Analytics im Wandel

Impact of todays digital convergence

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EY
Building a better
working world

Today with you

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We are at the beginning of a Cambrian explosion of technology

> " We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another.

-World Economic Forum, 2016

Only **3%** of the potentially useful data is tagged, and even less is analysed.

-IDC

More than **10**% of work will be sourced in the shared economy by 2019.

-IDC, 2015

Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world's largest accommodation provider, owns no real estate. Something interesting is happening.

-Tim Goodwin

35% New P&G products come from outside the company via it's open Innovation approach

By 2020, there will be **26** smart objects for every human being on Earth!
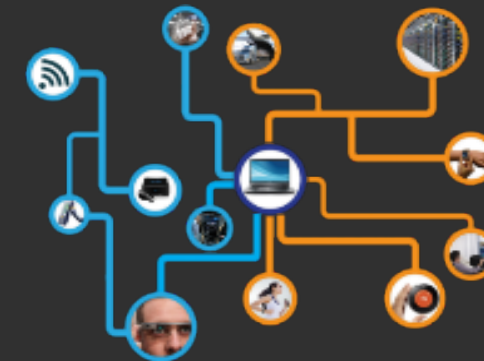
-IDC, Intel, United Nations, 2016

5 days For a drone capturing and analysing high definition video of off shore oil rigs to capture more data than a traditional "rope lift" team can capture in 8 weeks

25-50% Typical cost savings from RPA enabling automation 24x7x365

52% of the Fortune 500 since 2000 has been demolished because of Digital disruption

- Constellation Research

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Digitalization is happening since a loooooong time and every new invention was based on technology convergence

1982
Thirsty students at Carnegie-Mellon wired up their Coke vending machine with microswitches to report on inventory levels

1994
Pizza Hut launched the world's first online ordering system

1999
Nokia launched the 7110, the first mobile phone with a WAP browser.

Digital Convergence – Data is the foundation

Analytics

AI

Data Science

Big Data BI

Reporting

Data Mining

Robotics

??

Workflow
Automation
Screen Scraping
Wrapper
Web Crawler

Blockchain

Dapps
Hashcash
PoW P2P
Networks
Private
Key
Encryption

Innovation is the driver

Data is the foundation
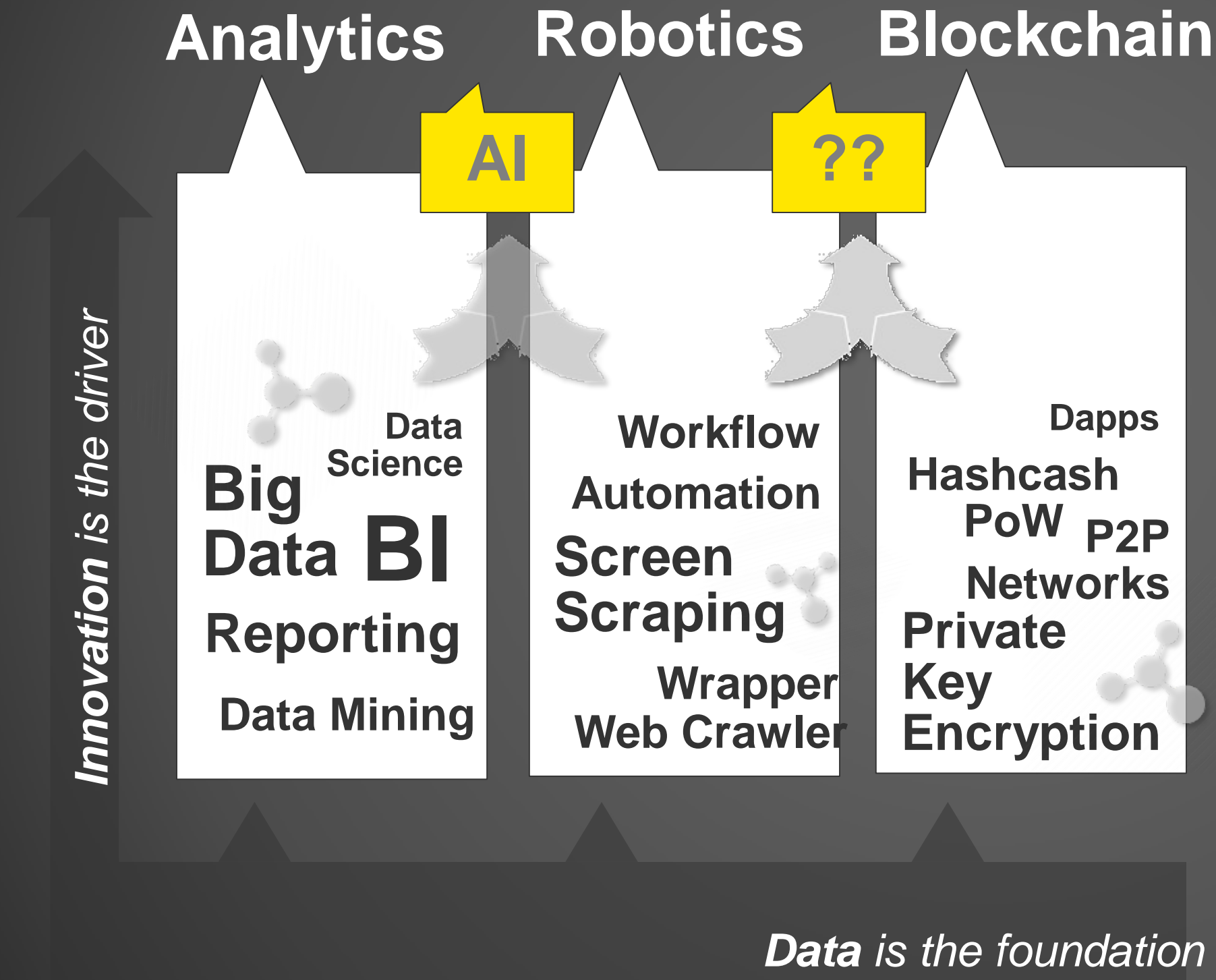
A closer look at **3** current digital megatrends

All are built on data

All are the result of digital convergence

And the converging is ongoing…

Be smart – Make use of analytics for future growth!

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Leaders use advanced analytics to drive double digit-growth

▶ 70% of "leading" organizations use advanced analytics to overhaul business strategies – changing where and how value gets created and the nature of competitive differentiation.

