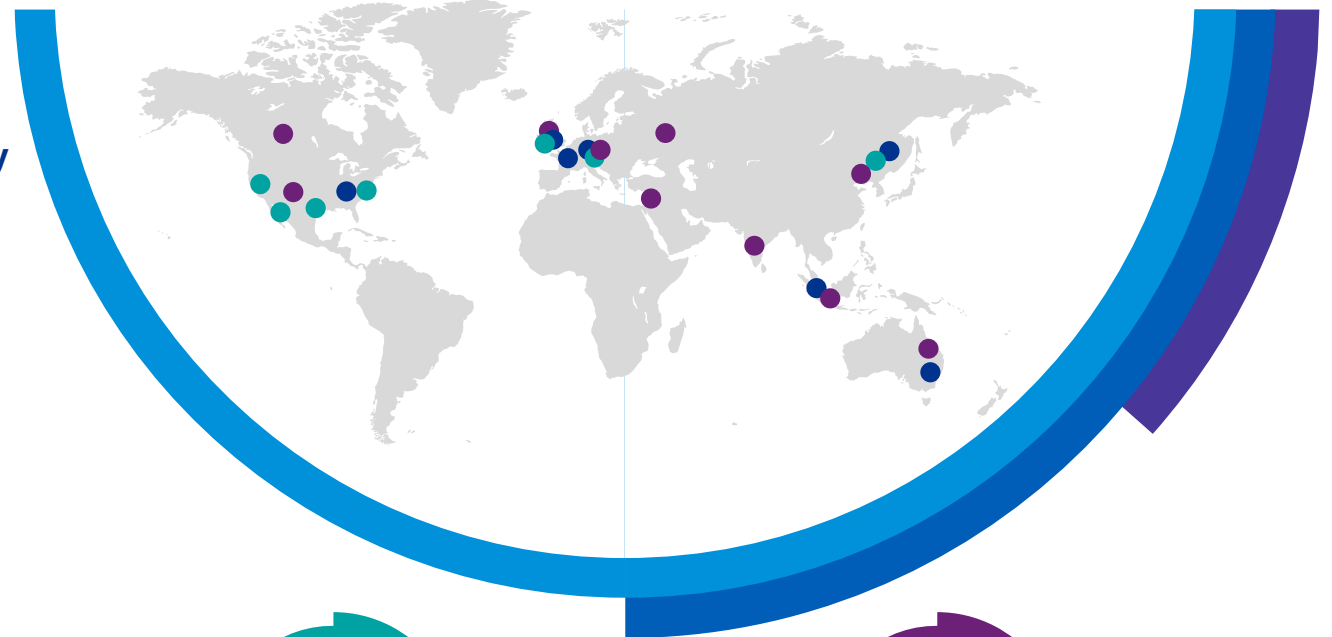


# Making it real

## Customer focus enabled by leading-edge technology

**As part of a client engagement, we can create leading edge immersive environments for visualization and collaboration that embrace the future of business.**

We operate a number of ‘high tech, high touch’ spaces around the world where we work with clients to expand the boundaries of their businesses and deliver inventive solutions. Insight Centers and Ignition Centers around the world take C-suite executives outside their normal environment to a space where we can explore the art of the possible; where clients can experience what data can do for them, extract insights through ‘design thinking’, experiment with applications, incubate ideas and get a practical understanding of how to solve their most challenging problems.



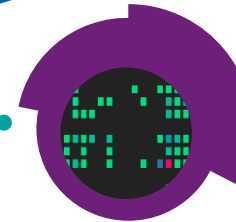
### KPMG Insights Centers

The Insights Centers enable clients to interact directly with their data and see data and analytics solutions come to life in ways never imagined. Using interactive visual technology and equipment, these centers host sessions that create a truly immersive client experience, ranging from analytics showcases to idea generation and project activation.



### KPMG Ignition Centers

These unique environments found in KPMG locations around the world encourage technological creativity. With project-focused work spaces that foster inventive technology driven solutions, these centers empower and inspire our clients. From idea generation to strategy to execution or at any stage in-between, these centers can help clients discover emerging opportunities through our intelligence capabilities, design scenarios using state-of-the-art interactive technology. They use multi disciplinary teams across tax, audit and advisory to find the best solutions for our clients...



