# Driving Performance with Digital Technology, Data, and Analytics

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# Competing and Winning with Data Core to the Strategy of More than Half of the Largest Firms in the World

| Symbol | Company | Cap Rank | Market Cap | 1d Chg | 1m Chg | 12m Chg |
|---|---|---|---|---|---|---|
| - | - | on 5/19/17 | on 5/19/17 | on 5/19/17 | on 5/19/17 | on 5/19/17 |
| AAPL | Apple | 1 | 798.0 | 0.3% | 8.8% | 62.5% |
| GOOGL | Alphabet | 2 | 660.4 | 0.4% | 11.5% | 33.5% |
| MSFT | Microsoft | 3 | 522.6 | 0.0% | 4.1% | 34.5% |
| AMZN | Amazon.com | 4 | 458.8 | 0.1% | 6.7% | 37.4% |
| FB | Facebook | 5 | 429.1 | 0.3% | 4.1% | 26.8% |
| BRK-A | Berkshire Hathaway | 6 | 403.3 | 1.0% | 0.4% | 16.0% |
| XOM | Exxon Mobil | 7 | 347.2 | 0.2% | 1.8% | -9.1% |
| JNJ | Johnson & Johnson | 8 | 342.1 | 0.0% | 4.6% | 12.5% |
| BABA | Alibaba Group | 9 | 306.2 | 1.6% | 11.2% | 57.3% |
| JPM | JPMorgan Chase | 10 | 301.2 | 1.0% | 0.4% | 33.7% |

# Compared to 5 Years Ago

| Rank | First quarter[28] | |
|---|---|---|
| 1 |  | Apple Inc.<br>▲559,002.1 |
| 2 |  | Exxon Mobil<br>▲408,777.4 |
| 3 |  | PetroChina<br>▲278,968.4 |
| 4 |  | Microsoft<br>▲270,644.1 |
| 5 |  | IBM<br>▲241,754.6 |

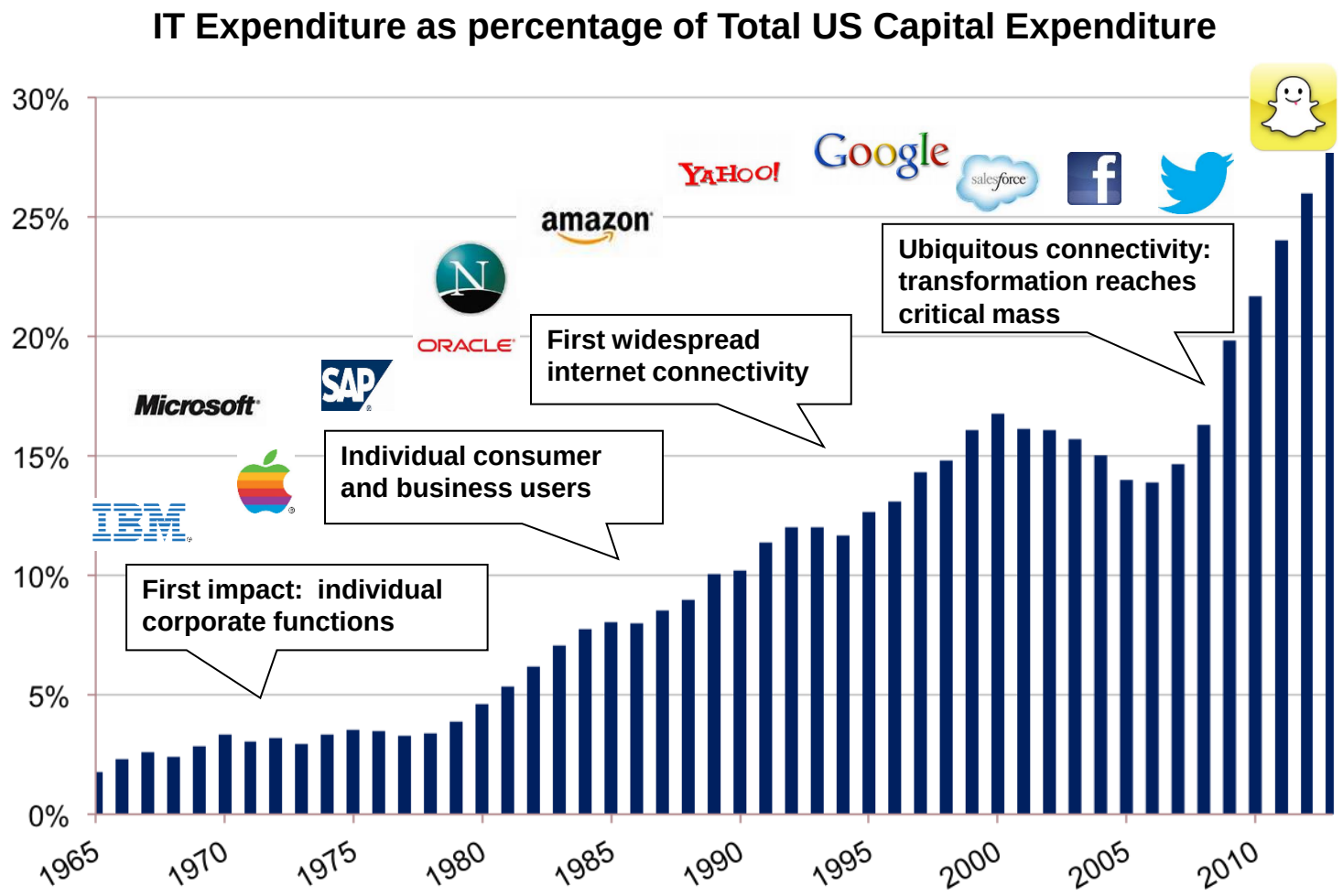
| Rank | First quarter[28] | |
|---|---|---|
| 6 |  | ICBC<br>▲236,335.4 |
| 7 |  | Royal Dutch Shell<br>▼222,425.1 |
| 8 |  | China Mobile<br>▲220,978.9 |
| 9 |  | General Electric<br>▲212,317.7 |
| 10 |  | Chevron Corporation<br>▲211,950.6 |

# Compared to 10 Years Ago

**Second quarter** This *Financial Times*–based list is up to date as of June 29, 2007.[50] Indicated changes in rank and m previous quarter.

