

“Towards Data-Driven Government” How Government Entities can Use Data and Analytics to Survive and Thrive

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How Gartner Delivers Service



Personalized service



Research



Peer community

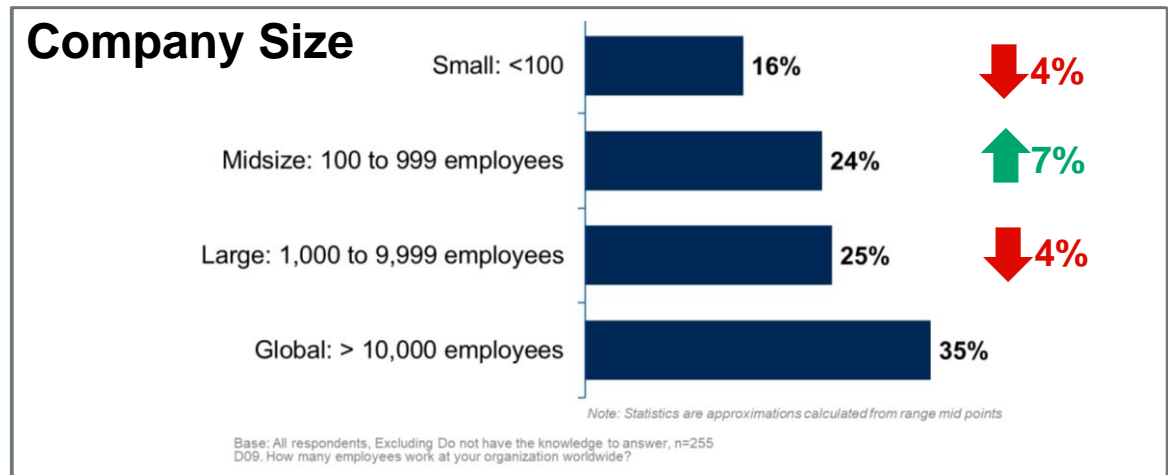
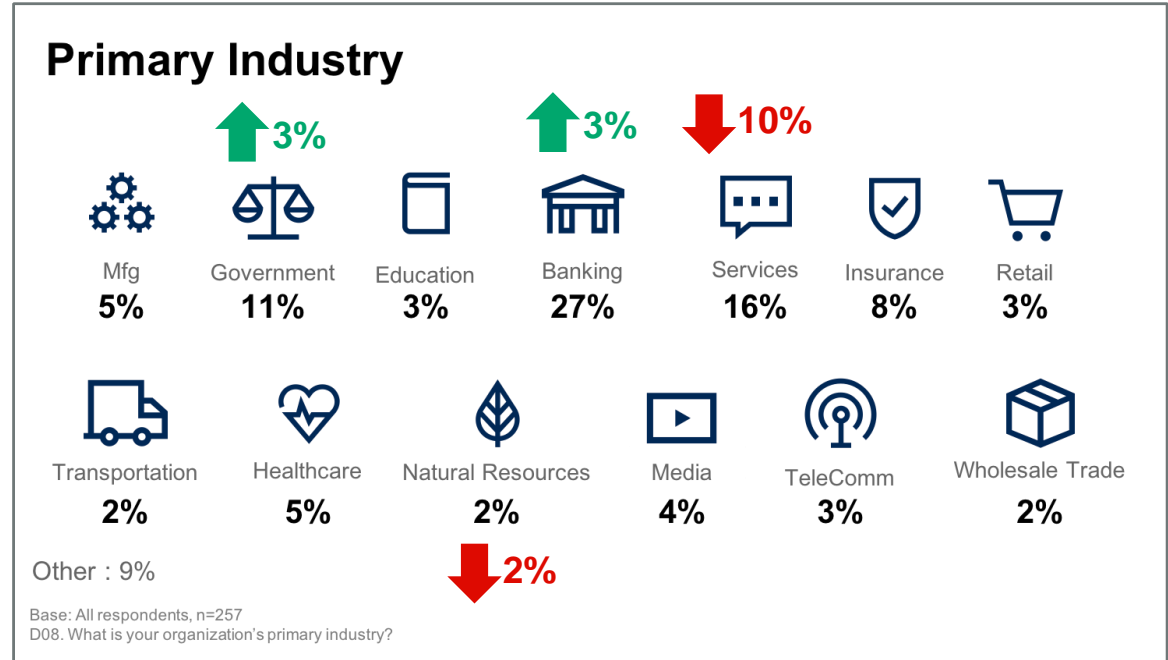
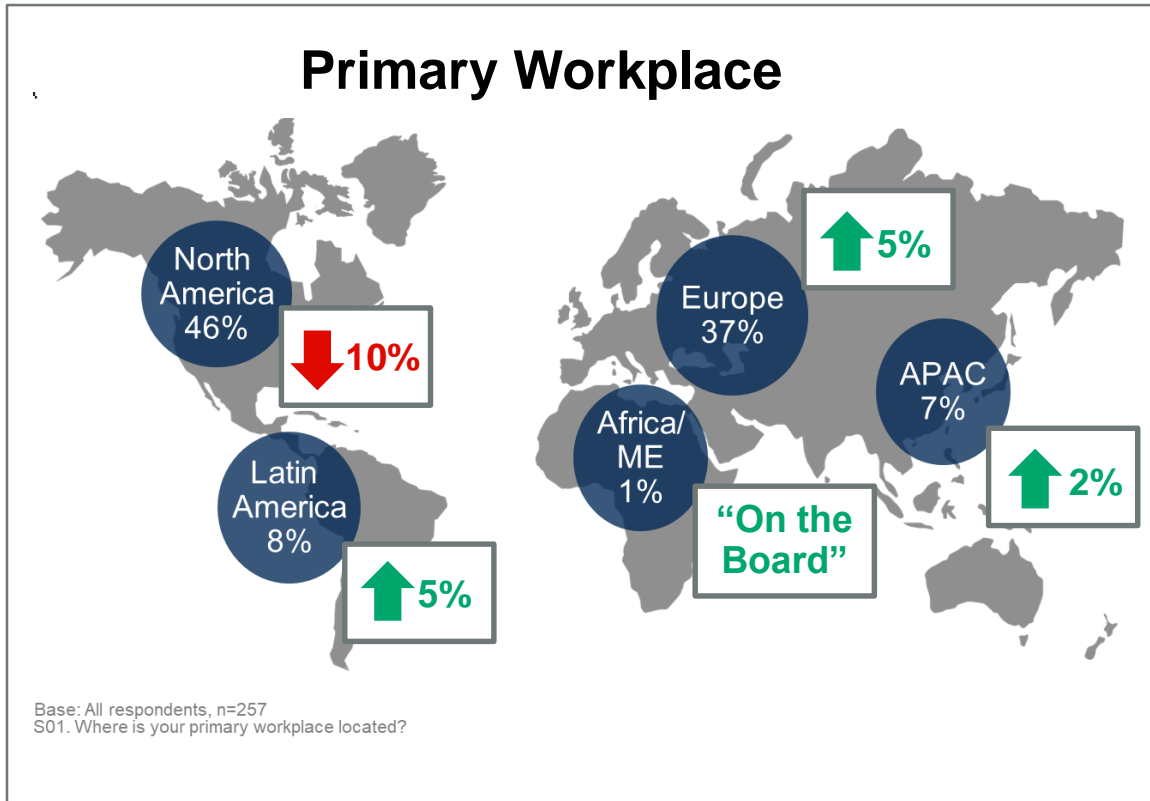


Analyst interactions



Events

CDO Survey Respondent Profile 2018/19



Digital Context: Data and Analytics at the Heart of It All

Data and analytics are central to:

- Proactive, pragmatic policy & planning
- innovation
- process efficiency and automation
- powering new business models

Government Digital Transformation

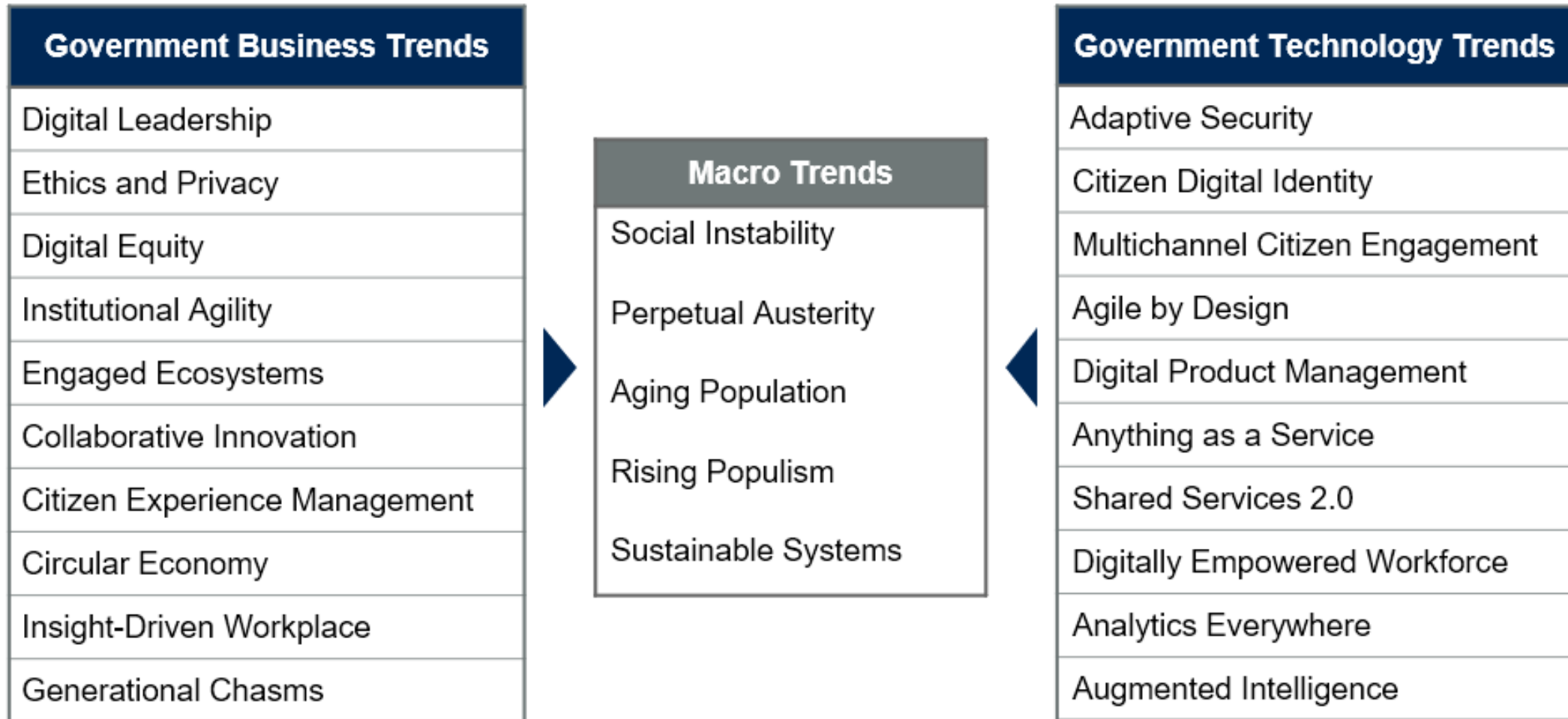


... and this is only going to get more complex, with data, analytics and AI pervasive to every policy, process, role and decision.