▶ 75% of top performers operate a full range of enterprise, departmental, and line-of-business analytics groups that work within a well-aligned framework.
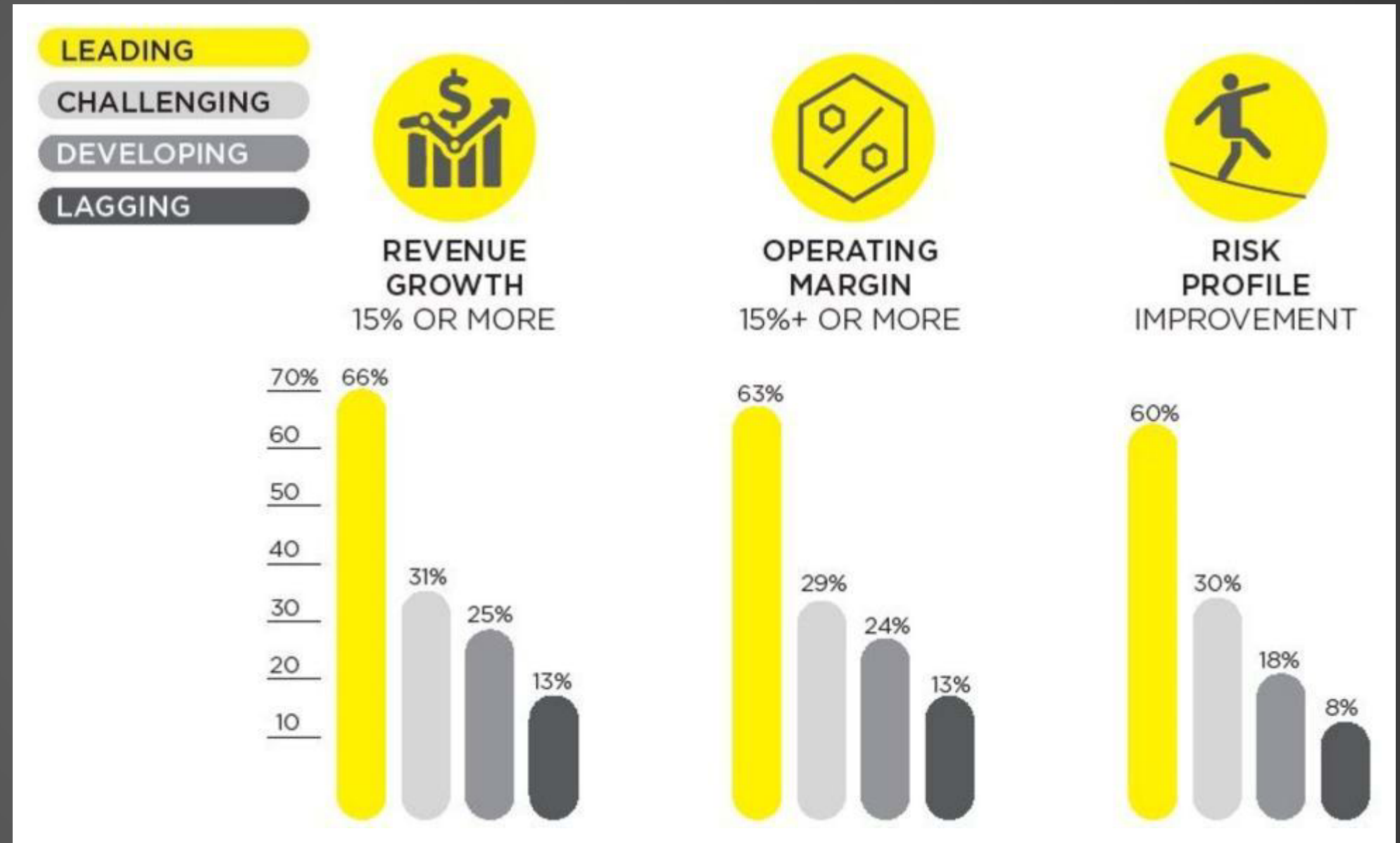
LEADING
CHALLENGING
DEVELOPING
LAGGING

REVENUE GROWTH
15% OR MORE
70% 66%
60
50
40
31%
30 25%
20 13%
10

OPERATING MARGIN
15%+ OR MORE
63%
29%
24%
13%

RISK PROFILE IMPROVEMENT
60%
30%
18%
8%

Competitive differentiation
Defining the role that analytics play in strategy and business model

Key findings

► Enterprise-wide strategies are key to analytics effectiveness.

► Less mature enterprises see only pockets of analytics proficiency.

► Lack of collaboration and alignment within the management committee blocks success.

Q: What best describes the role of data and advanced analytics in the business strategy of your organization?

LEADING — 100%

CHALLENGING — 27%, 63%, 10%

10% — 4%

DEVELOPING — 49%, 35%, 3%

LAGGING — 85%, 15%

Analytics strategy is well established and central to the overall business strategy

Analytics strategy is established and starting to be viewed as a key strategic priority

Analytics strategy is established for the enterprise, but not fully aligned across the business

Some analytics strategy exists for functions or lines of business

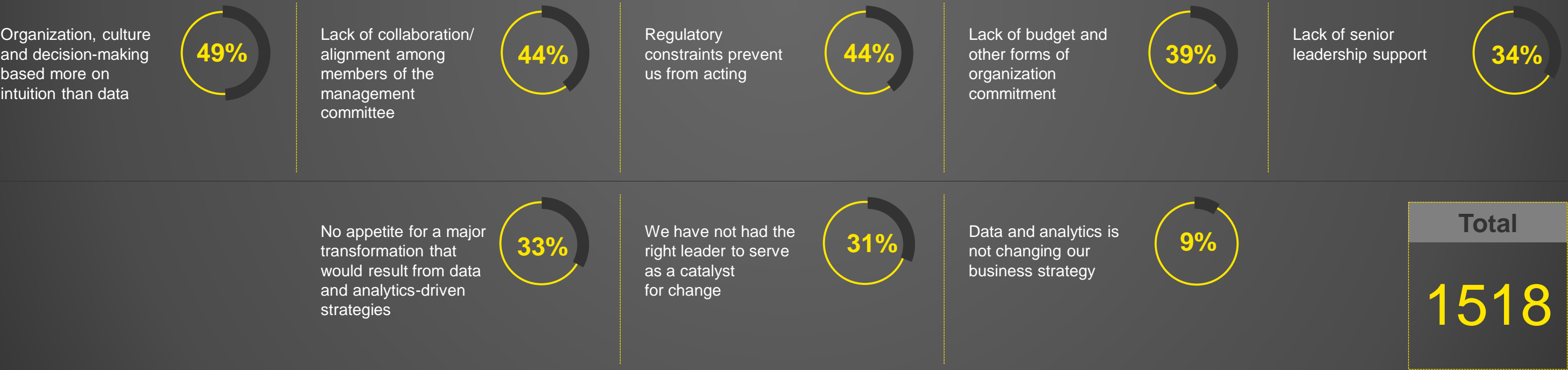No analytics vision or strategy exists at this time