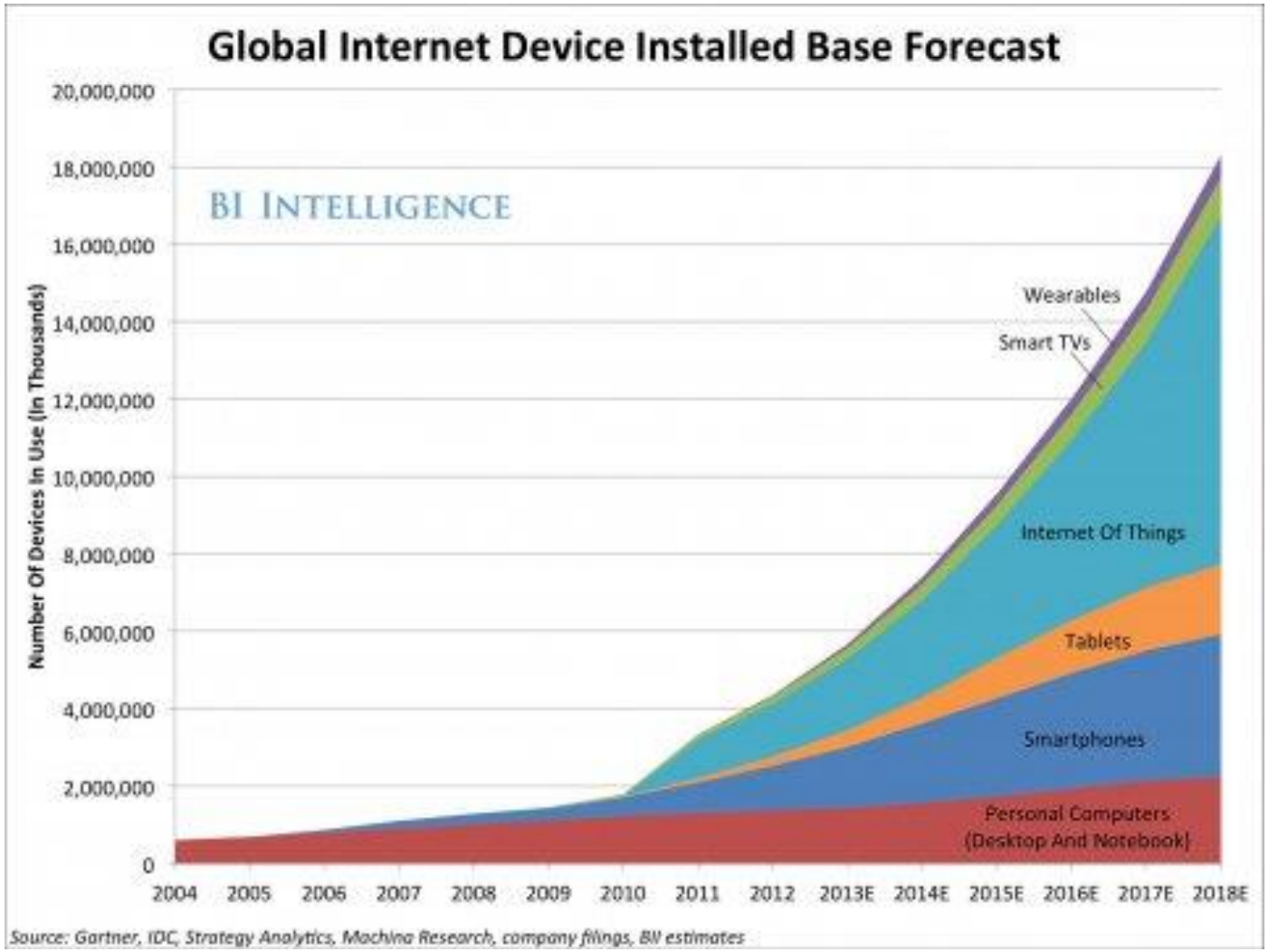
| Rank | Name | Headquarters | Primary industry | Market value (USD million) |
|---|---|---|---|---|
| —1 | Exxon Mobil | United States | Oil and gas | ▲472,519 |
| —2 | General Electric | United States | Conglomerate | ▲393,831 |
| —3 | Microsoft | United States | Software industry | ▲281,934 |
| ▲4 | Royal Dutch Shell | The Netherlands | Oil and gas | ▲266,141 |
| —5 | AT&T | United States | Telecommunications | ▲255,871 |
| ▼6 | Citigroup | United States | Banking | ▲253,703 |
| ▼7 | Gazprom | Russia | Oil and gas | ▼245,757 |
| ▲8 | BP | United Kingdom | Oil and gas | ▲231,495 |
| ▼9 | Toyota Motor Corporation | Japan | Automotive | ▼228,009 |
| ▼10 | Bank of America | United States | Banking | ▼216,963 |