ID: 375741

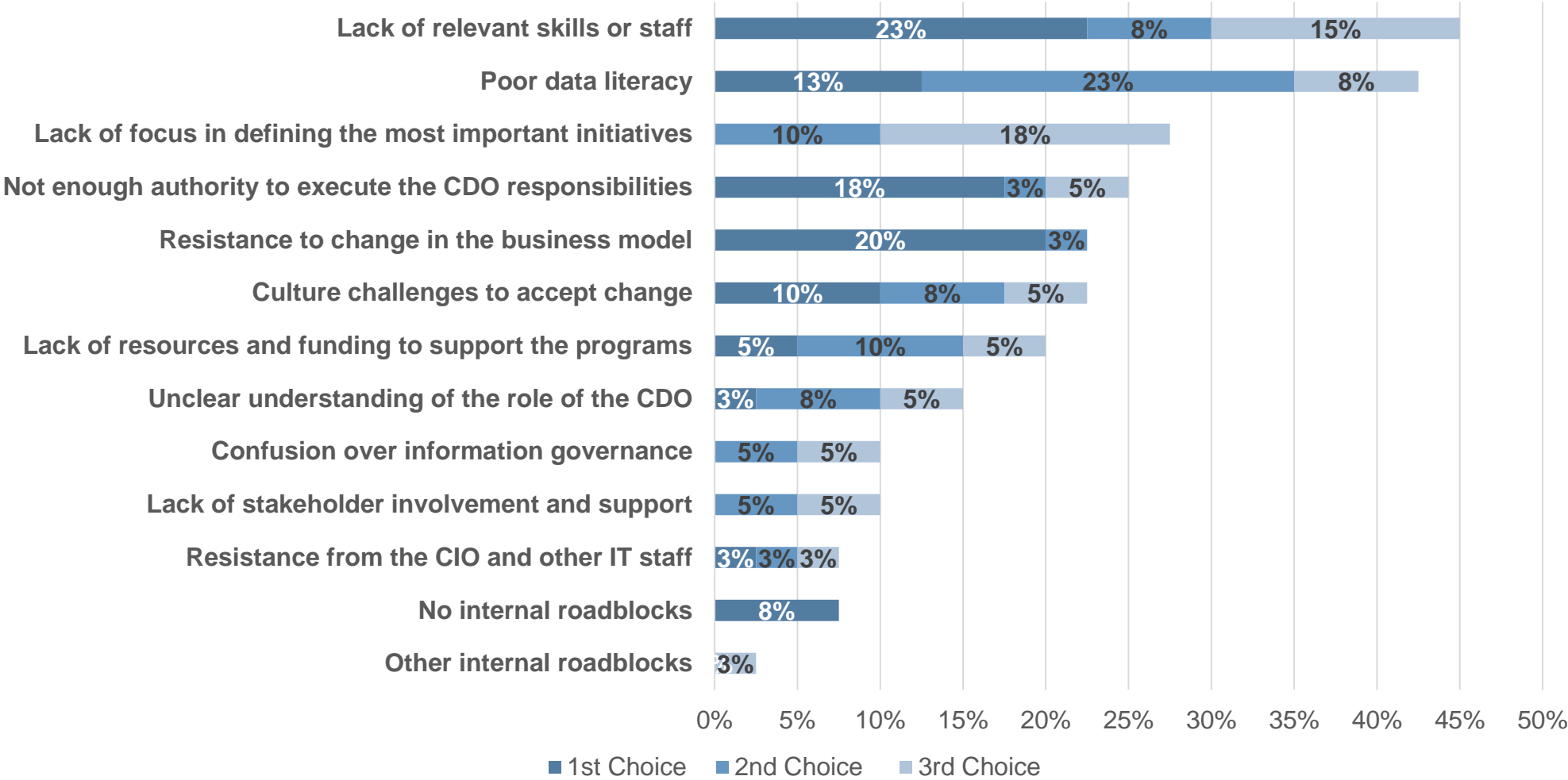
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Top Business, Macro and Technology Trends Impacting Government



Source: Gartner
ID: 389781

Roadblocks to Success: Government Respondents

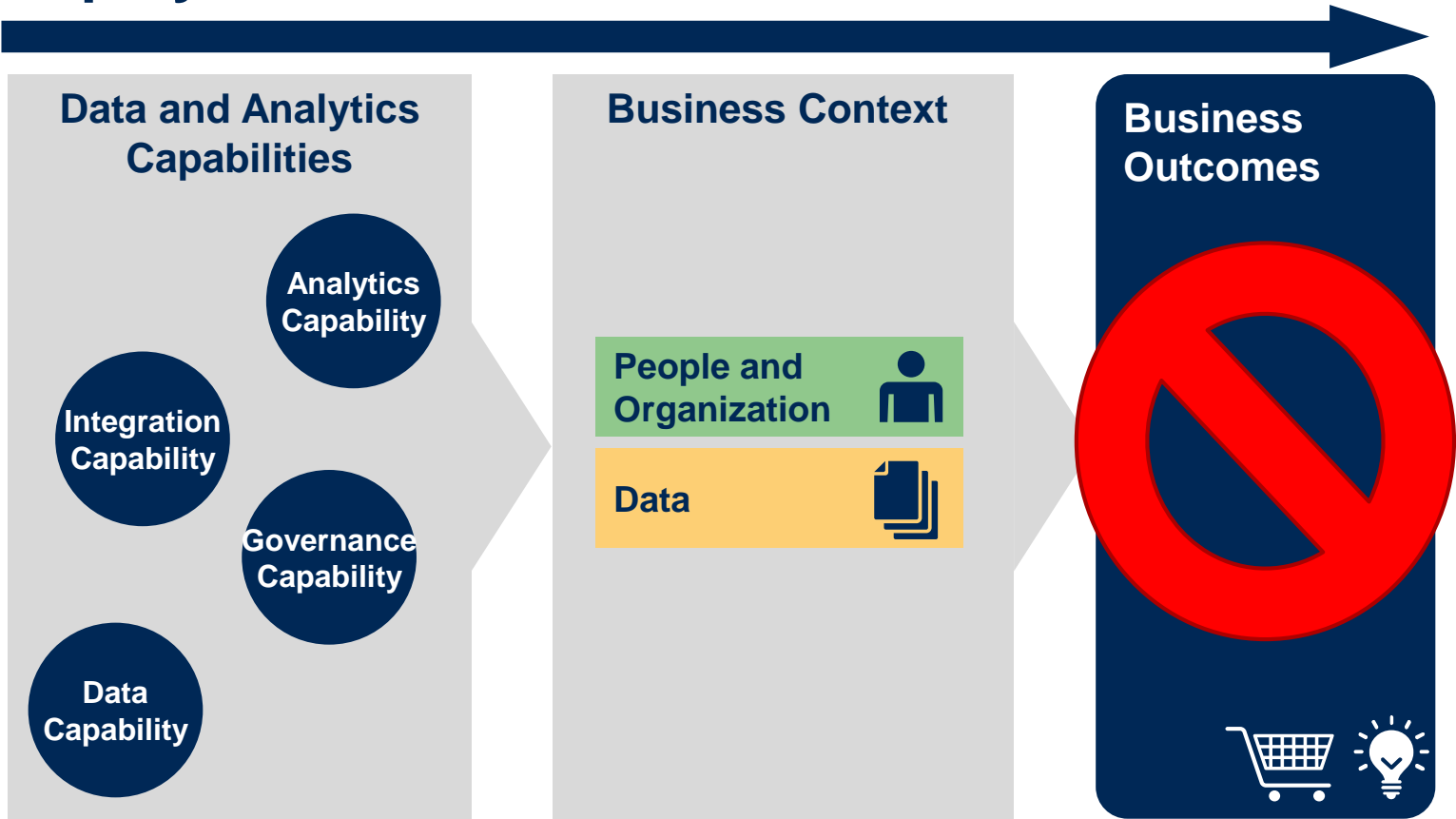


4th CDO Survey – Government respondents only,
 Base: All respondents, n=257; Government respondents n= 29
 Q07. What do you see as the internal roadblocks to the success of the Data and Analytics team you lead? (Summary of ranks 1-3)
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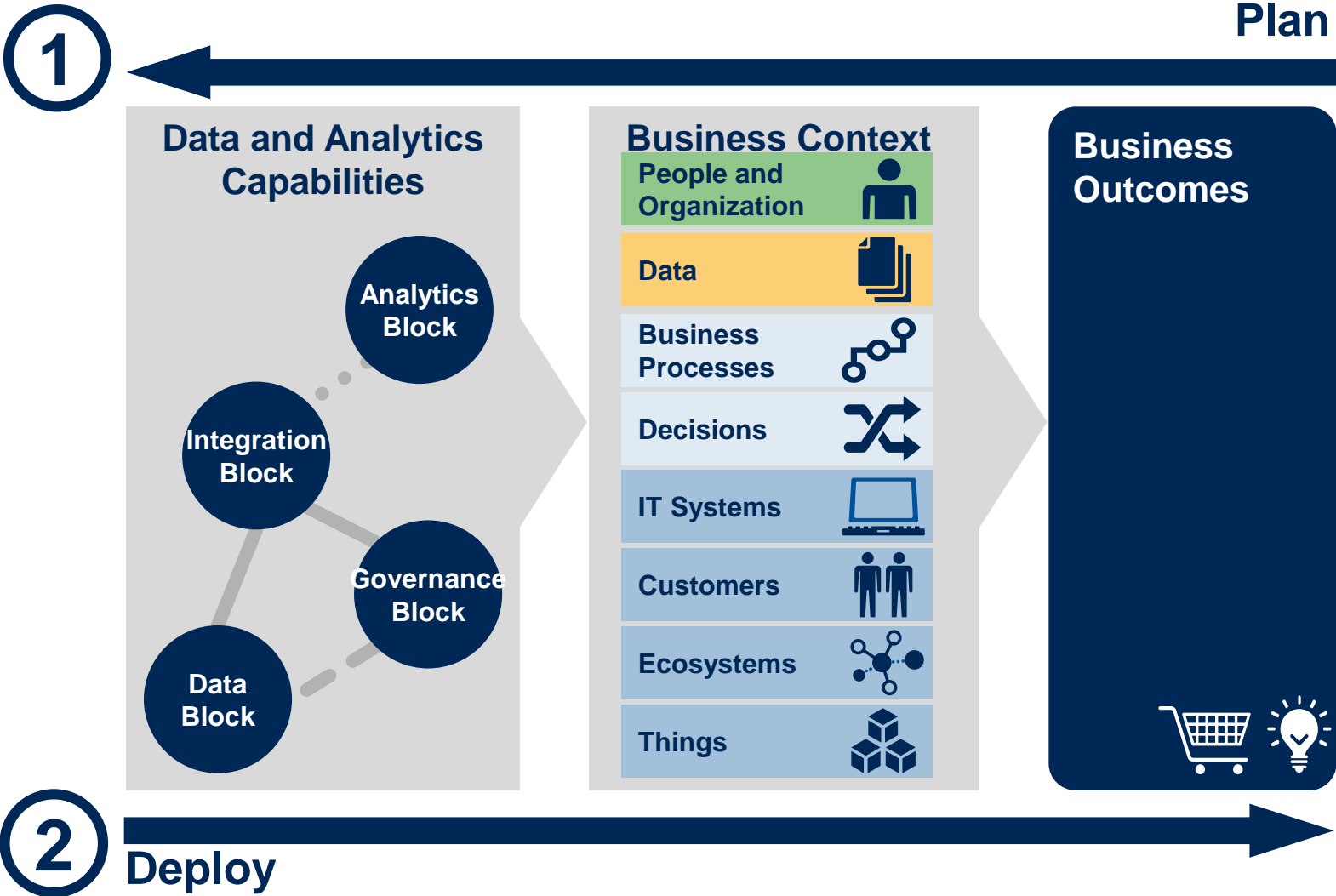


Technology-Driven Deployments Fail to Deliver the Expected Levels of Business Outcomes

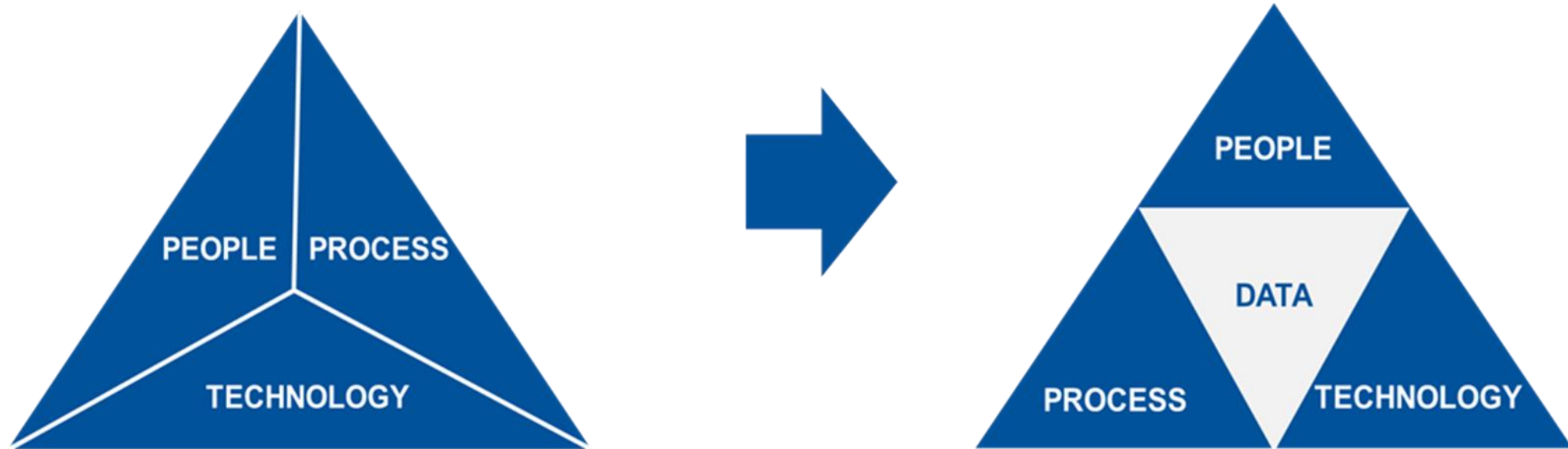
Deploy



Data and Analytics Must Be Driven by Business Outcomes



Data Literacy Is a Core Capability of Modern Organisations



Ability to read, write and communicate data in context.