Competitive differentiation
Defining the role that analytics play in strategy and business model (continued)

| Recommendations

1. Ensure advanced analytics initiatives are closely aligned with the overall business strategy and how the organization creates competitive differentiation
2. Consider what new products, services and capabilities can be created by considering data as an asset in its own right
3. Focus on creating alignment and closer collaboration among stakeholders from all relevant departments – define what "good" will need to look like and remove organizational and policy barriers to effectively execute.

Q: What are your top pain points when it comes to developing or refining the business strategy to account for analytics?

Organization, culture and decision-making based more on intuition than data — **49%**

Lack of collaboration/ alignment among members of the management committee — **44%**

Regulatory constraints prevent us from acting — **44%**

Lack of budget and other forms of organization commitment — **39%**

Lack of senior leadership support — **34%**

No appetite for a major transformation that would result from data and analytics-driven strategies — **33%**

We have not had the right leader to serve as a catalyst for change — **31%**

Data and analytics is not changing our business strategy — **9%**

Total

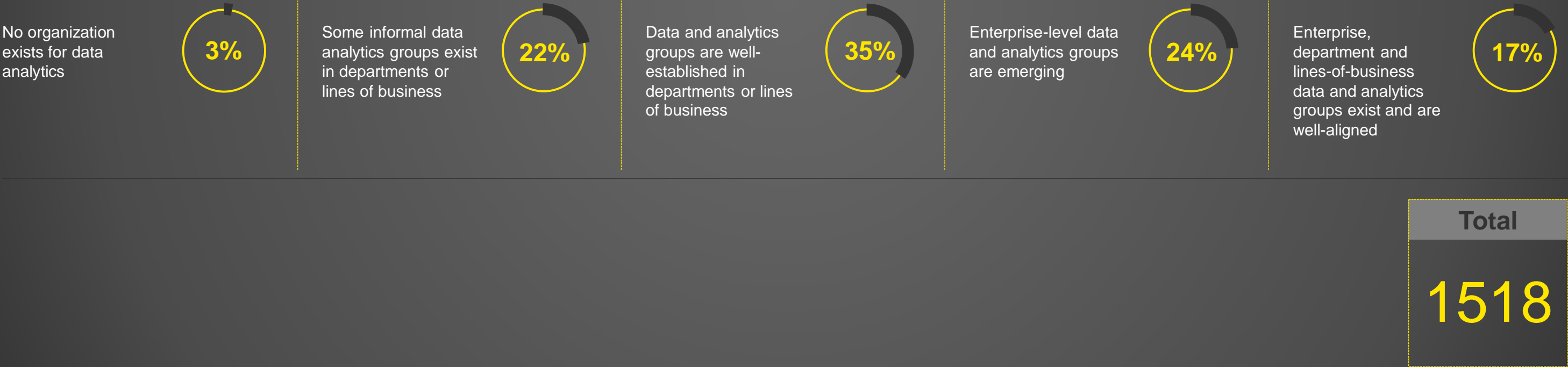**1518**

Multiple choice responses

EY

Operating model
Building the underlying models and org structure that govern analytics activities

Key findings

► Leaders manage advanced analytics groups within a well-aligned framework across the enterprise, departments and lines of business.

► The "right" operating model is highly organization and context specific.

► Cross-functional alignment and collaboration is typically the most difficult challenge.

Q: Describe your current status regarding the organization and governance of data and analytics

| No organization exists for data analytics | **3%** | Some informal data analytics groups exist in departments or lines of business | **22%** | Data and analytics groups are well-established in departments or lines of business | **35%** | Enterprise-level data and analytics groups are emerging | **24%** | Enterprise, department and lines-of-business data and analytics groups exist and are well-aligned | **17%** |

Total
1518

EY

Operating model
Building the underlying models and org structure that govern analytics activities (continued)

Recommendations

1. Clearly define an operating model that brings advanced analytics resources close to each line of business and function
2. Put significant focus on recruiting, developing and retaining individuals who can serve as advanced analytics "leaders" in various parts of the business
3. Define what it means in your organizational context to have more of an advanced analytics mindset and culture

Q: If your organization uses some form of enterprise level analytics in addition to existing capabilities within business units, what is the primary purpose of the team?

Technology — 57%
Selecting, implementing, managing common technology platform and tools

Data — 44%
Implementing data governance/ standards used across the organization

Advanced Analytics — 40%
working on use cases that require skills not resident in the businesses

Strategy — 39%
Setting the overall firm-level data and analytics strategy and plan

Development — 38%
building models and other assets that can be leveraged across the business

Portfolio Management — 21%
selecting projects, making investment allocation decisions