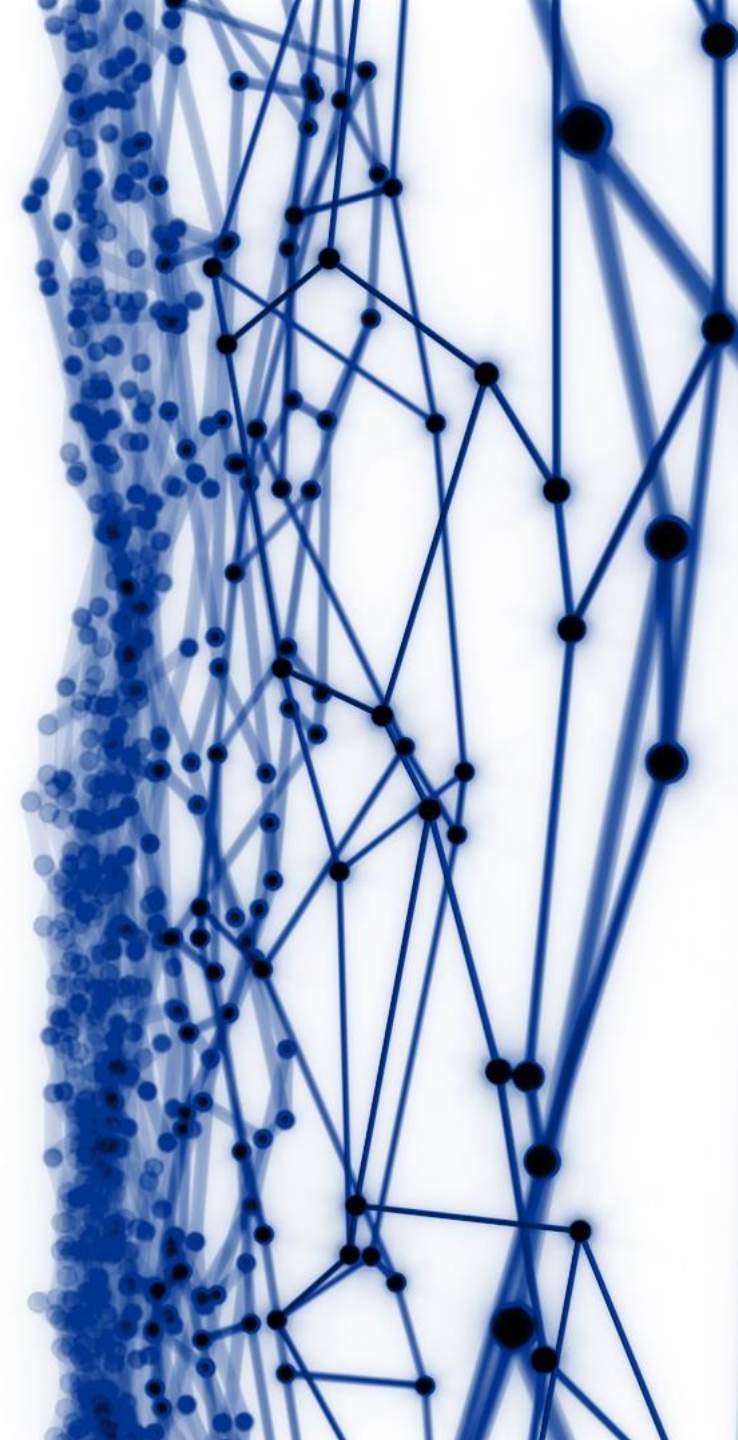
### KPMG Technology Innovation Centers

KPMG's Global Technology Innovation Centers were established to identify and evaluate the impact of emerging technologies. The centers connect leading global technology thinkers including entrepreneurs, Fortune 500 technology executives, venture capitalists and KPMG member firm professionals.