Understanding of data sources and constructs, analytical methods and techniques applied.

Ability to describe the use-case application and resulting value.

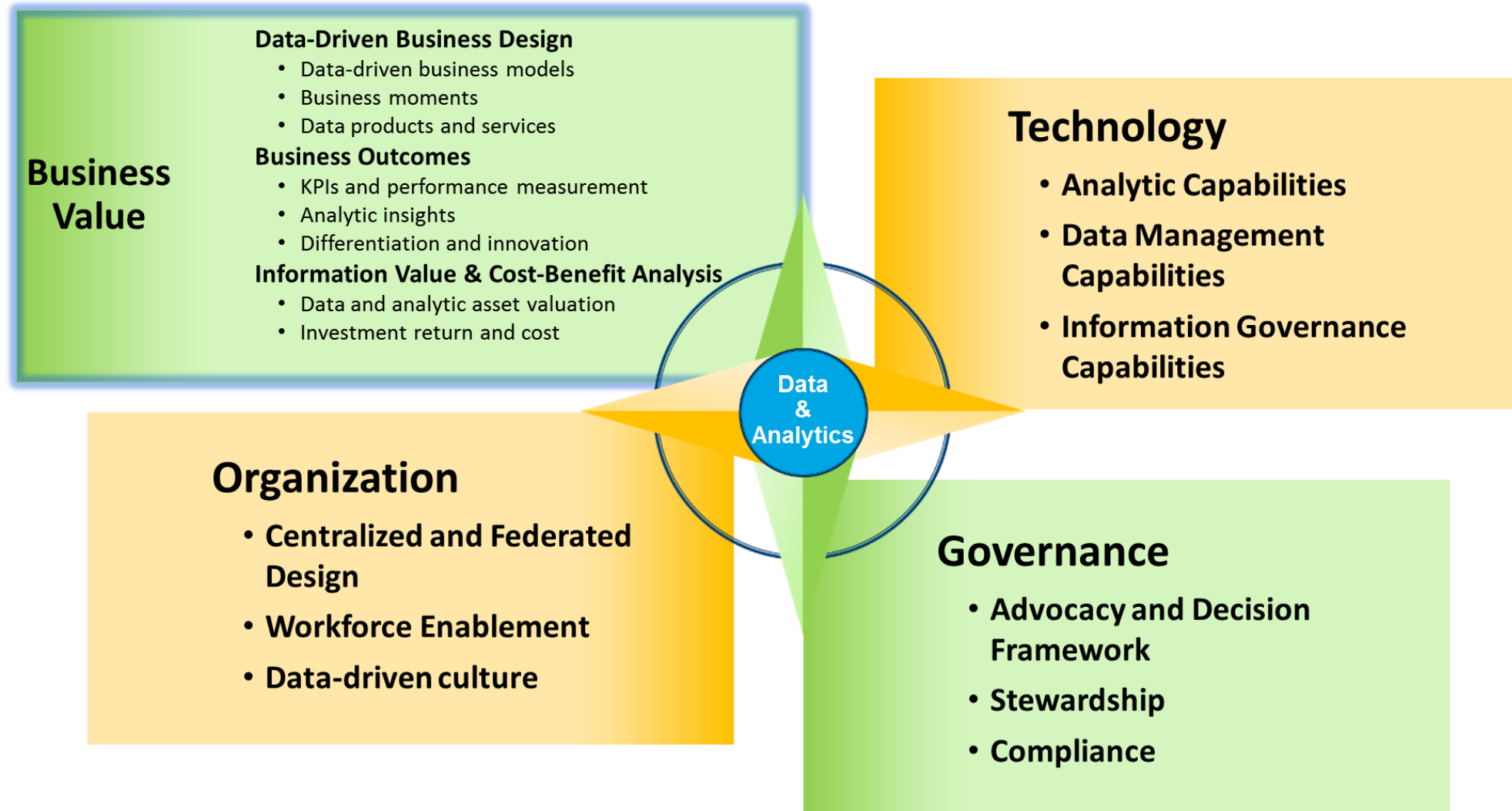
How can you take full advantage of your data?

"While money can't buy you happiness, it certainly lets you choose your own form of misery."

— Groucho Marx

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Data and Analytics Strategy: Balancing Act of Four Themes



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"It's Not Easy to Articulate Hard Benefits ..."

"We'll make better decisions ..."

"Operations staff will be more autonomous ..."

"Executives will be more informed ..."

Thou shalt never use the words "better," "more" or "improved"!

"Information will be treated as an asset ..."

"We can automate business process steps ..."

"We want to move from descriptive reporting to predictive models ..."

Can't Find "Hard" Benefits? You're Not Trying Hard Enough!

"Cancel the three loss-making services ..."

"Call center agents can approve a courtesy payment automatically ..."

"We will not run the new campaign until Q3 ..."

Must try harder!

"The impact of this data on operations is clear ..."

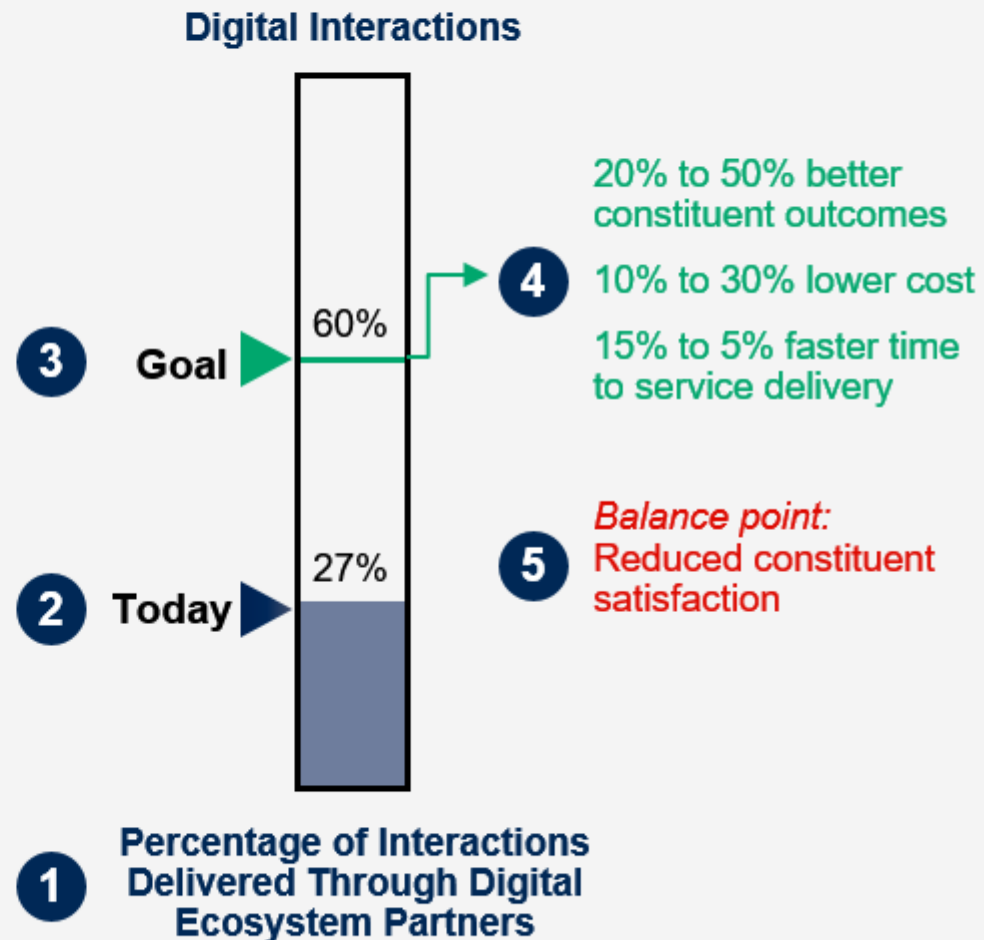
"Send the team ready to respond to the predicted incident..."

"We know the criteria that determine student success ..."

Anatomy of a Digital Government KPI

-  1 What is being measured?
-  2 Where are we today?
-  3 What is our target goal?
-  4 What is our desired business outcome/benefit?
-  5 What is our balance point?

Gartner Digital Government KPI Construct



Guidance Code of conduct for data-driven health and care technology

Updated 18 July 2019

Contents

Introduction

Introduction

The principles

Principles 1 to 12

Principles 13 to 14



OECD DIGITAL GOVERNMENT TOOLKIT

Principle 3

Creation of a data-driven culture

Key Issues

- > Data is increasingly recognised by governments as a strategic asset
- > ICTs have exponentially increased societies capacity to produce, store, process and share data
- > Using data to enhance public sector intelligence to support policymaking and service design and delivery
- > The creation of data-driven culture in the public sector



CIVIC DATA



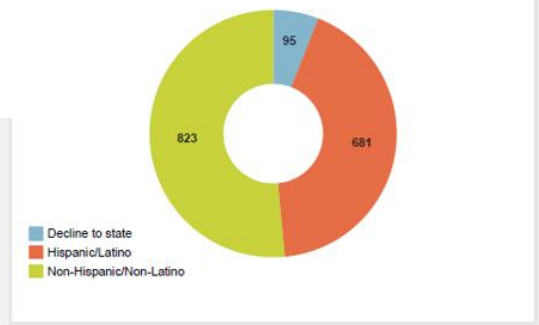
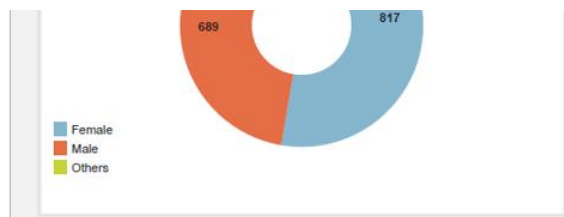
CTA Uses Data to Understand and Track the Needs of the Homeless

Who are our homeless neighbors and what are their needs?

JULIE CORDUA - CEO | THORN

WE FOUND A WAY

...to empower law enforcement to identify & assist trafficked children.



Gartner Predicts by 2022



30%

Category	Percentage
of CDOs will partner with their CFO to formally value the organization's information assets for improved information management and benefits	30%

of CDOs will partner with their CFO to formally value the organization's information assets for improved information management and benefits

How do you establish the necessary capabilities for data and analytics?

"It is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail."

— Abraham Maslow

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**Who Owns
the Data?**

**Who Is
Responsible
for the Data?**

Interesting
questions!

I don't know!

It's complicated ...