Measurement — 10%
putting in place standards for value measurement,

We do not have a central analytics team — 4%

Total
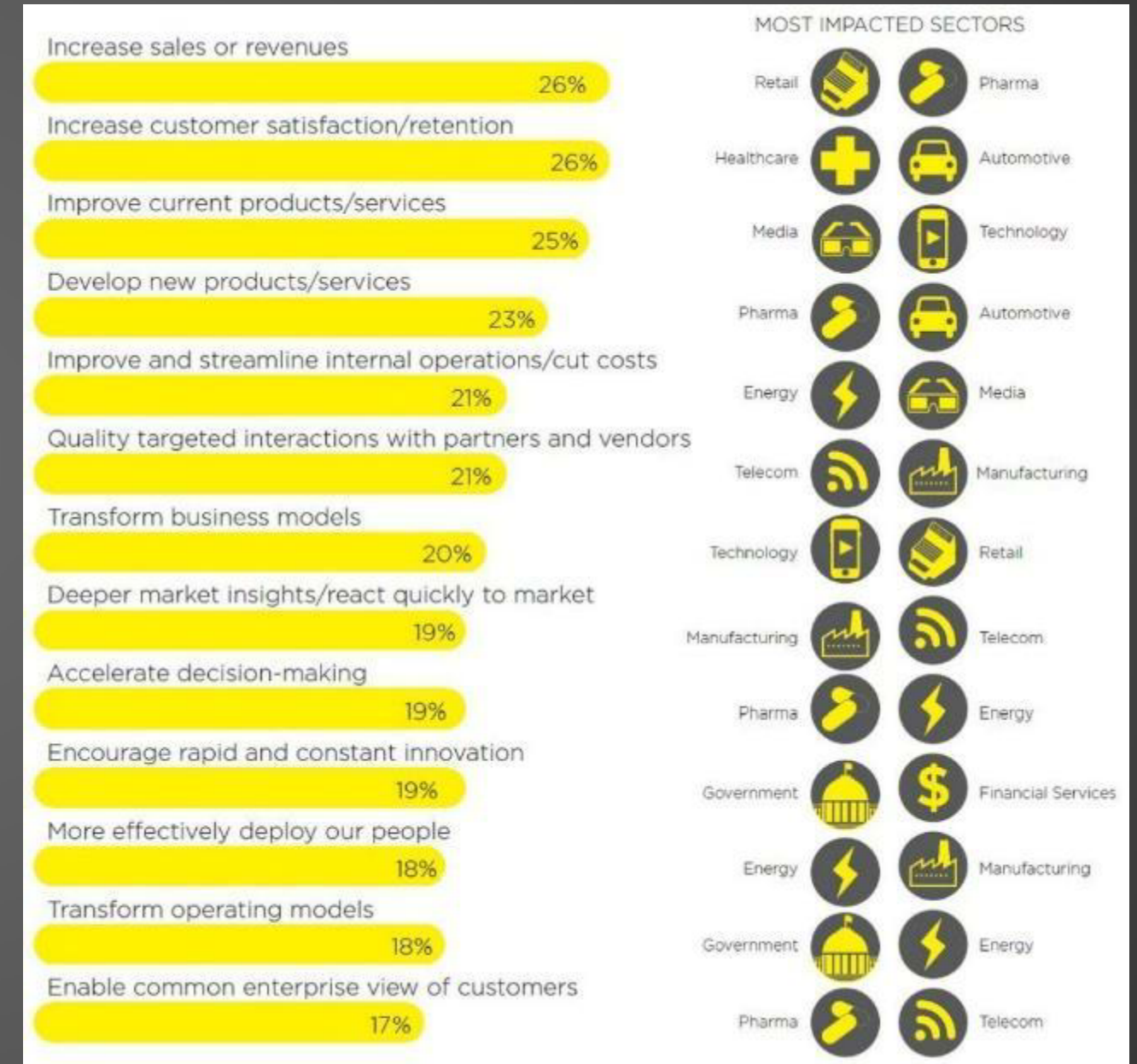1518

Multiple choice responses

EY

Initiatives design
Defining the specific activities/projects to achieve desired business outcomes

Key findings

► Leaders are experimenting with advanced analytics across many parts of the business then scaling.

► Lagging organizations apply inconsistent approaches for initiative design, and collaboration problems greatly reduce the chances of success.

► A sharp focus on what the initiative is attempting to accomplish and why needs to be driven into various steps of the design process.

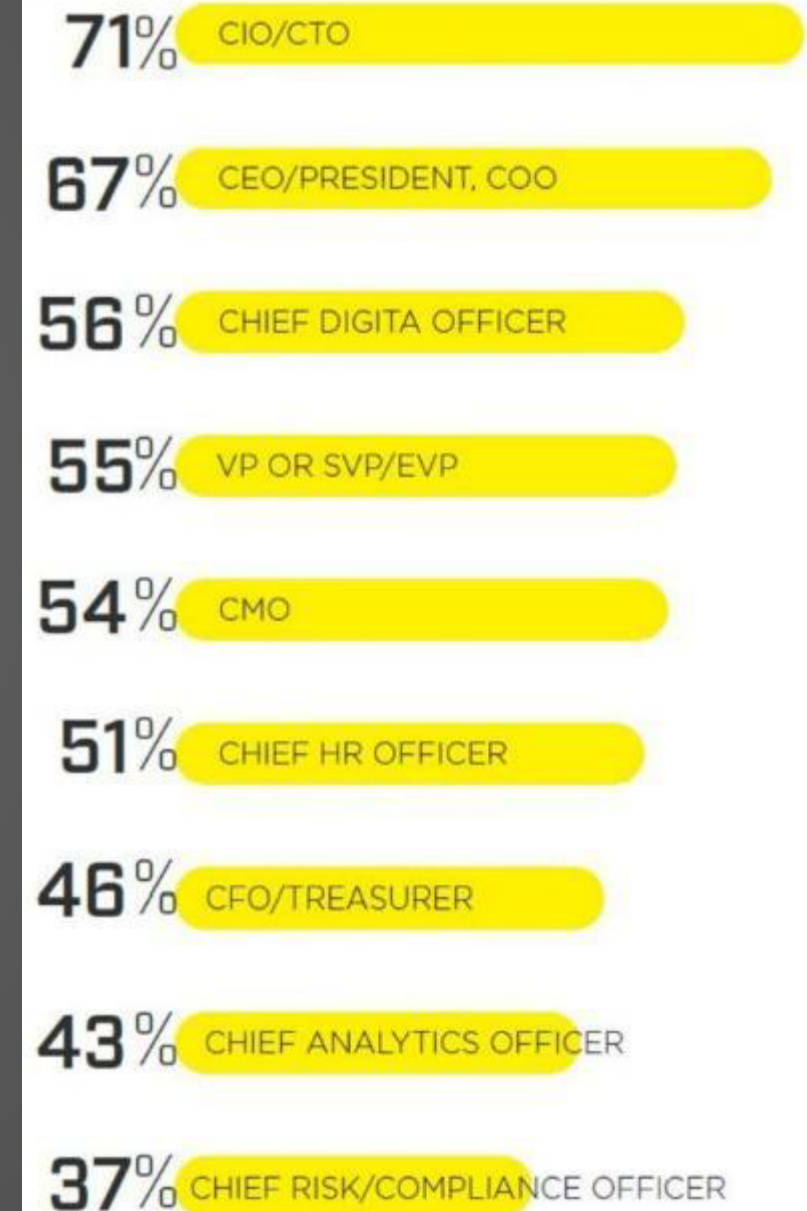Q: What specific business outcomes are you trying to achieve with data and analytics?