Anticipate tomorrow,  
deliver today

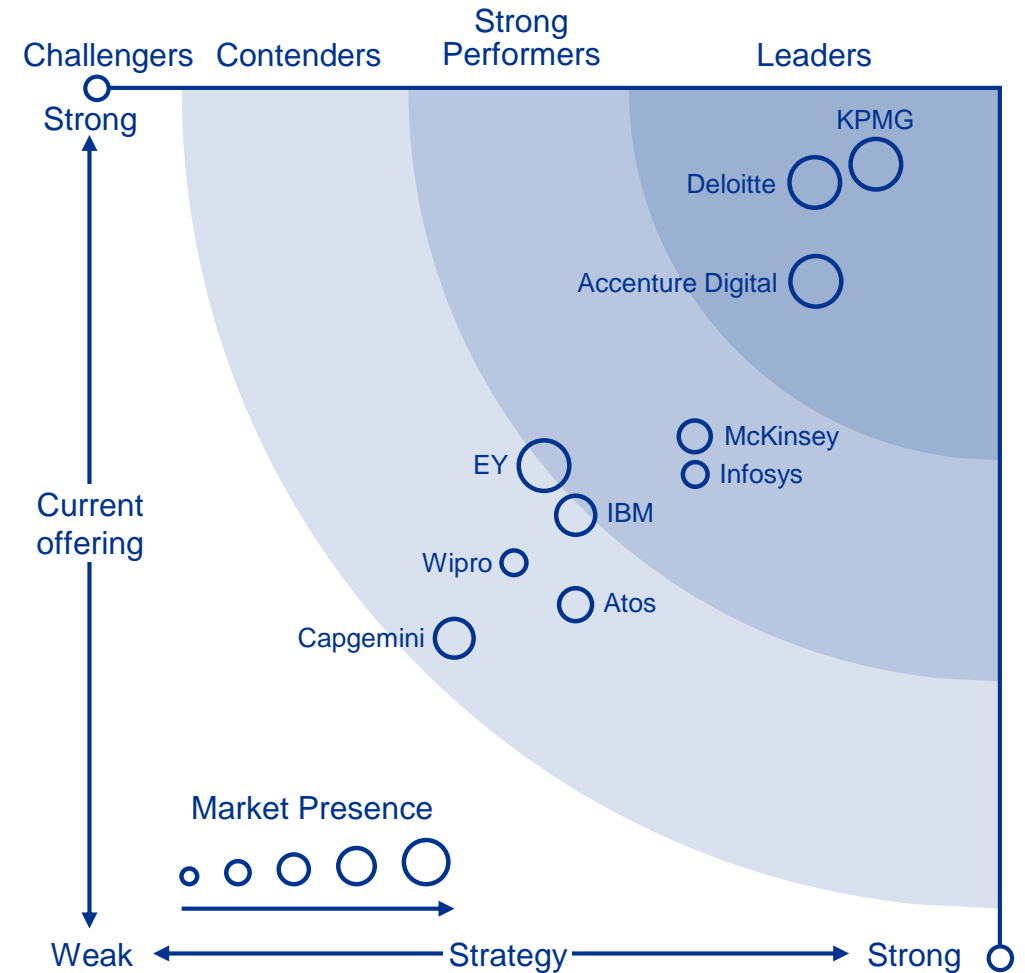
Unlocking the future with  
data-driven technologies



# BACKUP

< Additional slides >

# Recognized leader with analysts



# Real data science

Lighthouse resources are proficient in the latest data analytics and statistical skills.

## Statistics & modeling

- Bayesian data analysis
- Discrete choice models
- Exploratory data analysis
- Linear regression
- Monte Carlo methods
- Panel data/longitudinal data
- Statistical estimation adaptive filtering
- Survival analysis
- Time series analysis
- Advanced regression

## Big data architecture

- Cloud computing
- MapReduce
- Stream processing

## Supervised techniques

- Decision trees
- Ensemble methods, random forests
- Logistic regression
- Neural networks
- SVM

## Information extraction & retrieval

- Document clustering
- Fuzzy matching and term weighting
- Link analysis
- Web crawling
- Web scraping

## Decision science/ops research

- Decision theory
- LP/mixed integer programming
- Stochastic processes & queuing theory

## Natural language processing (NLP)

- Machine translation
- Named entity recognition (NER)
- Part-of-speech tagging
- Sentence parsing and chunking
- Sentiment analysis & text classification
- Topic modeling & keyphrase extraction
- Word sense disambiguation

## Unsupervised learning & clustering

- Unsupervised learning & clustering
- K-means
- LDA

## Data mining & machine learning

- Dimension reduction
- Feature selection
- Large-scale machine learning & algorithms
- Social network analysis and mining
- Ensemble methods and random forests
- Supervised techniques: SVM
- Supervised techniques: neural networks
- Supervised techniques: decision trees
- Supervised techniques: logistic regression
- Unsupervised learning & clustering: (k-means, LDA)