Governance: Treat Your Information as an Asset



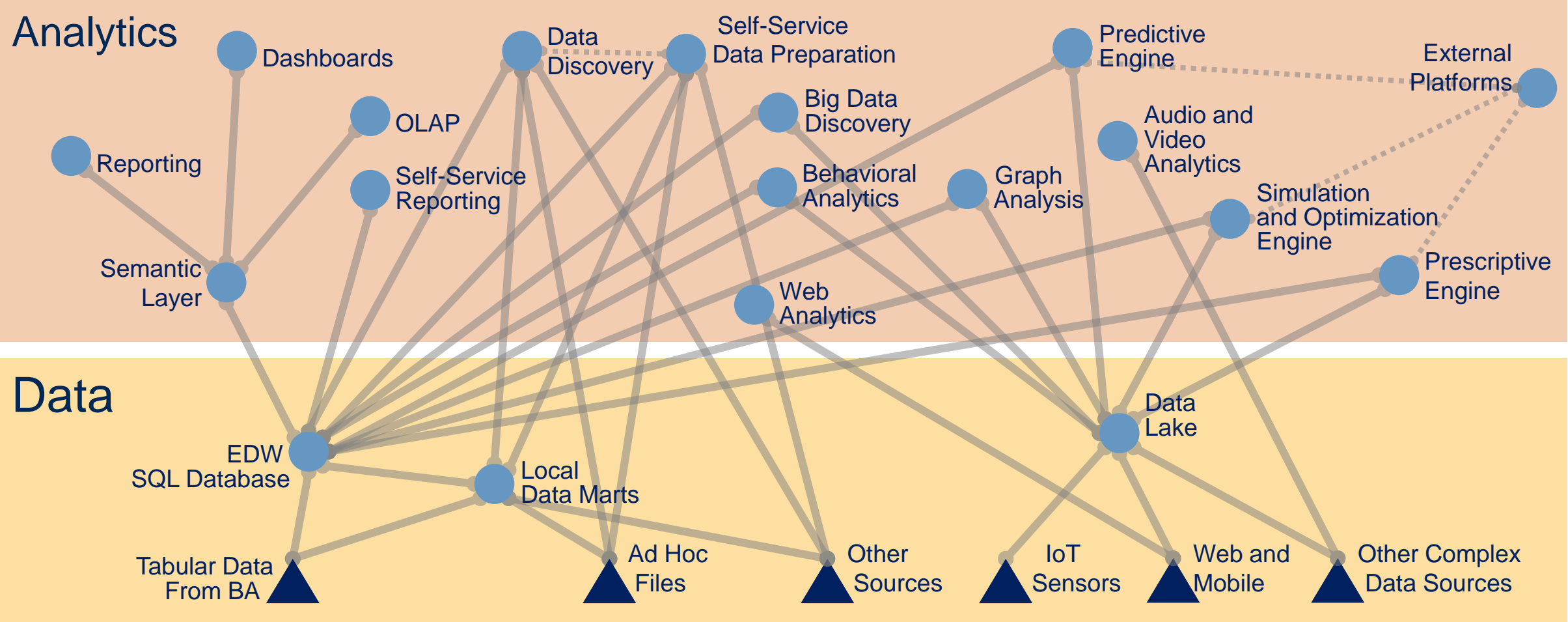
Curate Inventory of Information Assets

Collaborate for Accountability and Governance

Communicate Shared Semantic Meaning

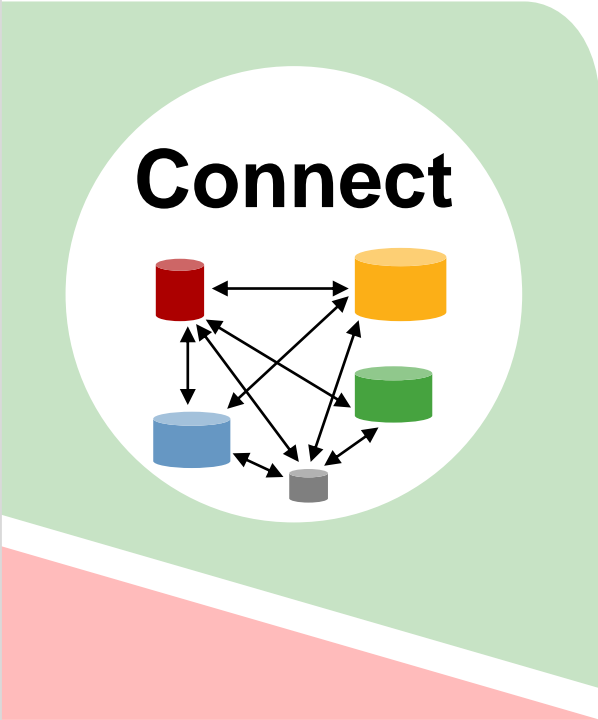
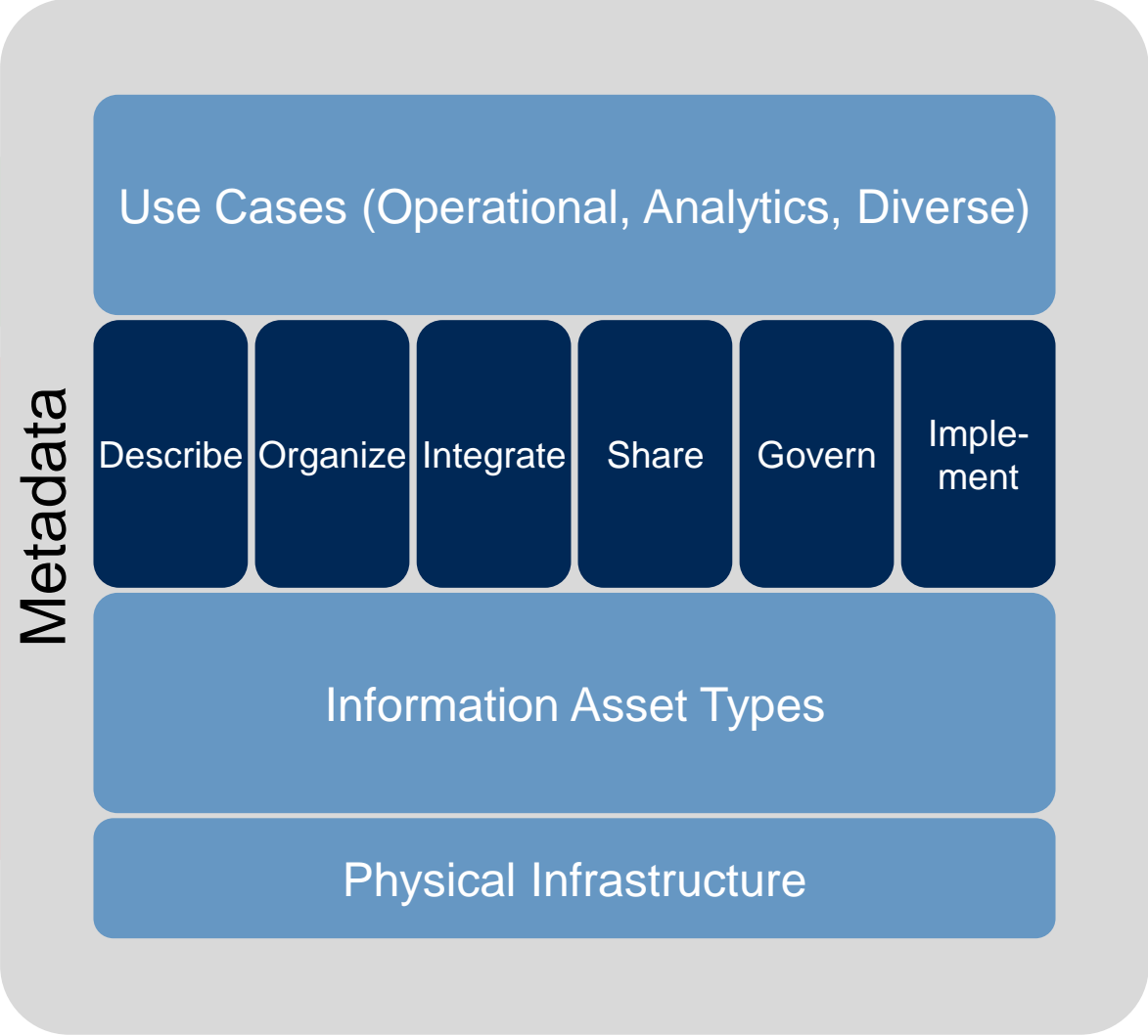
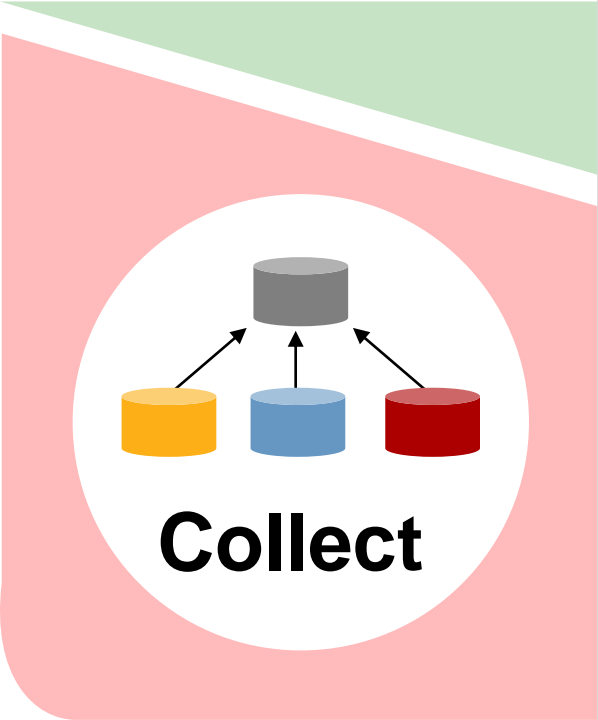
Facilitate, Broker, Enable, Share, Orchestrate

The Technology Map Is Complex and Continues to Evolve



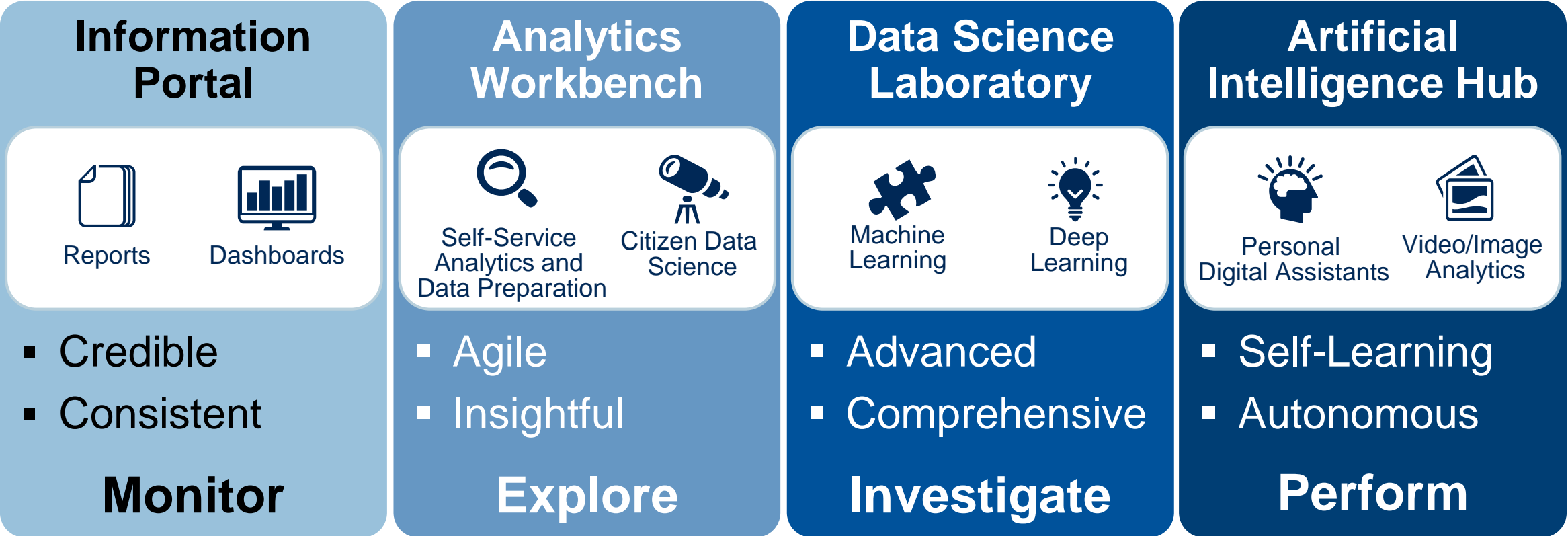
Sample List of Analytics Components and Most Relevant Touchpoints.

Create a Flexible Infrastructure



Present Data Through Consumable Services

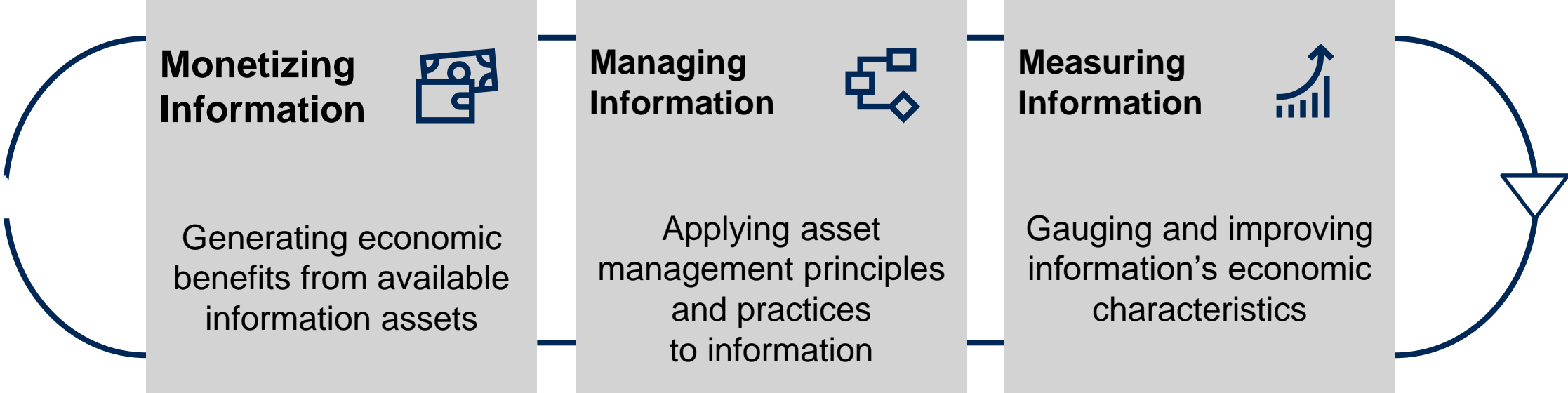
Analytics Capabilities



Sample list of analytics capabilities:



Introducing *Infonomics*



Treating Information as an Actual Asset

Gartner Predicts **by 2022**



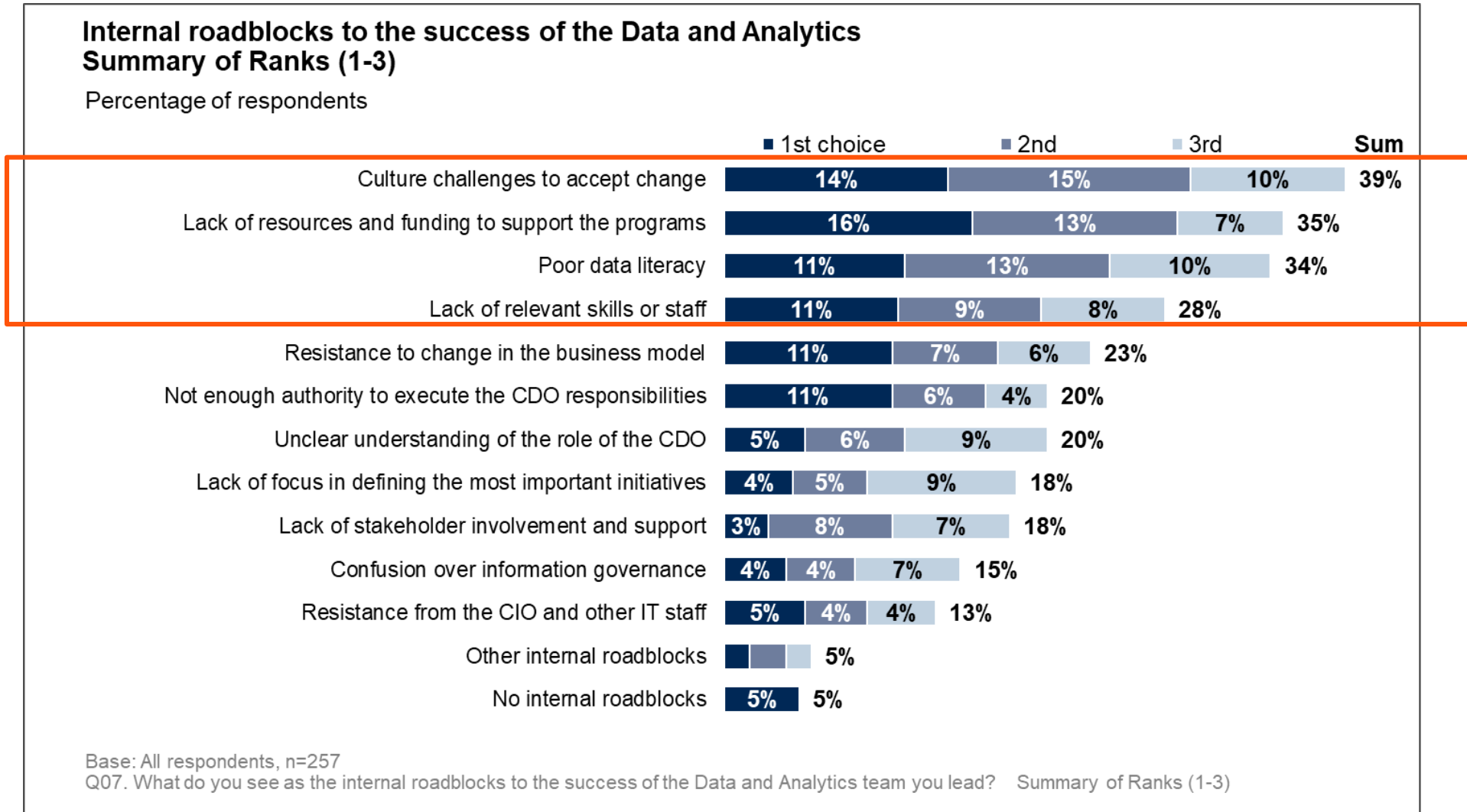
Cultivating a data-driven mindset

"Maybe stories are just data with a soul."

— Brené Brown

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Internal Roadblocks to Success – Human Problems

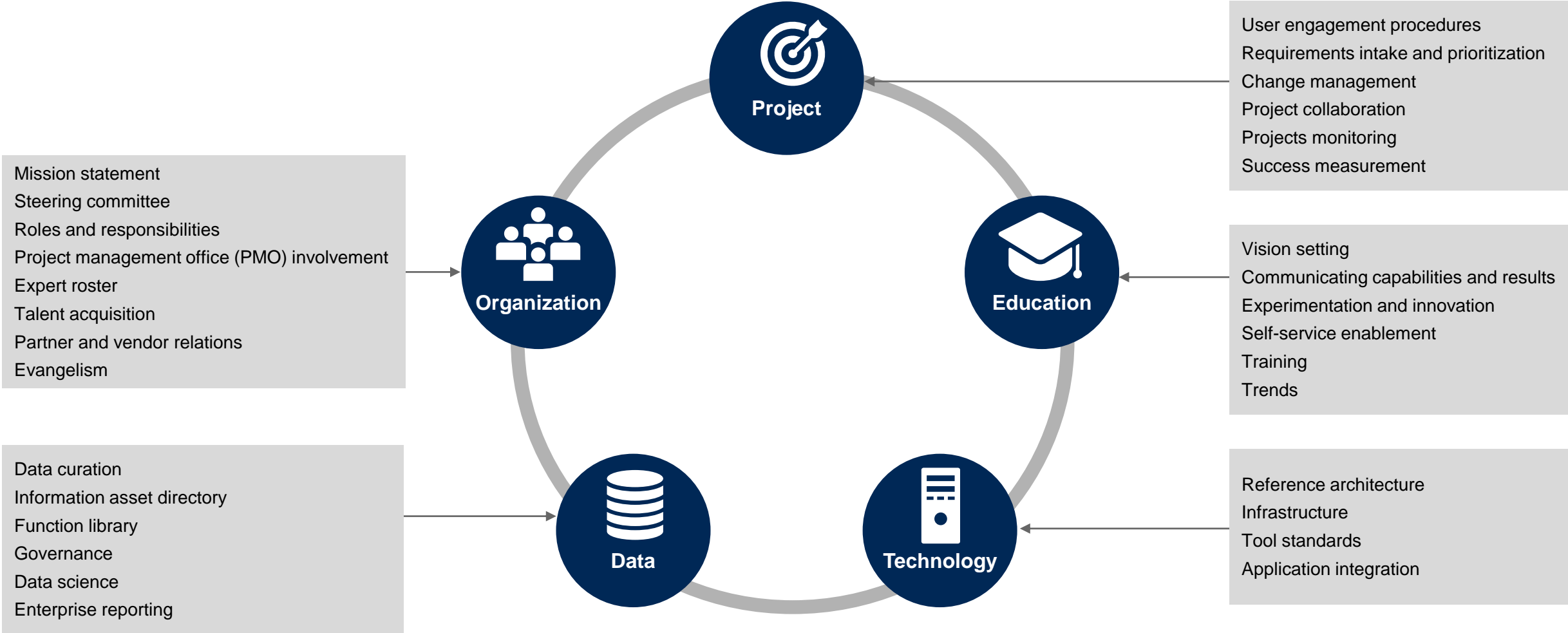


Left: Base: All respondents, n=257; Q04B. Has the number of employees directly reporting into the Data and Analytics team changed since 2017?

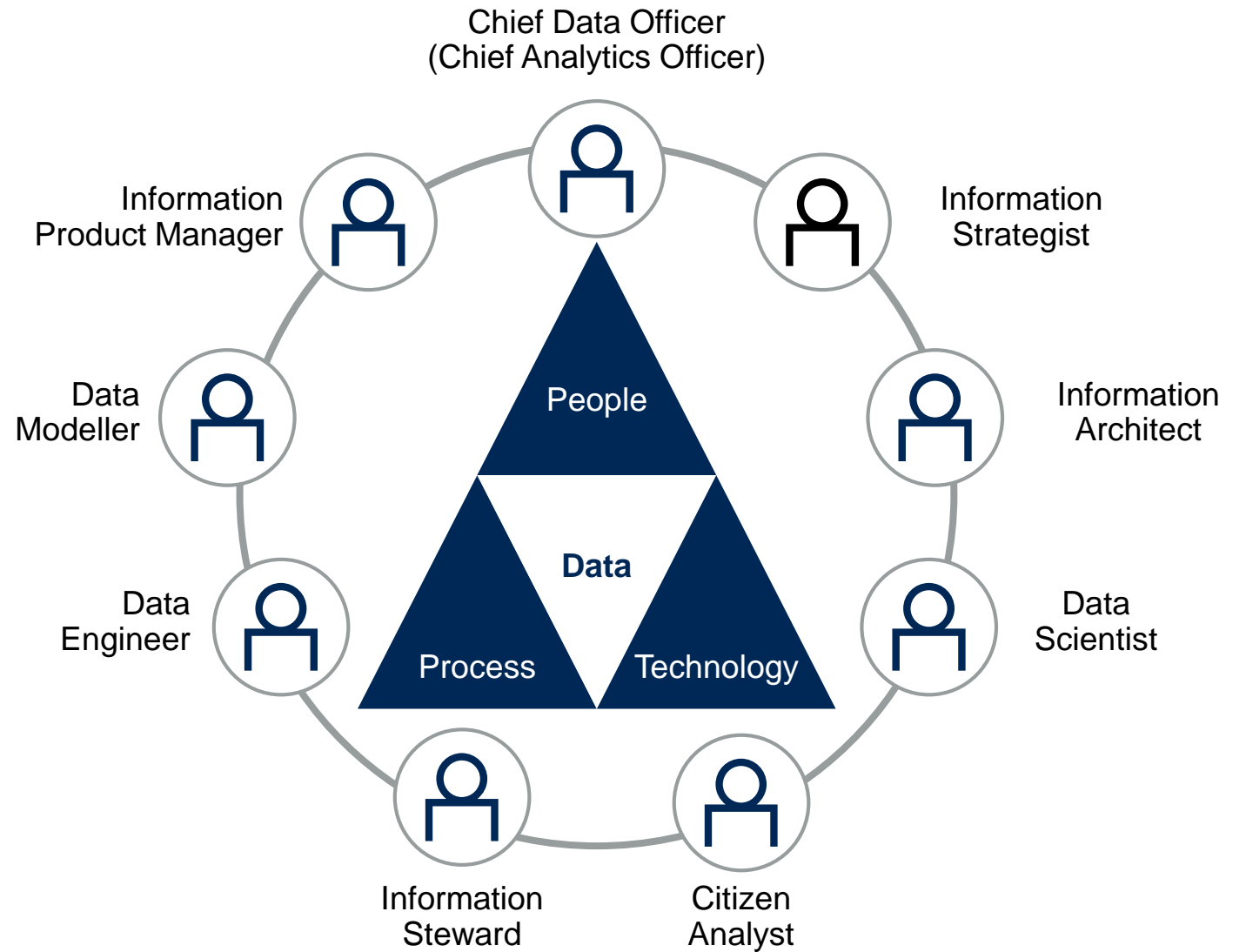
Right: Base: Base: All respondents, Excluding Unsure/Prefer not to answer, n=230; Q05B. How does the Data and Analytics budget for 2020 compare to last year (2017)?