MOST IMPACTED SECTORS

Outcome	%	Most impacted sectors
Increase sales or revenues	26%	Retail, Pharma
Increase customer satisfaction/retention	26%	Healthcare, Automotive
Improve current products/services	25%	Media, Technology
Develop new products/services	23%	Pharma, Automotive
Improve and streamline internal operations/cut costs	21%	Energy, Media
Quality targeted interactions with partners and vendors	21%	Telecom, Manufacturing
Transform business models	20%	Technology, Retail
Deeper market insights/react quickly to market	19%	Manufacturing, Telecom
Accelerate decision-making	19%	Pharma, Energy
Encourage rapid and constant innovation	19%	Government, Financial Services
More effectively deploy our people	18%	Energy, Manufacturing
Transform operating models	18%	Government, Energy
Enable common enterprise view of customers	17%	Pharma, Telecom

Initiatives design
Defining the specific activities/projects to achieve desired business outcomes (continued)

Recommendations

1. Develop and apply consistent processes and a common nomenclature for designing advanced analytics initiatives

2. Ensure that stakeholders define strategic objectives and desired business outcomes and closely align proposed initiatives to these goals

3. Carefully think through the competencies and roles that are needed across the advanced analytics, IT and business teams

Senior level executives are more likely to believe that subject matter experts and technical teams are effective at working together to design analytics initiatives.

Percentage	Role
71%	CIO/CTO
67%	CEO/PRESIDENT, COO
56%	CHIEF DIGITA OFFICER
55%	VP OR SVP/EVP
54%	CMO
51%	CHIEF HR OFFICER
46%	CFO/TREASURER
43%	CHIEF ANALYTICS OFFICER
37%	CHIEF RISK/COMPLIANCE OFFICER

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Intervention design
Translating the goals, models and methods into actions by imbedding analytics into business operations

Key findings

▶ Earlier is better when considering how insights from a specific advanced analytics initiative may lead to different actions.

▶ There's widespread under use of advanced analytics among senior business leaders, which leads to difficulty in translating into action.

▶ Lack of skills is a significant roadblock to activating the insights derived from advanced analytics.

Q: When in the process do you design how the insights from analytics will be applied/what actions will be taken to realize value?
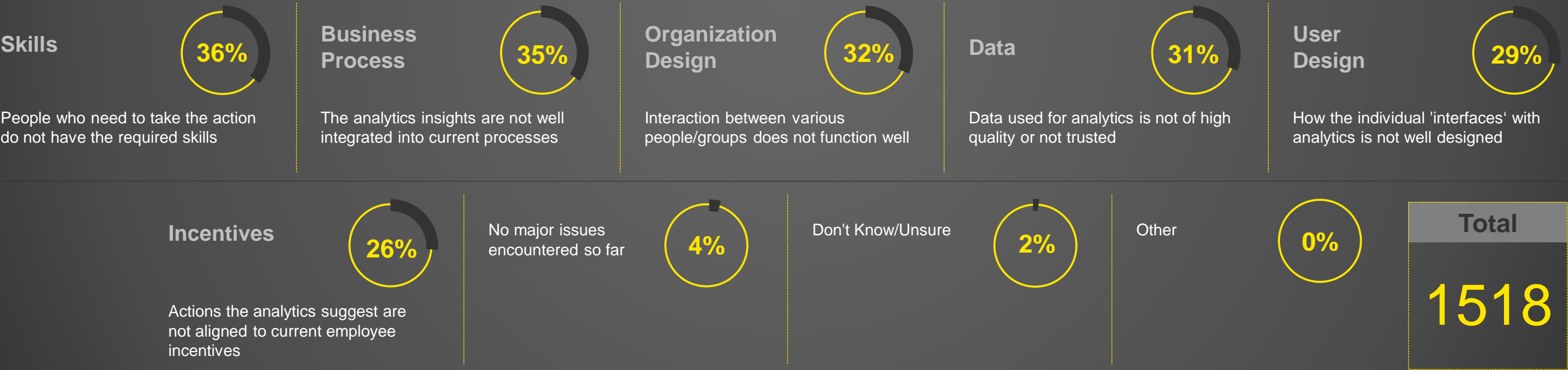
| When we are designing the use case at a high level | **22%** | After we have started data collection and know what is possible | **38%** | After we have determined what type of analytics will be applied | **28%** | After we have built models and determined what insights can be generated | **11%** | Other | **1%** |

Total

1518

Intervention design

Translating the goals, models and methods into actions by imbedding analytics into business operations (continued)

Recommendations

1. Begin to design the analytics intervention approach as early as possible to enable testing

2. Define and refine over time the methods, approaches and user-centric design

3. Don't forget the human element – while the growth of artificial intelligence (AI) and other forms of automation will increase, human judgment will remain vital when making strategic and operational decisions

Q: What are the biggest challenges in driving adoption of insights derived from analytics?

Skills — **36%**
People who need to take the action do not have the required skills

Business Process — **35%**
The analytics insights are not well integrated into current processes

Organization Design — **32%**
Interaction between various people/groups does not function well

Data — **31%**
Data used for analytics is not of high quality or not trusted

User Design — **29%**
How the individual 'interfaces' with analytics is not well designed

Incentives — **26%**
Actions the analytics suggest are not aligned to current employee incentives

No major issues encountered so far — **4%**

Don't Know/Unsure — **2%**

Other — **0%**

Total
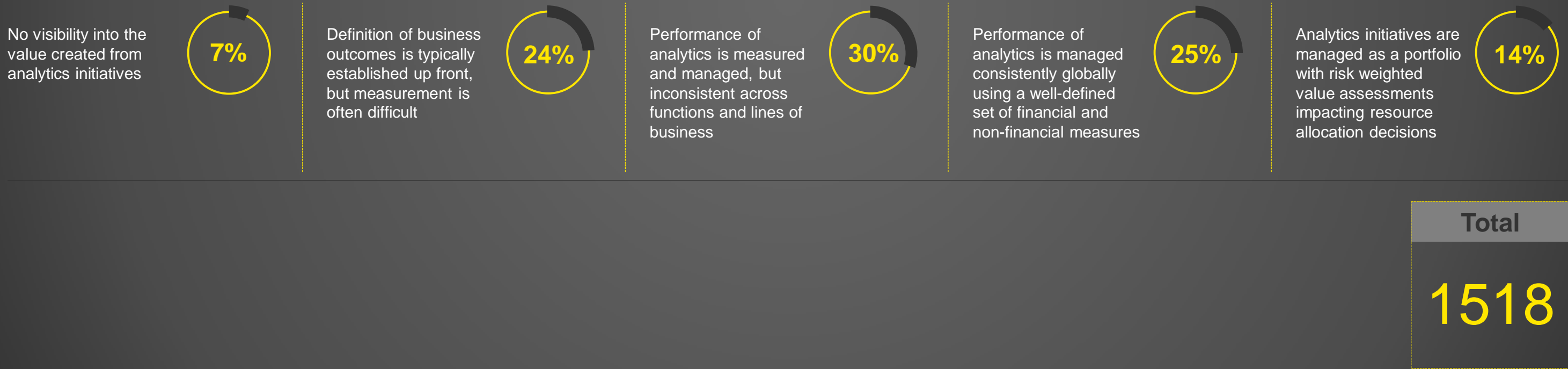
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Multiple choice responses