# Data Infrastructure is an Increasingly Important Economic Input

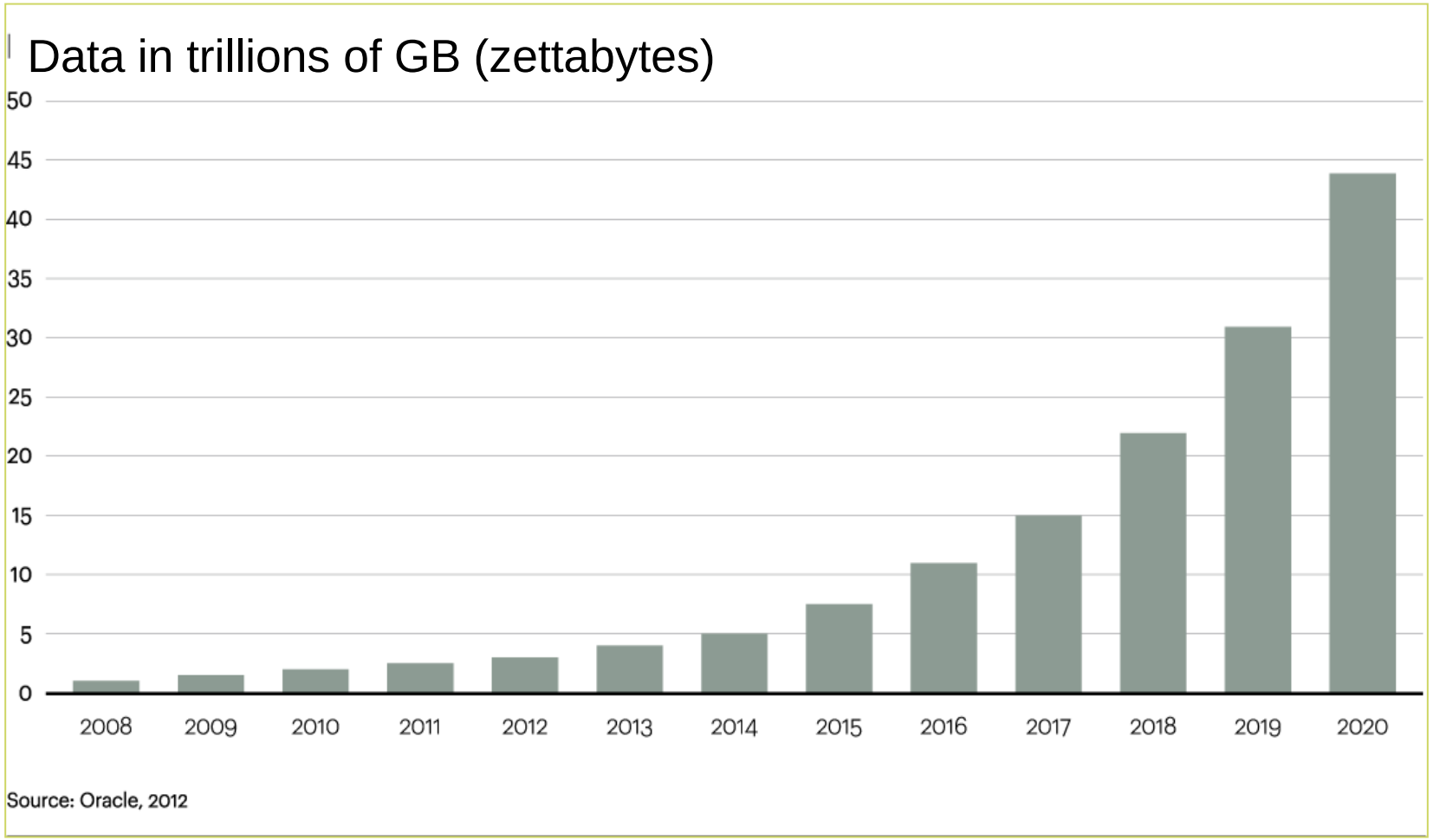



**Source:** US Bureau of Economic Analysis

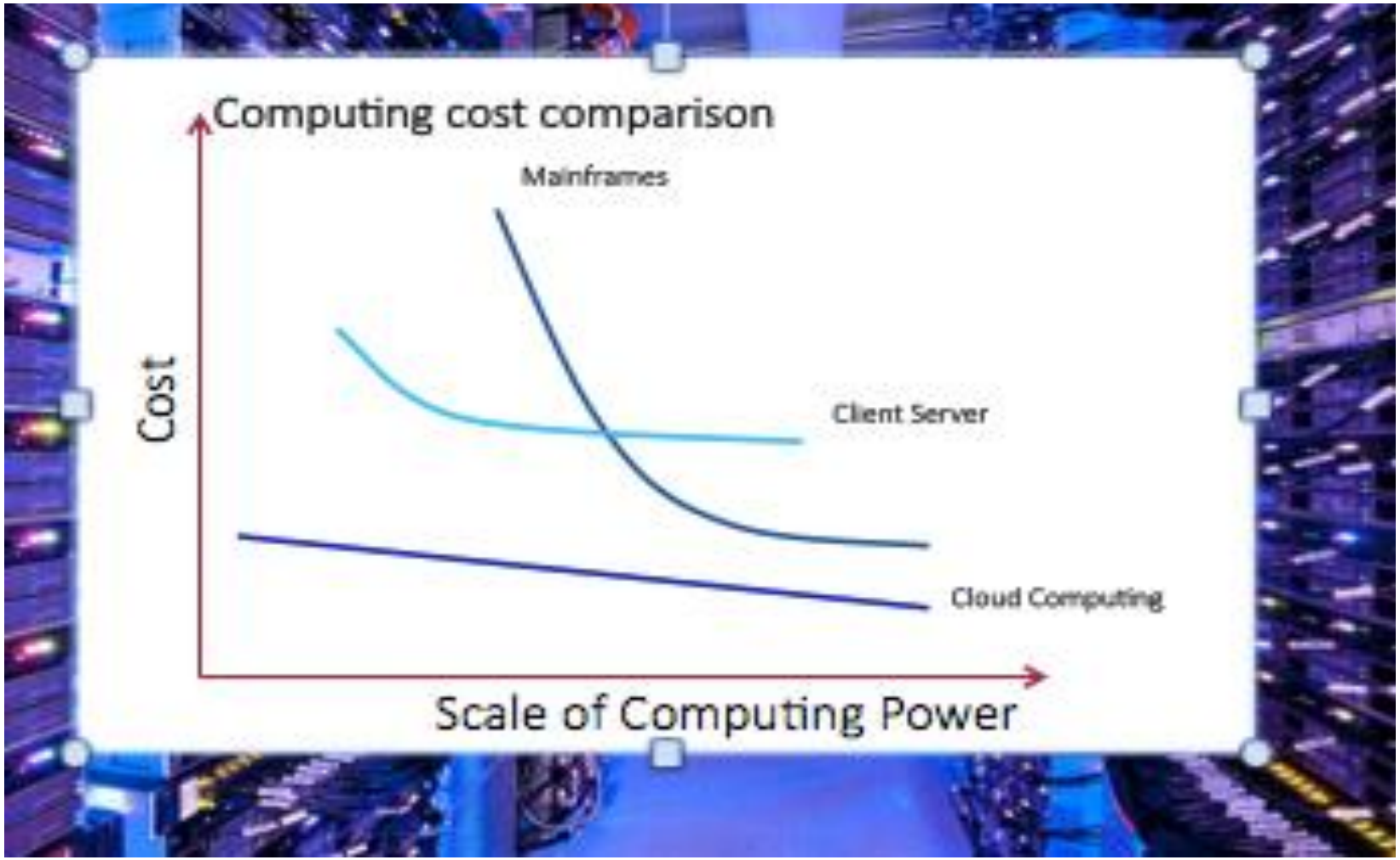
# More Sources of Data are Coming Online



# Creating Massive Increase in Global Data Creation

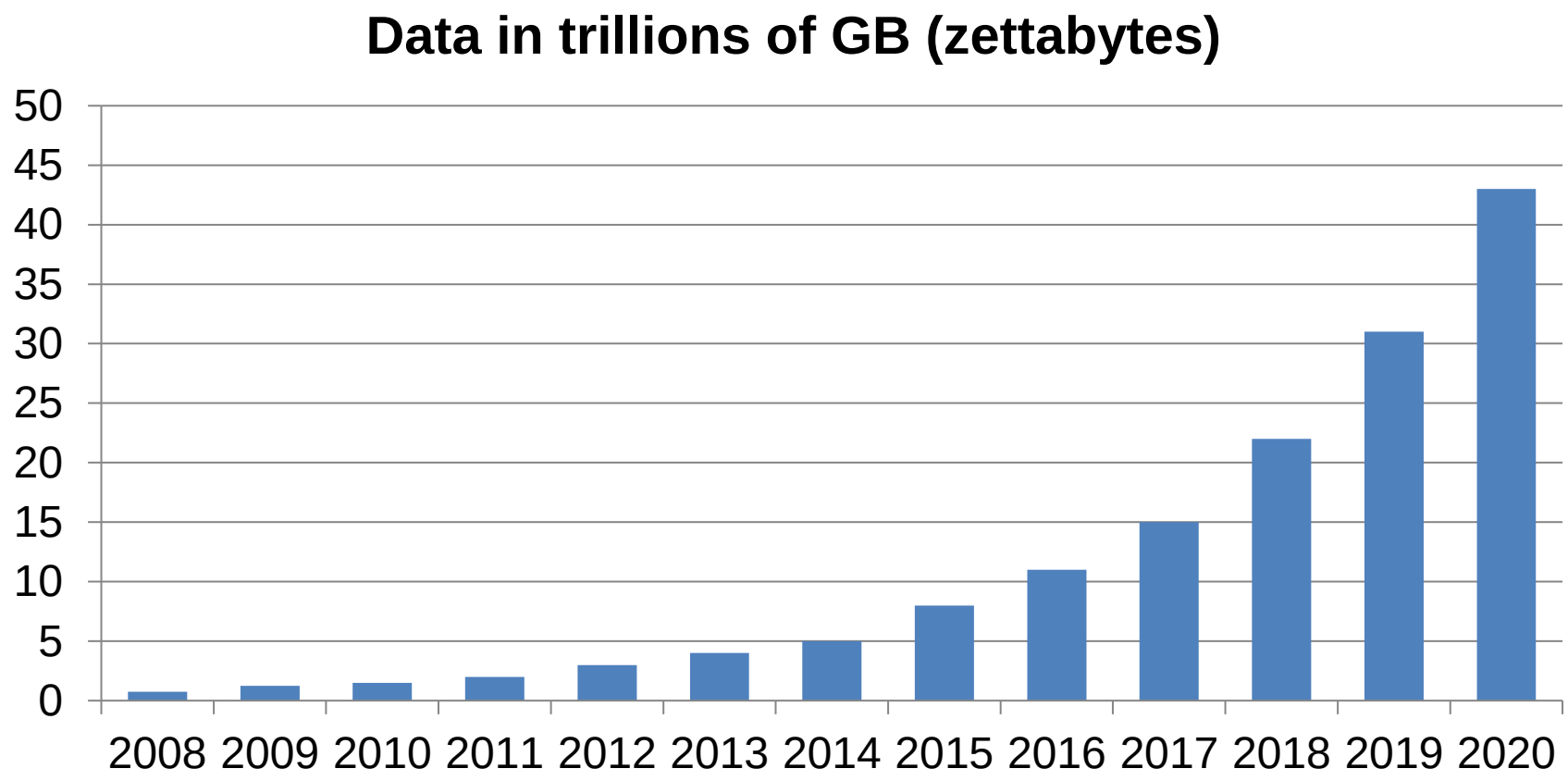


# Its Getting Cheaper to Process and Analyze Data



# The Increasing Importance of Data and Analytics

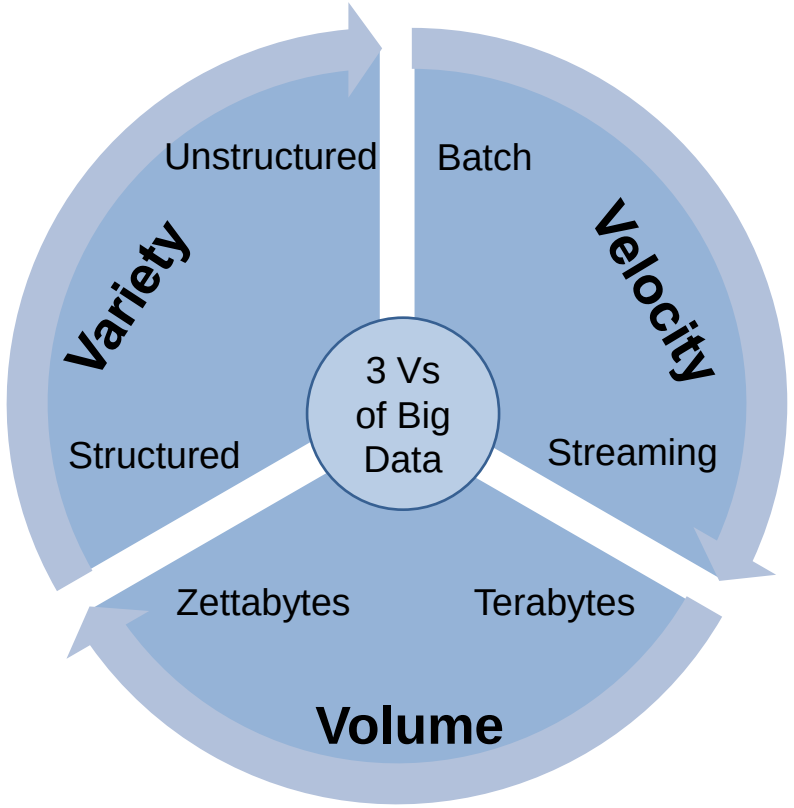
# Our Networked Economy Is Generating Unprecedented Amounts of Data




Source: Oracle, 2012

# The 3 Vs of Big Data

Data can range from all types
- Unstructured
- Semistructured
- Structured
- All of the above