Note: Statistics are approximations calculated from range mid points excluding No budget at this point

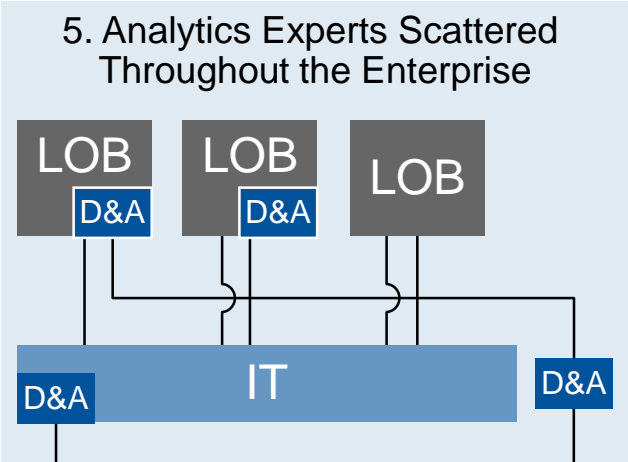
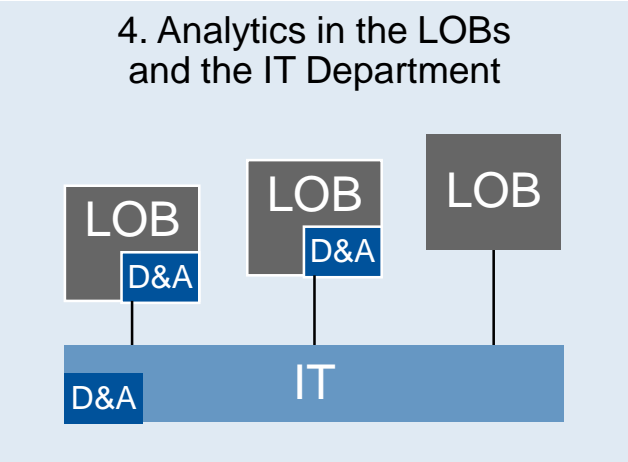
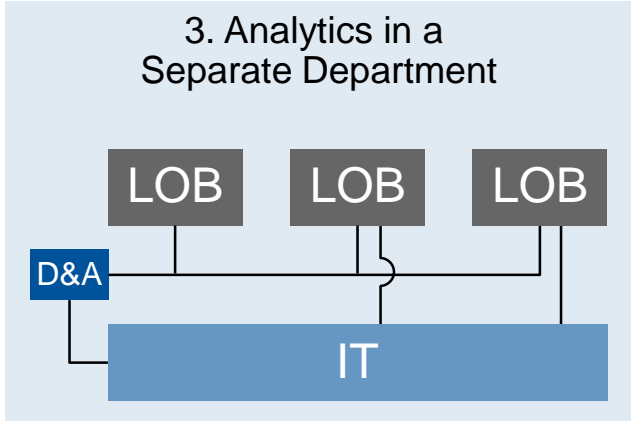
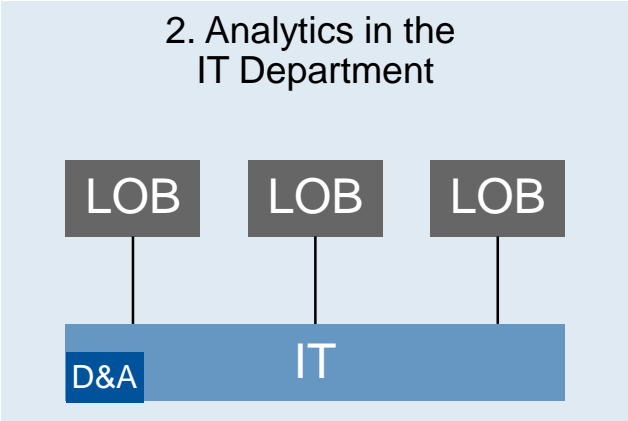
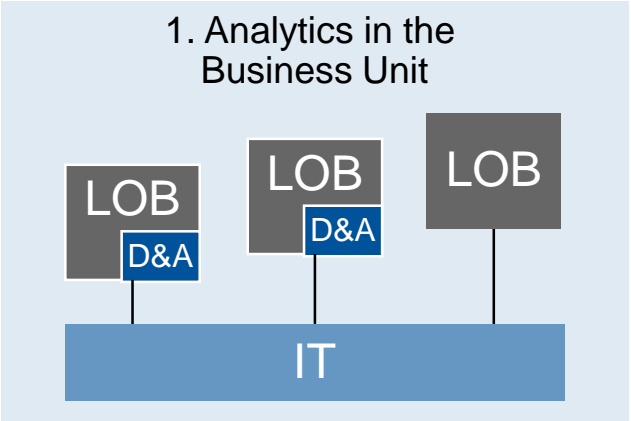
30 ACE Capabilities You May Be Lacking ...



Map both **roles**
and **jobs** based
on required
capability and
capacity to do the
work and deliver
the business
value
**i.e., Resource
Planning!**



Form Agile & DevOps “Squads” and “Tribes” — in both Mode 2 and Mode 1



D&A = Data and Analytics; LOB = Line of Business

Source: “[Organizational Principles for Placing Data Science and Machine Learning Teams](#)” (G00325989)

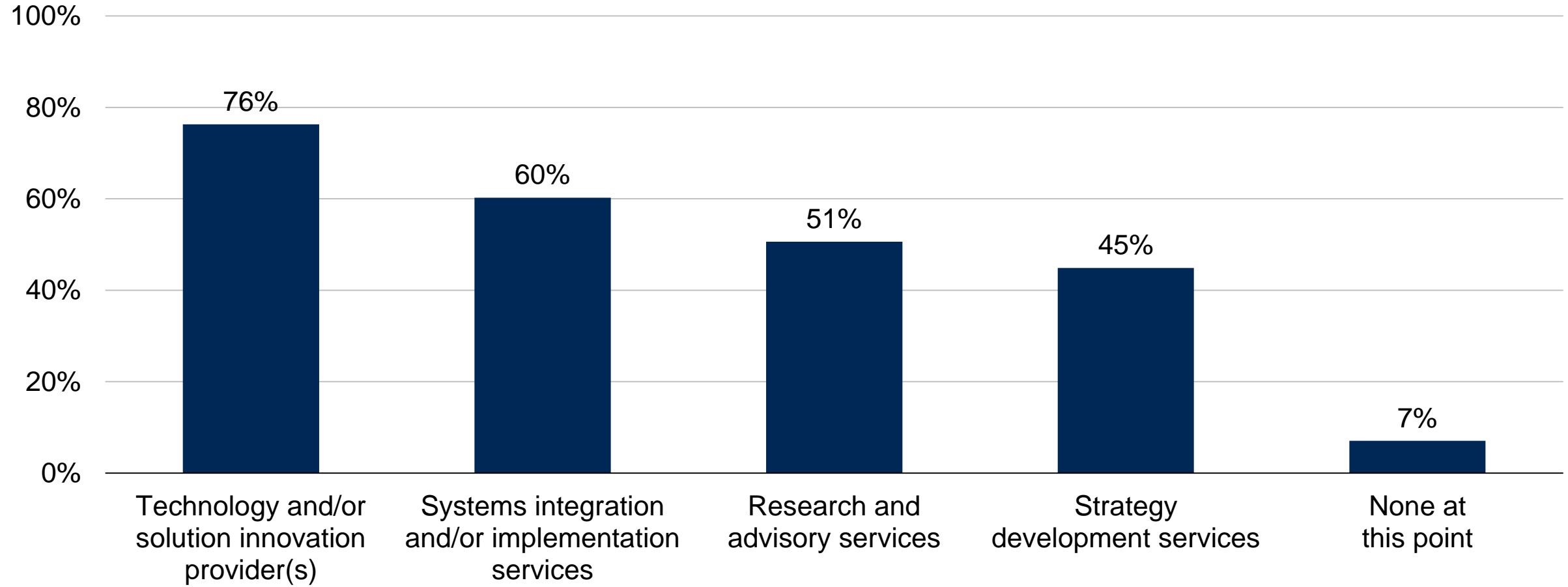
Organizing Is More Dynamic Than Before! Form Agile and DevOps “Squads” and “Tribes” — In Both Mode 2 and Mode 1

Where to Place Data Scientists and Analytical Roles?

Organic	Support initiatives as they arise in various lines of business (LOBs), yet limits knowledge sharing
In IT	A time-shared resource, but domain expertise suffers
Separate Department	May satisfy need for innovation, but priorities may be problematic
In IT and LOB	Resources applied to long-term and near-term opportunities. It can create silos stifling communication and knowledge sharing, and divergent approaches to tooling and practices
Data Science Lab and Distributed Resources	Best of all worlds to establish common practices and build an internal data science community, especially with distributed teams

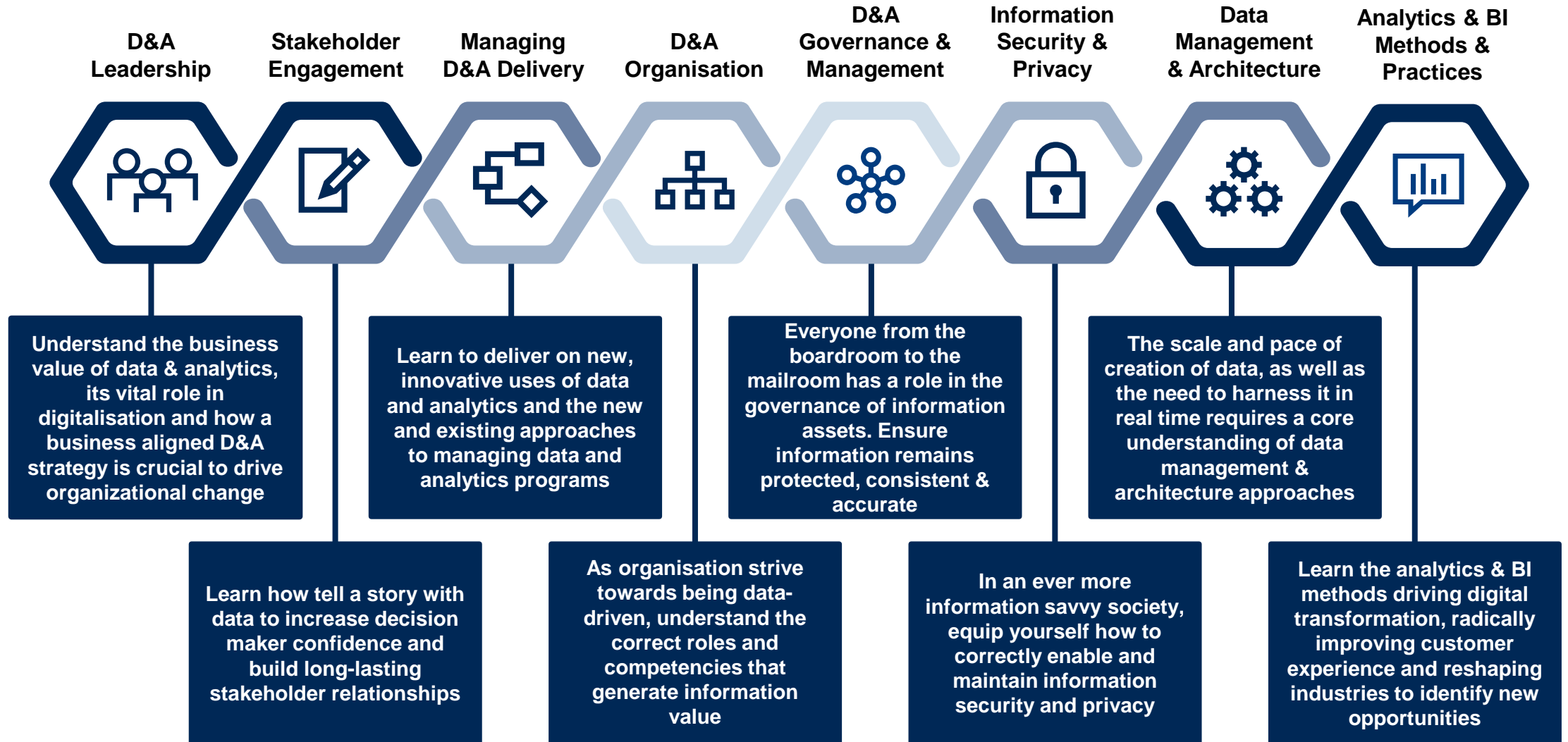
See also, [“Where to Organize the Work of Data and Analytics”](#) (G00348389), [“Organizational Principles for Placing Data Science and Machine Learning Teams”](#) (G00325989) and [“New Insights Into Success With Agile in Digital Transformation”](#) (G00359059)