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Measurement and learning
Quantifying and learning from data-driven business outcomes

Key findings

► Leaders diligently focus on measuring the impact of their advanced analytics initiatives – and learning how to adapt.

► Lagging organizations inconsistently apply performance measurements and often cannot overcome perceived barriers in developing an advanced analytics approach to measure impact.

► Poor communication of advanced analytics outcomes is a top challenge to value realization.

Q: Which best describes how value is measured when demonstrating the impact of analytics on your organization?

| No visibility into the value created from analytics initiatives | **7%** | Definition of business outcomes is typically established up front, but measurement is often difficult | **24%** | Performance of analytics is measured and managed, but inconsistent across functions and lines of business | **30%** | Performance of analytics is managed consistently globally using a well-defined set of financial and non-financial measures | **25%** | Analytics initiatives are managed as a portfolio with risk weighted value assessments impacting resource allocation decisions | **14%** |

Total
1518

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Measurement and learning
Quantifying and learning from data-driven business outcomes (continued)

Recommendations

1. Make value measurement a key part of any advanced analytics initiative
2. Ensure that actual results and best practices learned from each initiative are used to make decisions on what projects to stop, refine or accelerate
3. Focus on mechanisms to increase the likelihood that these experiences and lessons learned become part of the decision fabric of the enterprise

Q: What are the biggest challenges in measuring value realization?

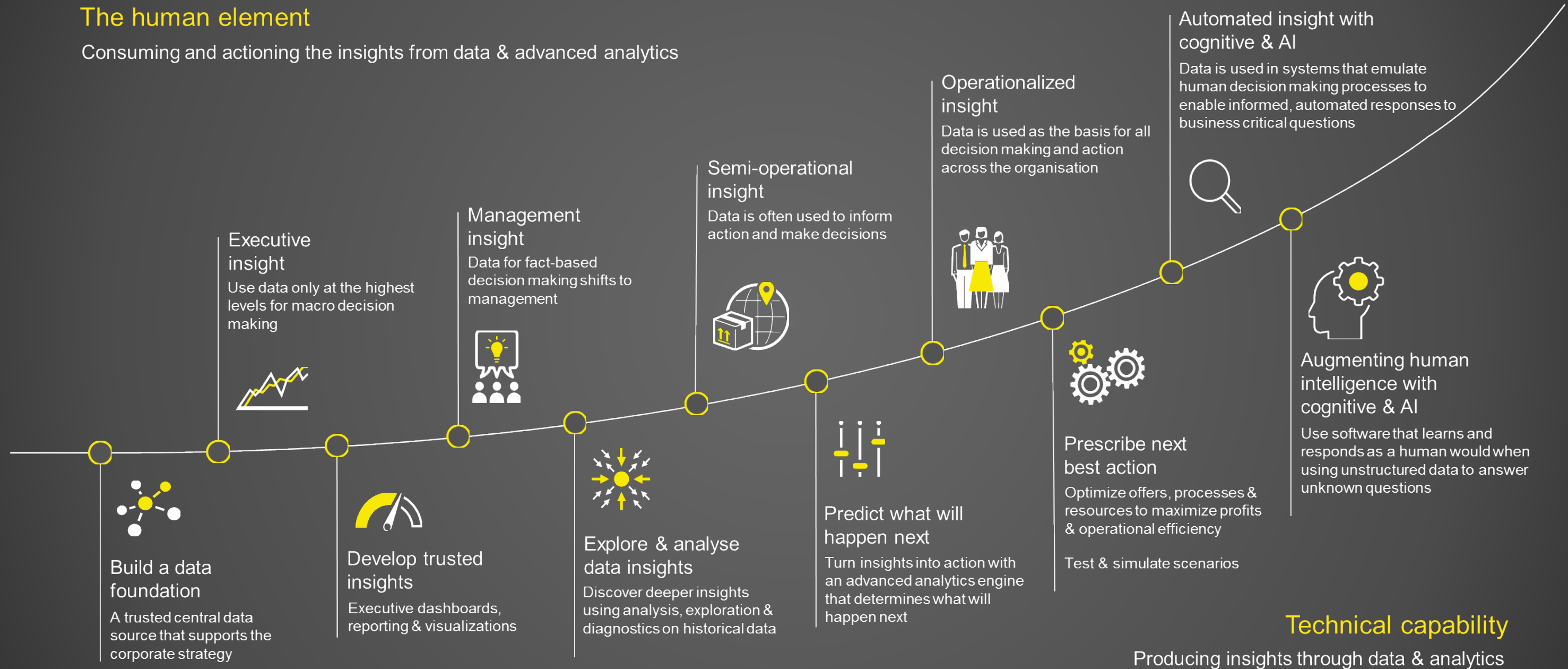| Challenge	%
Too many factors influence the business outcome (cannot isolate the actions from analytics)	33%
Capturing required data is difficult/too costly	30%
Communication of business outcomes to the stakeholders	29%
Expected performance outcomes are not well defined	28%
Lack of clear responsibility for business outcomes	26%
Lack of trust in the measurement process	25%
Lack of trust in the data	23%
Don't Know/Unsure	3%
Other	0%

Total: 1518

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Be active – Look into analytics use cases!