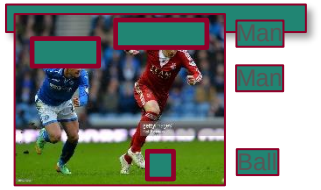

Readiness of data is getting more rapid
- Batch
- Near time
- Real time
- Streaming

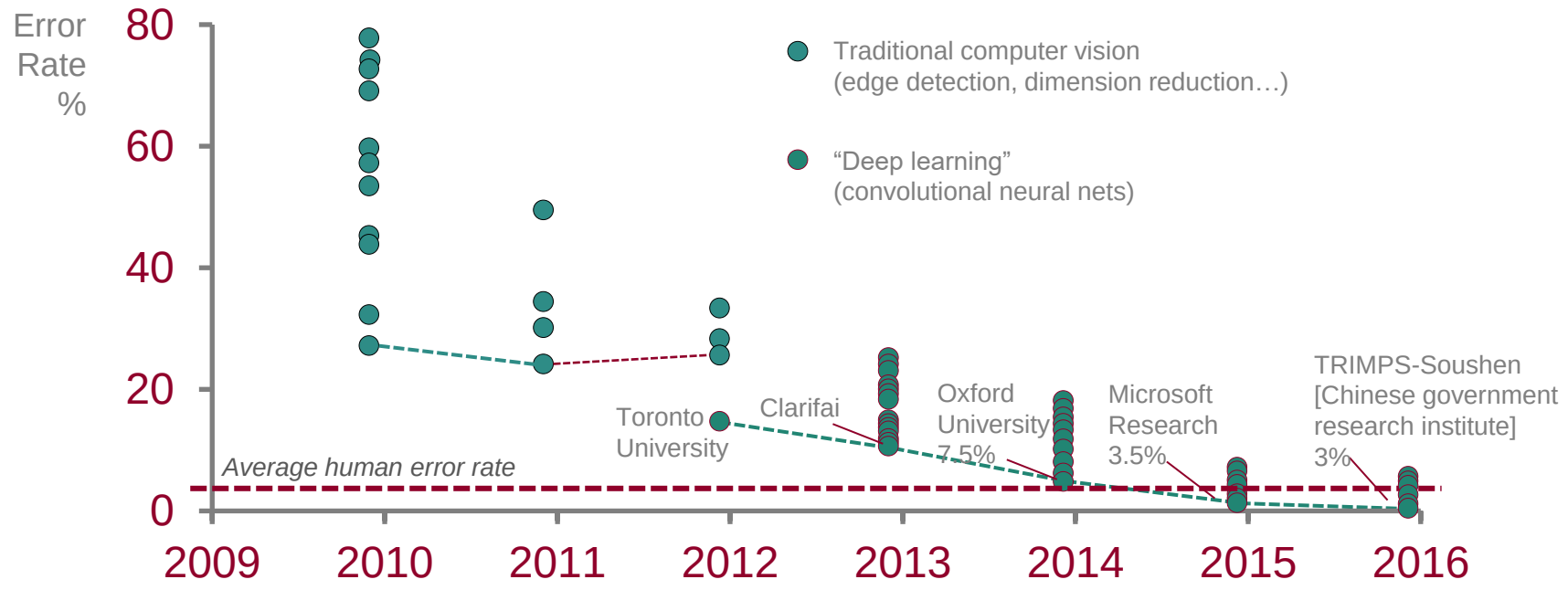
Volume of data is also increasing at an astounding rate
- Terabytes are now trivial
- Comes from all sources, transactions, media, web clicks

A fourth V also exists: *Veracity*. Is the data credible and trustworthy?

# AI: *The Breakthrough*

ImageNet contest: image classification problem



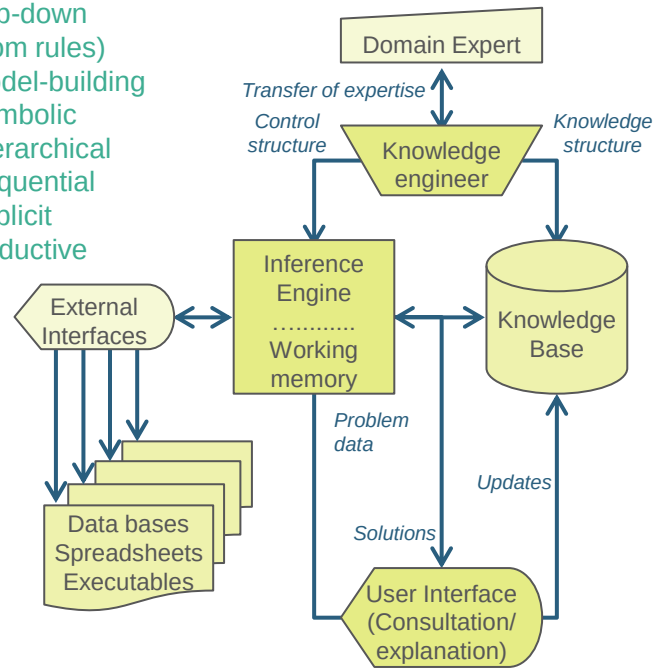

Source: Philip Evans, The Boston Consulting Group

# AI: *The Breakthrough (cont.)*

## Expert Systems and Neural Networks

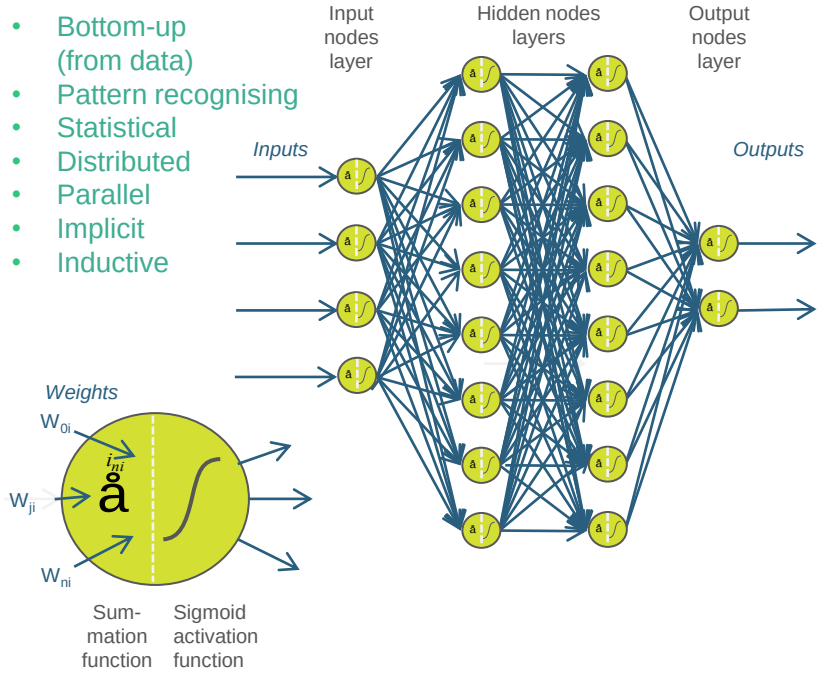
### EXPERT SYSTEMS

- Top-down (from rules)
- Model-building
- Symbolic
- Hierarchical
- Sequential
- Explicit
- Deductive




### NEURAL NETWORKS

- Bottom-up (from data)
- Pattern recognising
- Statistical
- Distributed
- Parallel
- Implicit
- Inductive