Use of External Partners by Office of CDO

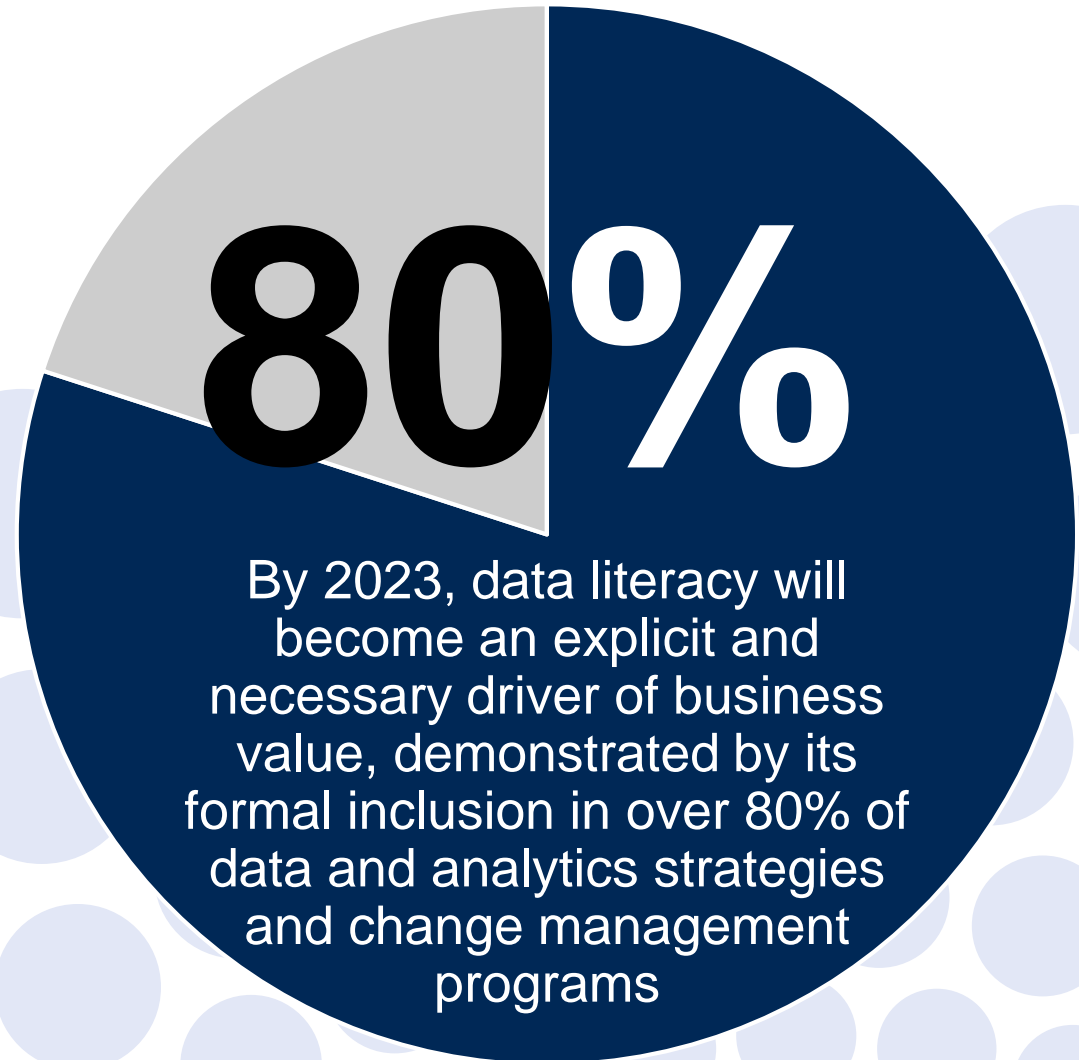


2017 CDO Survey. Base: Full/Partial Office of CDO, Excluding Unsure, n = 156
Which of the Following External Partners and/or Services, If Any, Does the Office of the CDO Leverage?
Multiple Responses Allowed.

Data Literacy Capabilities & Competencies



Gartner Predicts by 2023

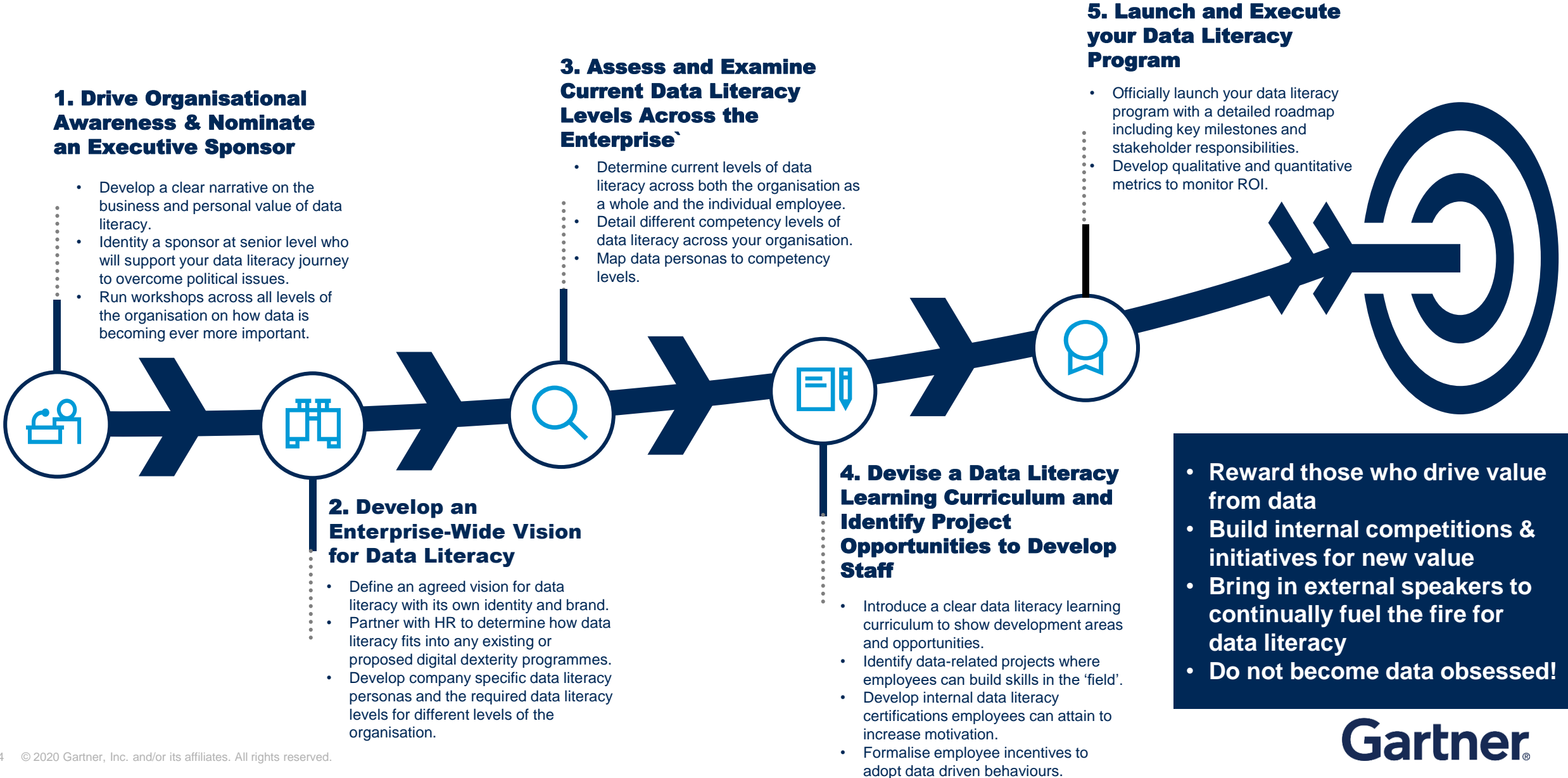


Final thoughts and next steps

"When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action steps."

— Confucius

5 Steps to Building a Data Literate Organisation



Recommended Gartner Research

- ▶ [Survey Analysis: Gartner's Fourth Annual CDO Survey — Key Capabilities That Enable Business Success](#)
Debra Logan, Alan D. Duncan, Valerie Logan, Lydia Clougherty Jones (G00351737)
- ▶ [Build a Data-Driven Enterprise](#)
Mike Rollings, Andrew White (G00348390)
- ▶ [10 Ways CDOs Can Succeed in Forging a Data-Driven Organization](#)
Mike Rollings, Alan D. Duncan, Valerie Logan (G00378249)
- ▶ [Use the Gartner Data and Analytics Compass to Drive Strategy](#)
Thomas W. Oestreich, Kurt Schlegel, Mike Rollings and Saul Judah (G00331789)
- ▶ [5 Pitfalls to Avoid When Designing an Effective Data and Analytics Organization](#)
Jorgen Heizenberg, Alan D. Duncan (G00367016)
- ▶ [Start Your Data and Analytics Strategy With a Clear Value Proposition](#)
Frank Buytendijk, Saul Judah, Mike Rollings, Michael Moran (G00375999)
- ▶ [How to Use Data for Good to Impact Society](#)
Cindi Howson, Lydia Clougherty Jones, Carlie Idoine, Mark Beyer (G00355735)
- ▶ [Business Trends in Government, 2020-2020](#)
Rick Howard (G00389781)
- ▶ [Develop Impactful KPIs Leveraging Citizen Experience Metrics to Show the Business Value of Digital Government](#)
Bill Finnerty (G00377269)
- ▶ [Business Trends in Government, 2020-2020: Insight-Driven Workplace](#)
Dean Lacheca, Rick Howard (G00421861)

For information, please contact your Gartner representative.



Art of the Possible with Data & Analytics

Information Innovation Example Library

Alan D. Duncan, Research Vice President

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Updated: 15 January 2020

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Smarter cities at intersection of information & analytics

- Opportunity
 - Optimize cities' investments in transportation infrastructure by improving traffic flow
- Data and Analytics
 - Conversion of 107 traffic intersection video feeds and mapping data into actionable traffic intelligence and integrated traffic signals using Metrotech's IntelliSection technology
 - Traffic data is dissected and analyzed by lane, by action and even down to the individual vehicle
- Results
 - 805,000 hours of reduced travel time per year due to reduced congestion (E.g. 18,000 fewer vehicle stops per day at 17 expressway intersections)
 - 1 million gallons of fuel savings (\$3,000,000) per year
 - Total emissions reduction of over 100 tons per year



Estonia Becomes E-stonia

- Opportunity
 - Make doing business in Estonia easier for foreigners
- Data and Analytics
 - Offering “e-residency” to anyone for 50 Euro
 - Part of the government’s “Tiigrihüpe” (tiger’s leap) to computerize the entire country
 - All banking, tax, legal and document services are online
- Results
 - Shortcut and improved access to the Estonian and EU market, and attract startups
 - Access to entire range of Estonian digital services
 - Generate external revenue stream
 - Reduce corruption by handling business electronically
 - Dissuade further Russian cyber attacks by endearing Estonia to the global digital community



Estonia
Positively surprising.



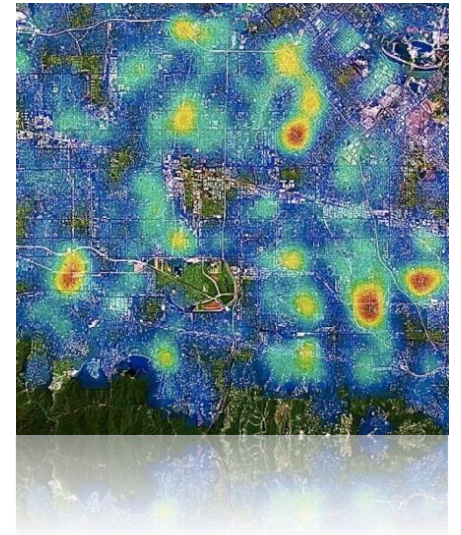
The Human Side of Data

- Opportunity
 - More efficient spending for at-risk kids
- Data and Analytics
 - Integrated child-relevant datasets from different systems such as schools, child welfare, juvenile justice and impact data
 - “Youth at Risk Index” identifies how children have used Juvenile Welfare Board funded programs throughout their lifetime and gauge impact.
- Results
 - Innovate policies and optimize budgets
 - Predict where and model likely outcomes when adding resources to a particular program
 - Mobile app for community and staff



Predictive Policing

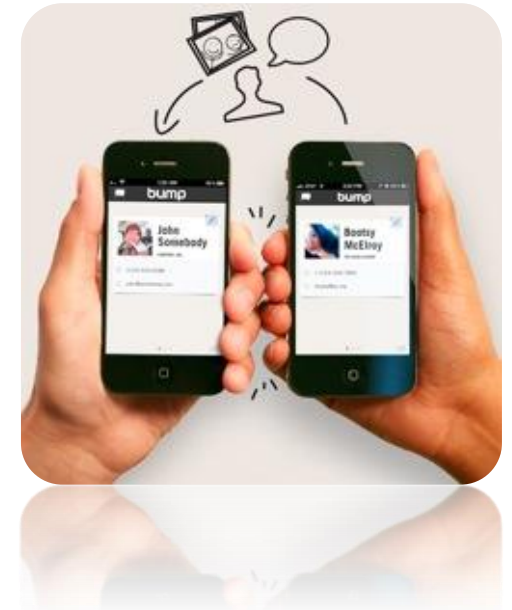
- Opportunity
 - Increase Los Angeles police presence where it's most likely needed
- Data and Analytics
 - PredPol applies models for predicting earthquake aftershocks to historical crime data and other factors
- Results
 - Predicted twice as many crimes as experienced crime analysts in controlled trials
 - 33% reduction in burglaries and 21% reduction in violent crimes in test region of Los Angeles, compared to a slight increase in the rest of the city



Keeping Cousins from Kissin' (or worse)

- Opportunity
 - Reduce the number of “hook-ups” between close cousins in Iceland
- Data and Analytics
 - The *Íslendingabók* database traces family lineage of 720,000 current and deceased Icelandic natives
 - Mobile *ÍslendingaApp* app that allows trawling Icelanders to bump phones together to see how closely they're related
- Results
 - 4.6/5.0 app store rating
 - Actual tagline: “*Bump the app before you bump in bed.*”
 - Potential to reduce birth defects...and uncomfortable family gatherings

ÍSLENDINGABÓK



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Big data helps Vitens detect and remedy costly pipe leaks

- Opportunity
 - Vitens water supply company needed to simplify the maintenance of 96 water production facilities and 49,000 kilometers of pipes.
- Data and analytics
 - CGI developed a proof of concept solution. It gathered and analyzed data on variables such as pressure, flow, temperature and physical location.
 - Using predictive analytics and visualization software, it searched for data patterns that could be used to detect or predict incidents.
- Results
 - It was able to detect leaks within a 2.5 kilometer radius in 50% of cases demonstrating that, by using big data and predictive analytics, leaks can be detected and repaired faster.