Before you start with an analytics journey you need to understand where you are and what you already have
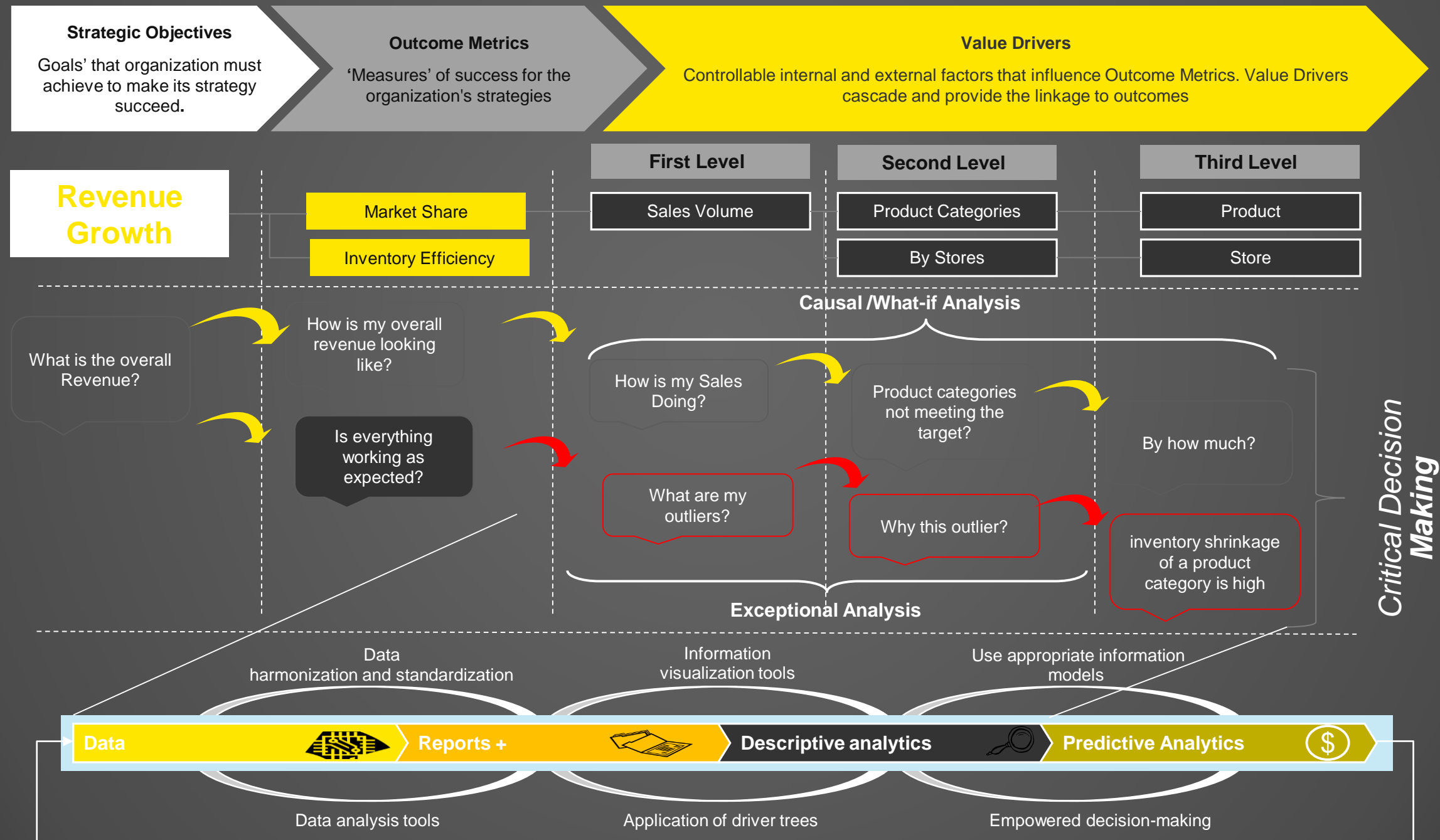
The human element

Consuming and actioning the insights from data & advanced analytics

Automated insight with cognitive & AI

Data is used in systems that emulate human decision making processes to enable informed, automated responses to business critical questions

Operationalized insight

Data is used as the basis for all decision making and action across the organisation

Semi-operational insight

Data is often used to inform action and make decisions

Management insight

Data for fact-based decision making shifts to management

Executive insight

Use data only at the highest levels for macro decision making

Augmenting human intelligence with cognitive & AI

Use software that learns and responds as a human would when using unstructured data to answer unknown questions

Prescribe next best action

Optimize offers, processes & resources to maximize profits & operational efficiency

Test & simulate scenarios

Predict what will happen next

Turn insights into action with an advanced analytics engine that determines what will happen next

Explore & analyse data insights

Discover deeper insights using analysis, exploration & diagnostics on historical data

Develop trusted insights

Executive dashboards, reporting & visualizations

Build a data foundation

A trusted central data source that supports the corporate strategy

Technical capability

Producing insights through data & analytics

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We discuss these challenges as a starting point for use case identification

API selection

Which APIs fit the identified use cases?

What is the cost of using these APIs for the use cases?

How will these APIs perform given the expected volumes of data and users?

Analytics platform integration

How will the source data be extracted, transformed, stored and ingested into the cognitive engine?

How will we future-proof a pilot solution for future cognitive use cases?

How will we support the use of unstructured data in algorithms and models?

Training approach

What is the minimum viable data set required to support the use case?

What will be the approach to train the cognitive engine?

How will we determine the solution has learned enough to be piloted for business use?

Data availability and privacy

What restrictions apply to the use and transfer of source data?

How will the preferred APIs handle the data?

What mechanisms need to be implemented to comply with the client's information security requirements?

Adoption into the business

What will be the approach for executing a pilot?

How will we determine the solution is ready for wider community use?

After a successful pilot, how will we keep the solution up-to-date as new information becomes available?

Analytics infused use cases should enable critical decision making

Strategic Objectives
Goals' that organization must achieve to make its strategy succeed.

Outcome Metrics
'Measures' of success for the organization's strategies

Value Drivers
Controllable internal and external factors that influence Outcome Metrics. Value Drivers cascade and provide the linkage to outcomes

First Level

Second Level

Third Level

Revenue Growth

Market Share

Inventory Efficiency

Sales Volume

Product Categories

By Stores

Product

Store

Causal /What-if Analysis

What is the overall Revenue?

How is my overall revenue looking like?

Is everything working as expected?

How is my Sales Doing?

Product categories not meeting the target?

By how much?

What are my outliers?