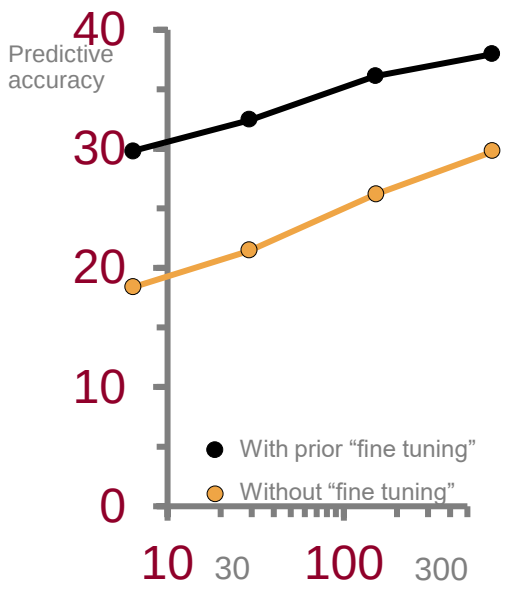



Source: Philip Evans, The Boston Consulting Group

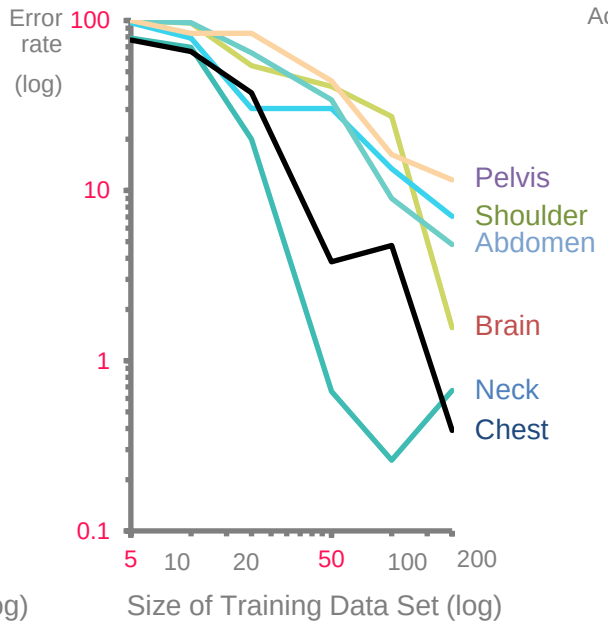
# DATA Drives Advantage

## Experience Curve

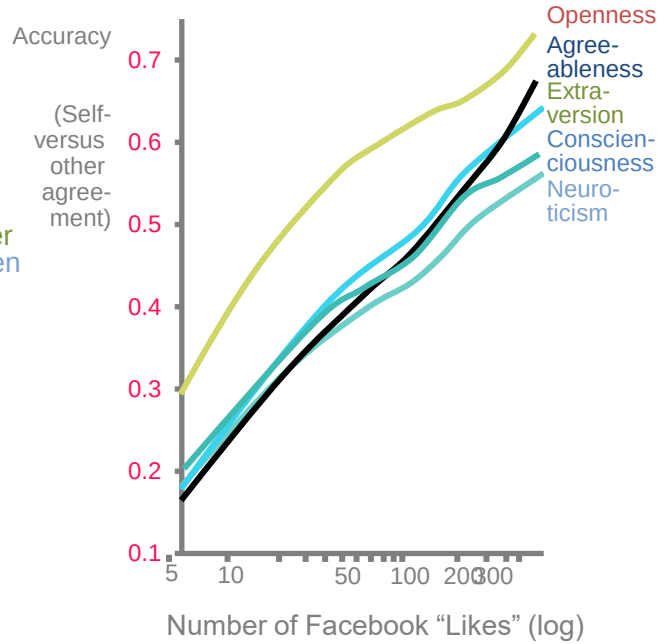
CLASSIFICATION OF OBJECTS IN PHOTOS




CANCER DIAGNOSIS FROM SCANNED IMAGES

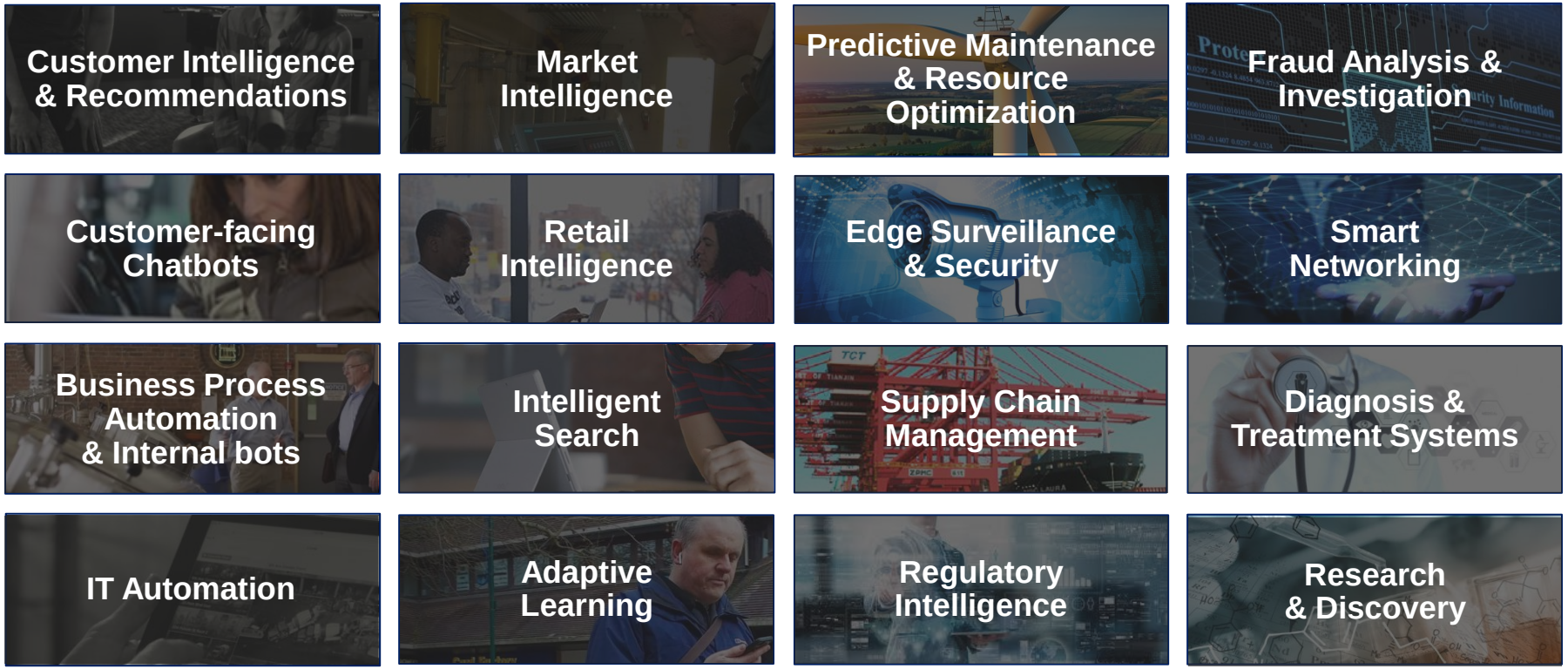



PERSONALITY PREDICTION FROM FACEBOOK "LIKES"