Sourcing Crowd Analytics

- Opportunity
 - Estimate crowd sizes for crowd control and safety
- Data and Analytics
 - Tweets sent with associated geolocation and timestamps with a designated area
 - The volume of mobile calls, messages and Internet connections opened, closed and maintained within a grid of 10,000 cells of 235 sq meters each
 - Analyzed the size of activity spikes versus baseline activity using a simple least-squares regression
- Results
 - Calculate crowd size +/- 5%, at any moment
 - Ability to facilitate evacuations
 - Crowd control and disaster avoidance



Sensor data analysis gives more mileage from fewer trains

- Opportunity
 - Siemens needed an efficient maintenance program to move to a more cost effective, condition-based predictive maintenance of trains.
- Data and analytics
 - In a pilot project analyzed a relatively small data set of one million sensor-log readings, taken in five-minute intervals over the course of a year.
 - It used Teradata Aster Discovery Platform's analytic tools to evaluate the combined data from different perspectives.
- Results
 - Increased up-time through significant reduction of un-planned downtime.
 - More mileage from fewer cars, improved utilization of assets
 - Reduced labour costs, quicker root-cause analysis, and improved first-time-fix rate.

SIEMENS



Gartner

Busing Service Performance Transported by Geospacial Sensor Visualizations

- Opportunity
 - Improve public transportation system to stay competitive with private bus operators in Helsinki, Finland
- Data and Analytics
 - Microsoft and CGI built a SQL Server DW to collect and analyze data on buses in the Helsingin Bussiliikenne (HeiB) fleet
 - Sensors generate 4M data records each day, including speed, braking, acceleration, speed, idling, engine temperature, and fuel consumption, on routes carrying 60M passengers per year
 - Excel Power Map (Bing Maps integration) geospacial visualizations are shared with drivers via Sharepoint to improve their performance
- Results
 - Reduced fuel consumption by 5%; increased rider satisfaction 7%; reduced city's carbon footprint
 - Identify any mechanical problems that are developing



OresundsBron Uncovers Marketing Secrets using Analytics

- Opportunity
 - Analyzing behavioral data of 180,000 bridge users for finding actionable data to personalize marketing initiatives
- Data and Analytics
 - Used SAS Enterprise BI server along with SAS Financial management for financial reporting & budgeting and SAS Marketing Automation for automatic customer profile updating
- Results
 - Achieved a weekly Marketing E-Mail open rate of 30% and sale of 35,000 new bridge passes in no time
 - Automated management reporting delivered an efficiency gain of 20,000 hours



There's Nothing Fishy About Media Spend Optimization

- Opportunity

- Reverse a trend in falling aquarium attendance

- Data and Analytics

- Georgia state researchers in marketing and analytics correlated the demographics of the top 50 zip codes of visitors and the top 50 zip codes of season pass-holders.
- Plugged this data into a media optimization model.

- Results

- Grew attendance 10%, revenue 12%, the number of new pass holders 12%, and pass renewals by 10% over projections based on trends.
- Turned a \$700,000 increase in media spending into revenue that exceeded projections by \$8M—a 12-fold return on investment.



Heat Mapping Potential Fire Risk Hotspots

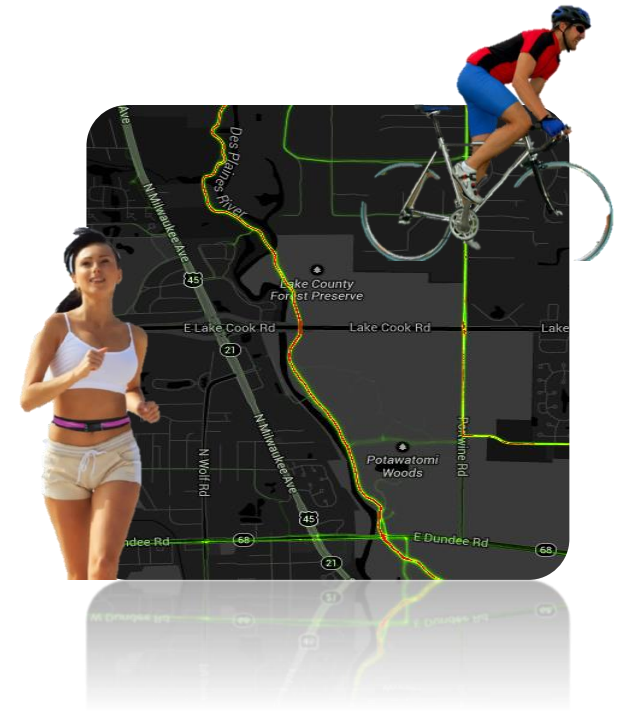
- Opportunity
 - Improve citizen safety and save city resources
- Data and Analytics
 - The New York City Fire Department algorithm analyzes 2400 factors from 330,000 commercial and public buildings
 - Determines a risk score that guides inspectors to prioritize certain buildings and their likely fire safety issues
- Results (TBD)
 - 70% success in identifying fire hazards in buildings
 - Reduce fires and other safety related events; Save on personnel and firefighting resources; Reduce insurance claims



Big Data Paves the Way to Better Biking and Running

- Opportunity
 - Improve city planning for runners and cyclists
- Data and Analytics
 - 220 billion data points from 78 million bike rides and 20 million runs in communities around the world are compiled by the Strava app
 - Interactive spatial analytics and high-res heatmap visualization along with localize downloadable data sets
- Results (TBD)
 - Make cycling, running and walking in cities better and safer
 - Make informed and effective decisions when planning, maintaining, and upgrading cycling and pedestrian corridors, even seasonally
 - Identify biker hangouts

STRAVATM



A Fire Hose of Big Data

- Opportunity
 - Limit the instance and spread of forest fires
- Data and Analytics
 - The WIFIRE system combines local sensor data including temperature, wind, humidity, along with topography and other satellite imagery, and fuel content
 - Analyzed in UCSD's Supercomputer Center to generate dynamic, real-time wildfire modeling
- Results (TBD)
 - Identify potential hotspots and better determine firefighting strategies
 - Save lives, property, forests and water
 - Operational trial starting in Jan 2015



South Australia Water taps into demand and forecasting

- Opportunity
 - Provide reliable forecasts for demand, movement and supply of clean water.
- Data and Analytics
 - Imports weather data and historical customer usage data to analyze potential demand for all water data collection every 15 minutes
 - Amulet Predictive Analytics creates ‘what if’ scenarios in 30 minutes, replacing 2-3 weeks of analysis
- Results
 - Actual versus predictive forecasts of water demand, levels, and best routes by zone.
 - Amulet calculates daily water demand up to 2 years into the future.



The power of scenario planning models

- Opportunity
 - To predict tower condition/risk and extend asset life
- Data and Analytics
 - Remote real-time monitoring & analysis of tower lines including corrosion rates, location, arboreal growth near routes and historical weather patterns to predict degradation and maintenance of 23,000 towers
 - Model run on Monte Carlo uncertainty analysis for present and future conditions
- Results
 - Corrosion prediction for life expectancy
 - ‘What if’ analysis to determine intervention programs of painting, maintenance or replacement
 - Saved tens of millions of British pounds by knowing where to place operational spend

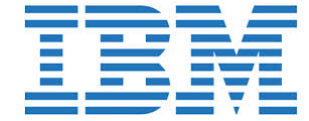
nationalgrid



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New tricks to help old people

- Opportunity
 - Save on required community services and infrastructure for an aging population in the city of Bolazno in northern Italy
- Data and Analytics
 - A “smart city” network of home sensors to monitor temperature, carbon monoxide levels, water and energy usage
 - Analytics to determine “normal” household behavior, identify aberrations, and alert family or neighbors
- Results
 - Lower assistance and care costs by 30%
 - Enable more retirees to remain in their homes
 - Reduce the need to build assisted living facilities



Keeping the Lights on in California

- Opportunity
 - Improve reliability of the electric grid and the utilization of energy to meet state renewables goals
- Data and Analytics
 - Real-time visualization and analysis of 25,000 miles of power lines
 - Space-Time Insight, OSIssoft, Oracle
 - Hourly reforecasting of generation needs based on wind and solar estimates; real-time alerts for crisis conditions
- Results
 - No system-wide outages since implementation
 - Enabled implementation of 4,000 pricing nodes (up from 5) to facilitate cost-effective local market pricing
 - 50% improvement in renewable forecast accuracy



Using Data Dumps to Find Grease Dumpers

- Opportunity
 - Tracking grease dumpers in NYC that account for 60% of backups citywide in 7400 miles of sewer lines
- Data and Analytics
 - “Dark data” on local restaurants from the city’s Business Integrity Commission, license data from the Department of Health and Mental Hygiene were used to compare restaurants that did not have a grease carter with geo-spatial data on sewers
- Results
 - 95% success rate in tracking down dumpers
 - Eliminated 30 million pounds of debris from sewers providing 2 million gallons of extra sewer capacity
 - Reduced sewer backup-related costs for businesses and homeowners



Police Predict Predator's Position

- Opportunity
 - Increase the speed of Swedish police investigations
- Data and Analytics
 - Communication behaviour from phone calls in combination with crime statistics, weather, day-of-week and city events
 - Analysed data from over 500,000 interrogations, evidence and background info using QlikView
- Results
 - Reduced nine months of manual analysis to *three minutes* of automated analytics
 - Helped locate a serial killer in the city of Malmö by calculating the time and location of the next shooting
 - 6.7M krone reallocated from administration to law enforcement



Getting Rail Performance Back on Track

- Opportunity
 - Improve coverage and performance of rail dispatching system
- Data and Analytics
 - Sensors generate a hundred messages per second from 9000 passenger and freight trains and 5000km of track
 - Advanced in-memory algorithms from CSC continually forecasting network-wide impacts of delays and connection postponements
- Results
 - Increased on-time performance from 94% to 96%
 - Improved customer satisfaction, rail network loads, and communication between train staff and dispatchers

Swiss-Rail



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NOAA's Ark of Weather Data

- Opportunity
 - Travel safety
 - Community preparation for weather related events
- Data and Analytics
 - 30 petabytes of data per year from 3.5 billion daily observations via satellites, ships, aircraft, buoys and other sensors
 - Sophisticated high-resolution predictive modeling
- Results
 - Generates millions of weather-related products per day including weather warnings and guidance for public and private sectors
 - Saves lives and expense via severe weather alerts



Electing to use advanced analytics

- Opportunity
 - Understand and connect with voters and donors at a more granular and personal level
 - Improve on previous analytic agility and speed
- Data and Analytics
 - Integrated data from digital and other channels
 - Continual voter modeling using KXEN to predict voter segment receptiveness and behavior
 - 66,000 election simulations per night
- Results
 - Raised \$1B in campaign funds with fewer resources by communicating with the right individuals at the right time on the right medium
 - Grew digital fundraising by 20%, added 500,000 donors, increased ad buying efficiency 15%, and improved volunteer and per-donor rates over 2008

***Obama for
America
Campaign***



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Smart Buildings on the Rise

- Opportunity
 - Reduce building operation costs; green building designation
- Data and Analytics
 - Monitor and analyze dozens of continuous data streams such as personnel locations, sunlight, room temperature, HVAC performance, elevator/stairwell usage, water & electricity usage
- Results (varies)
 - Automatically adjusting lighting & blinds, and air/water temperature; optimizing elevator patterns
 - Enhancing building security and safety, and employee comfort and productivity
 - Saving money and energy; reduced maintenance
 - Improving future building designs



Tomorrow's news, today

- Opportunity
 - Identify systemic, related or mounting health, geopolitical or financial issues
- Data and Analytics
 - Continually capture, translate, classify and analyze 40,000 local news reports in 43 languages from around the world
 - Custom charting, alerts, animated map visualization of categories or search terms
 - Predict and highlight emerging hot topics and trends
- Results
 - Enable politicians, insurers, investors, disease control institutions and global support groups to respond quicker to local or global issues