Why this outlier?

inventory shrinkage of a product category is high

Exceptional Analysis

Critical Decision Making

Data harmonization and standardization

Information visualization tools

Use appropriate information models

Data

Reports +

Descriptive analytics

Predictive Analytics

$

Data analysis tools

Application of driver trees

Empowered decision-making

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We usually start with the discussion of pain points and analytics solutions

Issues	Solutions

Revenue Growth

Issues:
- Misalignment between KPIs and sales forecasts
- Limited visibility into 'true' growth drivers in business
- Difficulty in monitoring effectiveness of sales/marketing programs

Solutions:
- **Real time data driven pricing models**
- **Visualization for "What-if" scenarios**
- **Interactive dashboards to deliver business insights**

Margin Improvement

Issues:
- No clear understanding of profitability per customer
- Disconnect between spend analytics (marketing, IT, etc.) & financial results
- Inability to perform root cause analysis (fixed vs variable costs, etc.)

Solutions:
- **Multidimensional analysis for allocations and profitability**
- **Integrated reporting with drill down analytics**

Operational Excellence

Issues:
- Sub-optimal processes with limited automation of transactional tasks
- Too much time spent in non value add tasks resulting in delayed results and inaccurate information
- Systems complexity and data infrastructure challenges drive churn

Solutions:
- **Increased automation through analytics**
- **Reporting and analytics tool as 'one-stop' shop**

Risks & Controls

Issues:
- Weak controls environment and increased threat of data security breach
- Cost of compliance is becoming burden with significant manual effort
- Complex systems landscape and continued use of legacy systems present unique challenges

Solutions:
- **Risk sensitivity analysis and risk event modeling**
- **Embed business analytics for proactive risk management**

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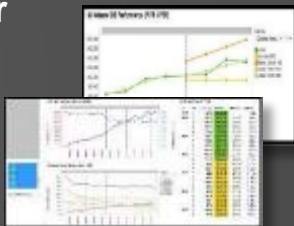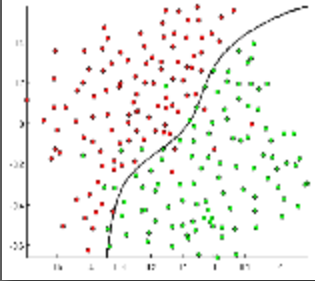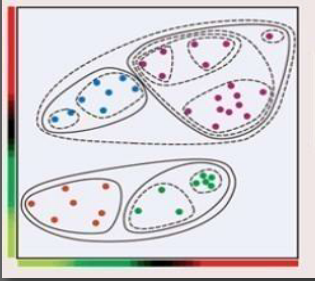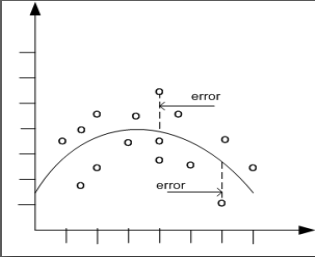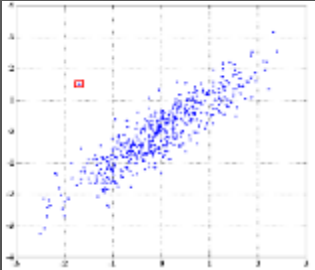
Thank you!

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EY is working with many of the world's leading companies on analytics deployments across many different types of use cases

USE CASES	USES	APPROACH		ML TECHNIQUE
Customer Attrition **Compliance Concerns** **High Risk Behavior Analysis**	► Category Prediction ► Sentiment Analysis ► Compliance	Categorical Prediction (**Classification**)		► Decision tree / forests ► Support Vector Machines (SVM) ► Neural Networks ► Naive Bayes
Customer Preference **Customer Experience**	► Offering / Market Segmentation ► Topic Mining ► Pattern Discovery ► Network Analysis ► Population Research ► Image Analysis	Discovering Structure (**Clustering**)		► K-means clustering ► SOM Neural Network
Default Risk **Forecasting** **Sales/Profit Optimization**	► Forecasting ► Designing Simulations ► Minimizing Risk ► Cost Analysis ► Optimization	Value Estimation (**Regression**)		► Neural Networks ► Linear / Polynomial Regression ► XGBoost ► Collaborative Filtering
Insider trading **Transaction Fraud**	► Transaction Monitoring ► AML ► Compliance ► Trend Detection ► Identification Theft	Irregularity Identification (**Anomaly Detection**)		► Hazard Function (Survival Analysis) ► Poison Regression ► Bayesian Analysis

Applications and Approaches are not mutually exclusive, this is a general overview. Problems can be solved using a variety of methods

Credentials - EY has already successfully implemented more than 2000 analytics engagements

NLP for Complaint/Compliance

Used NLP Model to automate voice-text analytics.

Result:

725% Decrease in False Positives

500% Increase in Accuracy

317% Reduction in population for review

DOL Compliance Automation

Used NLP text analytics model to identify potential fiduciary concerns.

Result:

20x Decrease in required time to review and resources requited for review

Increase Accuracy and consistency

MBA for Data Quality and Risk

Used Market Basket Analysis to impute missing data through rule based system

Result:

99+% Accuracy in Prediction

45% Population Data gaps remediated

Increase Fraudulent activities identified

Email Vendor Implementation

Currently assisting a client with the implementation and training of a vendor box for email monitoring across multiple use cases in a capital markets environment.

Call Center Analytics

Improved on call voice reason analytics compared to current vendor solution

Result:

Increased accuracy of reason and sub-reason codes

Lowered cost by optimizing targeted review population

NLP and Text Analysis

Enhance current unsupervised machine learning NLP and text analytics methodologies and capabilities to significantly improve our offerings with emails and voice.

Network Analysis

Developing capabilities around analyzing network communication and social group clustering. Being able to analyse communication behaviour and capture communication between users.

AI Go-To-Market Highlights

-> Email Optimization

-> Strategic Platform and Knowledge Graphs

-> Complaints Optimization

-> Insights Generator for Compliance

-> Voice Extension

-> Fannie Point Solution Demo

AML KYC Risk Rating Modeling

Improving current Customer Risk Rating models through the use of neural networks. Initial model testing has shown that neural networks can decrease misclassification by 100% or more and are better at classifying High risk customers than current methods.

Knowledge Graphs

Define a knowledge repository for hosting the semantic information about a specific domain (e.g. AML regulations). These repositories have a highly dynamic structure and are used in guiding the analysis and interpreting the outcomes. They are automatically enriched over time using NLP techniques.

Unsupervised Text / Document Classification

Document classification requires a large labelled training data set which is generally never available. This significantly increases model tuning time and is labor intensive. DL Lab is developing a method to solve this issue by greatly decreasing the time needed for model tuning.