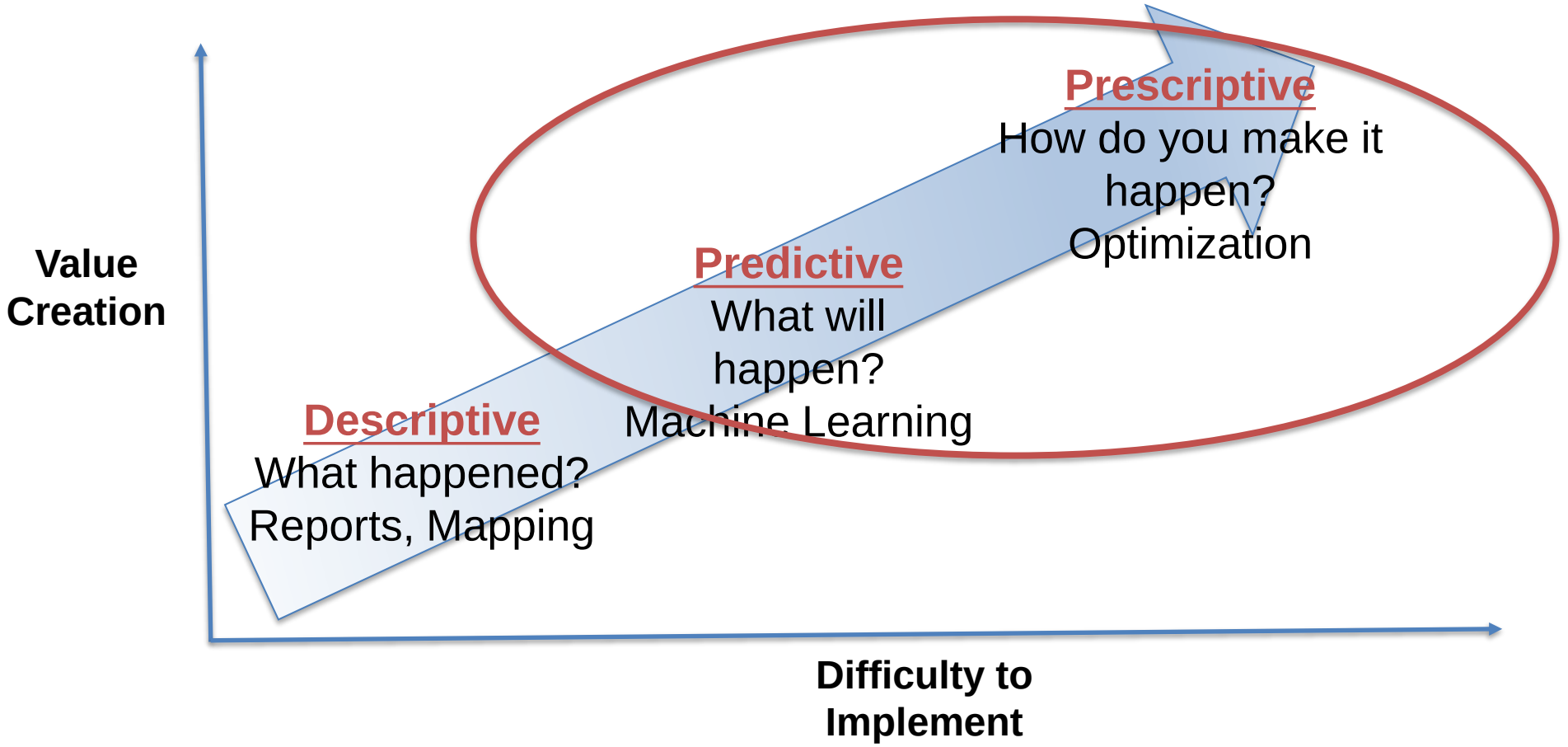



Source: Philip Evans, The Boston Consulting Group

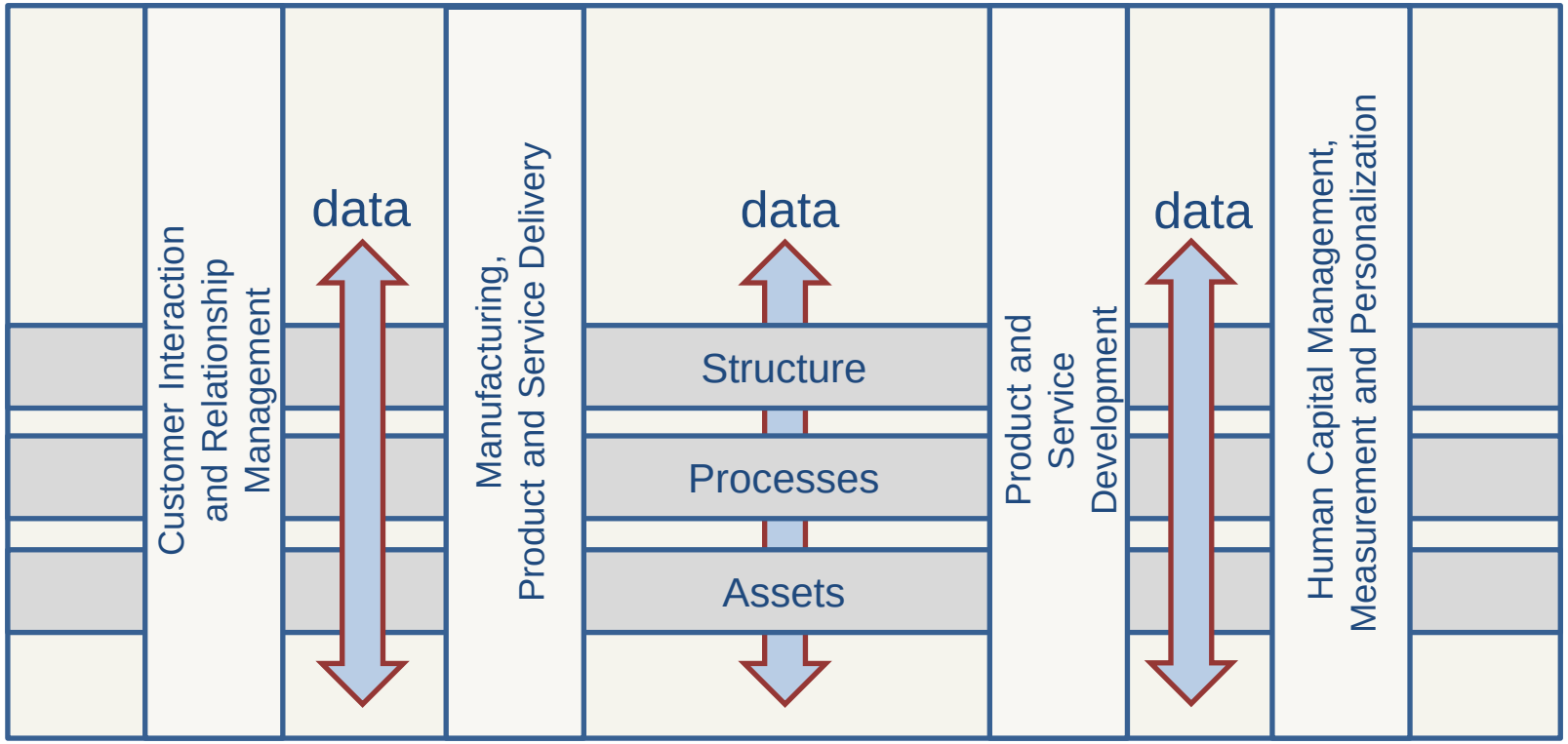
# A particular tool for data decision making: AI is driving value across a broad variety of enterprise applications



# Different Types of Analytics



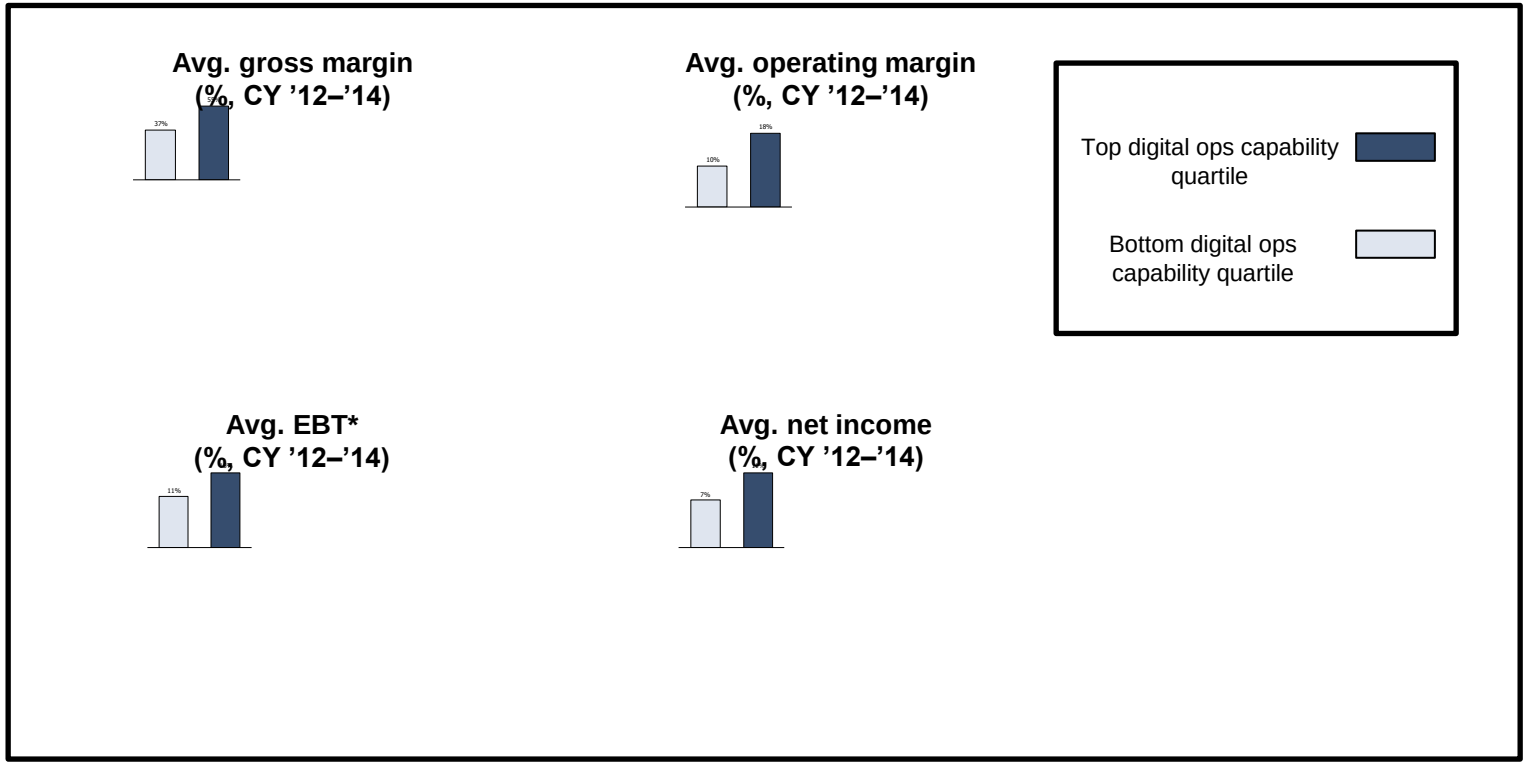
# Digitizing the Operating Model




Every organization's operating model is being transformed with data and analytics providing real-time context to managerial decision-making.

# Digitizing Operations Works

Strong correlation between digital operations capability index and company performance



# Driving Digital Transformation to Enable Operational Improvement

## Customer relationship management

- ✓ **2.5x** more likely harness real-time data and analytics to deliver tailored customer experiences
- ✓ **2.5x** more likely to use analytics to develop perceptual intelligence about customers
- ✓ **2.6x** more likely to use analytics to prescribe business actions to limit customer churn

## Human capital management

- ✓ **2.6x** more likely to collect data on employees performance and generate recommendations for development
- ✓ **1.4x** more likely to empower employees with access to the self-service visualization and business intelligence tools

## Manufacturing, supply chain, and service delivery

- ✓ **1.5x** more likely to optimize production runs based on demand forecast
- ✓ **1.7x** more likely to be able to predict equipment downtime using advanced analytics
- ✓ **2.3x** more likely to use predictive modeling to anticipate customer support requests

## Product development

- ✓ **2.3x** more likely to inform product design by capturing data on how their products are used
- ✓ **1.8x** more likely to monitor products remotely and drive customer support based on data insights
- ✓ **1.9x** more likely to use data they collect to benchmark their customers and advise them on how to realize more value

**Source:** Team interviews Oct 2015–Mar 2016

# Creating New Capacity through Data

- Real time monitoring opens up potential to know sooner whether a service or manufacturing process achieves minimal quality control levels.
- Automated monitoring and data collection redefines tasks so that employees save time and apply labor to do other things.
- Reduction in error rates in processes creates enormous benefits when it increases capacity and opens up supply for alternative uses.

# Using Big Data to Drive Productivity and  ESG Goals at Petronas




IoT sensors enable:

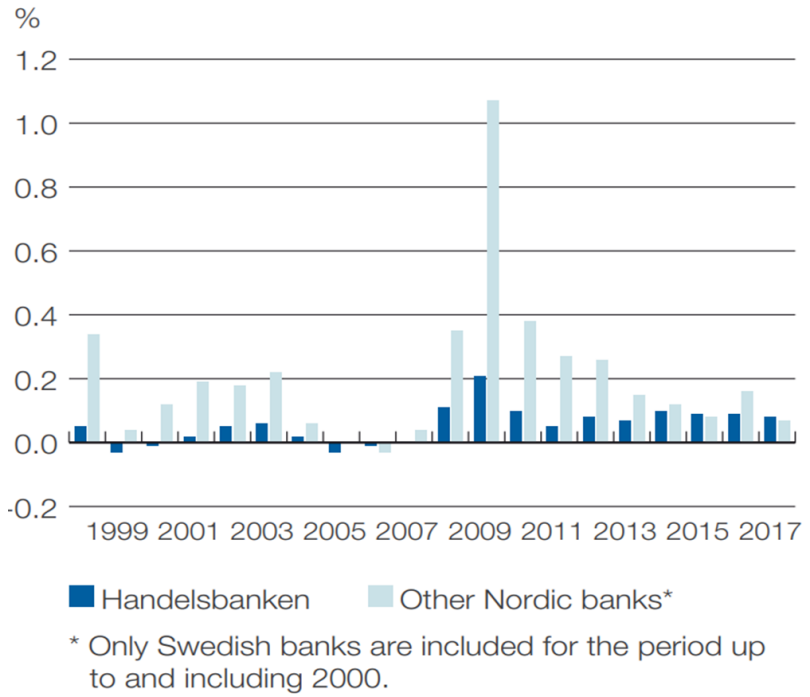
- Remote operation of facilities
- Predictive maintenance
- Sending people only when needed

This leads to:

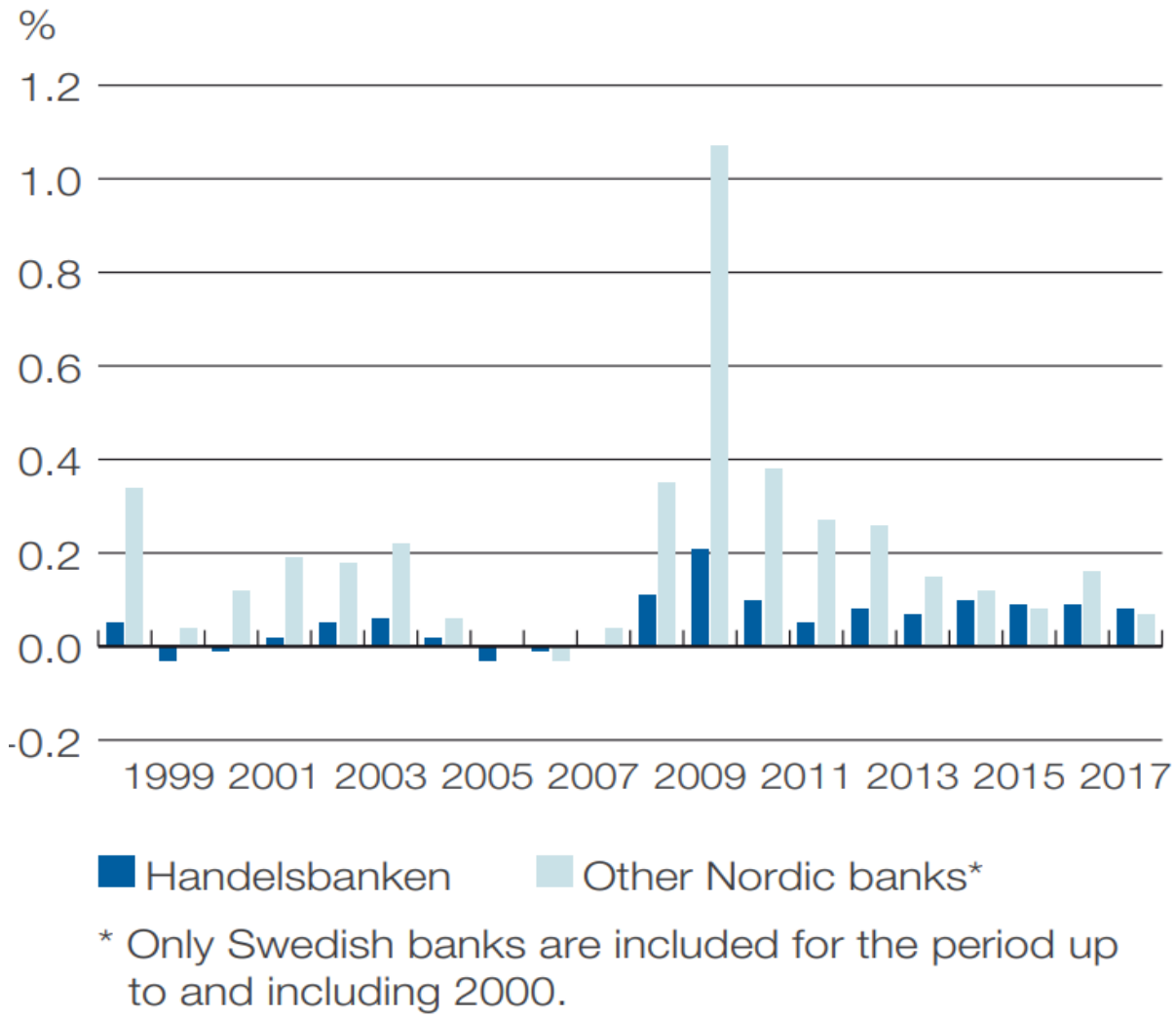
- More productivity
- Less time spent in risky facilities
- Higher safety and lower fatality rates

# Data and New Sources of Value at Handelsbanken

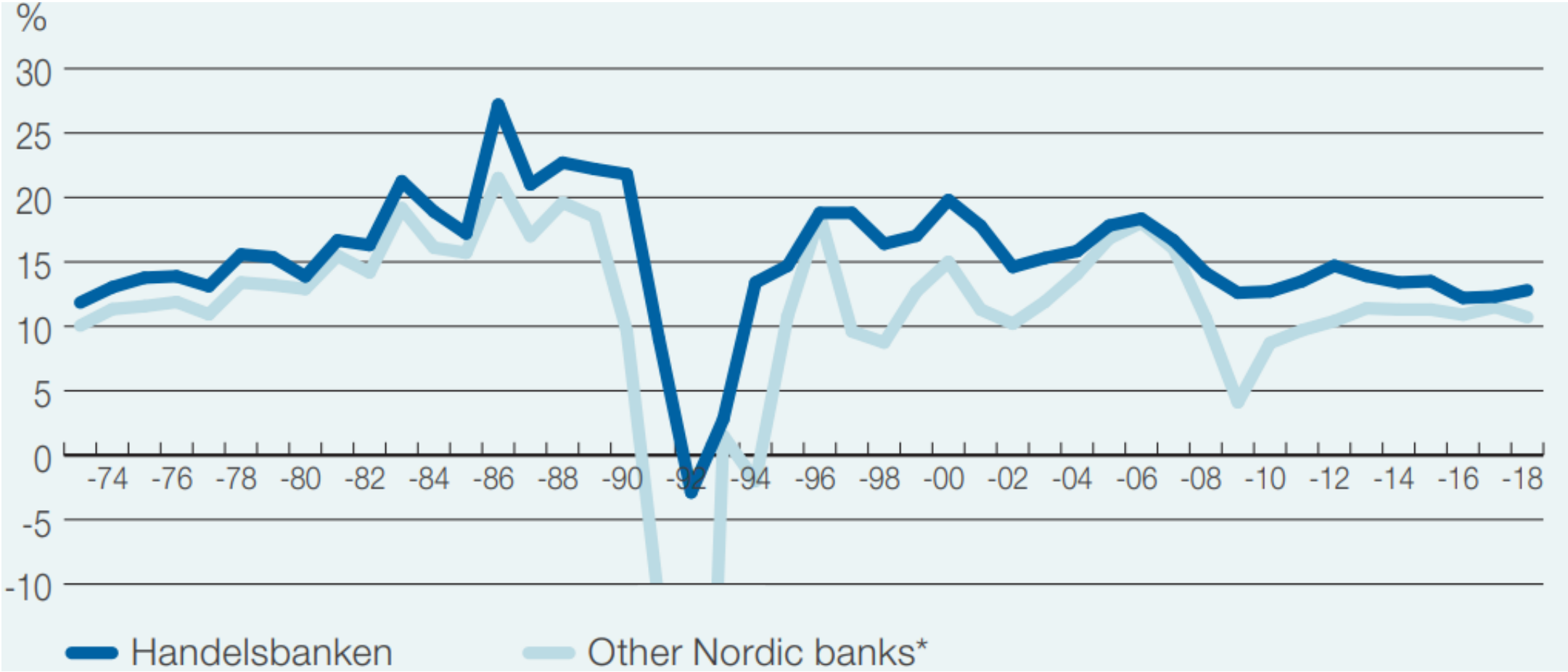


# Loan Losses as a Percentage of Lending versus Other Nordic Banks (1998-2017)



# ROE (after tax) versus Peers over Time (1973-2018)




Source: Company documents.
Note: Only Swedish banks are included for the period up to and including 2002.

# People – on site – makes a difference

## Necessities

### Digital technology




- Necessity
- All banks have it
- Easy to copy

### Product




- Standardised
- Easy to compare
- Easy to copy

### Price



- Set by the market
- Easy to compare
- Easy to evaluate

## Differences

### Local presence




- Creates sense of belonging
- The town's own bank
- Increases availability

### Personal service




- On customer's terms
- Builds relations
- Customer always meets the decision maker

### Unique local knowledge



- Better risk assessment
- Unique customer knowledge
- More business opportunities

# Creating New Capacity through Data at Handelsbanken



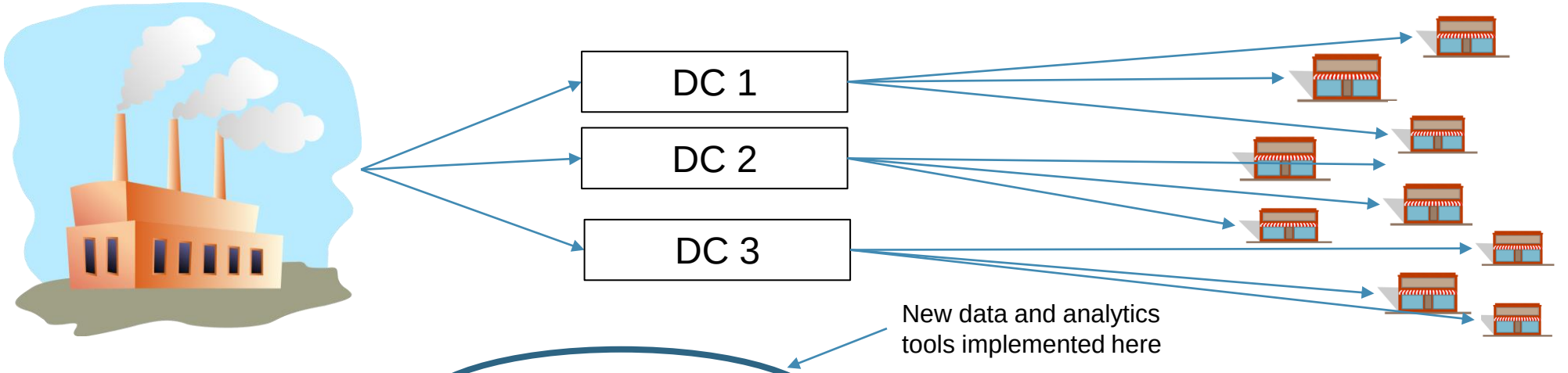
Handelsbanken uses data and digital to:

- Automate compliance functions
- Provide basic transaction functionality
- Create better tools for customers and branches

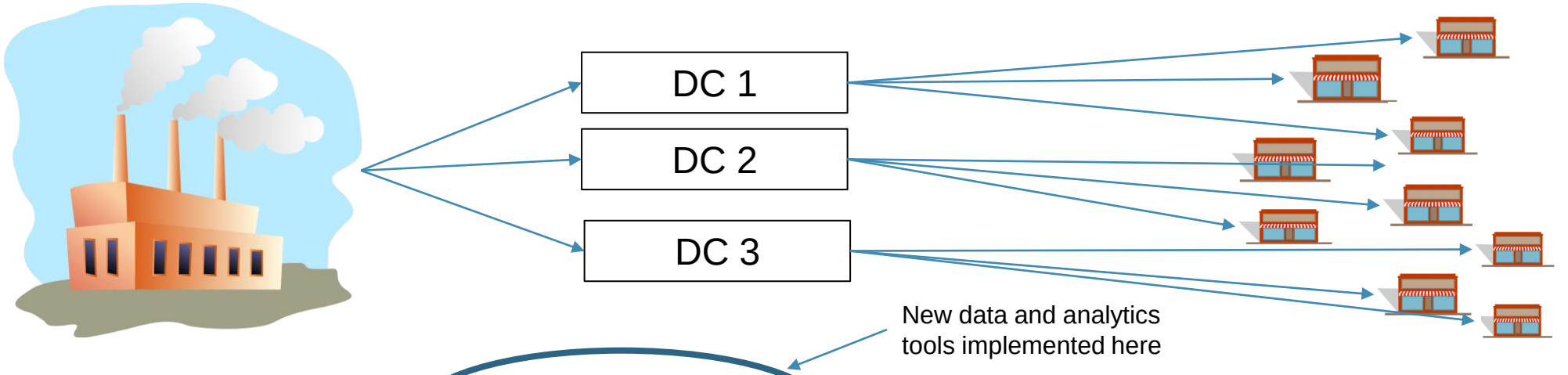
Use data and digital technology to enhance the *core capability* of high touch personalization


JOANN


CUT BAR
CUT BAR



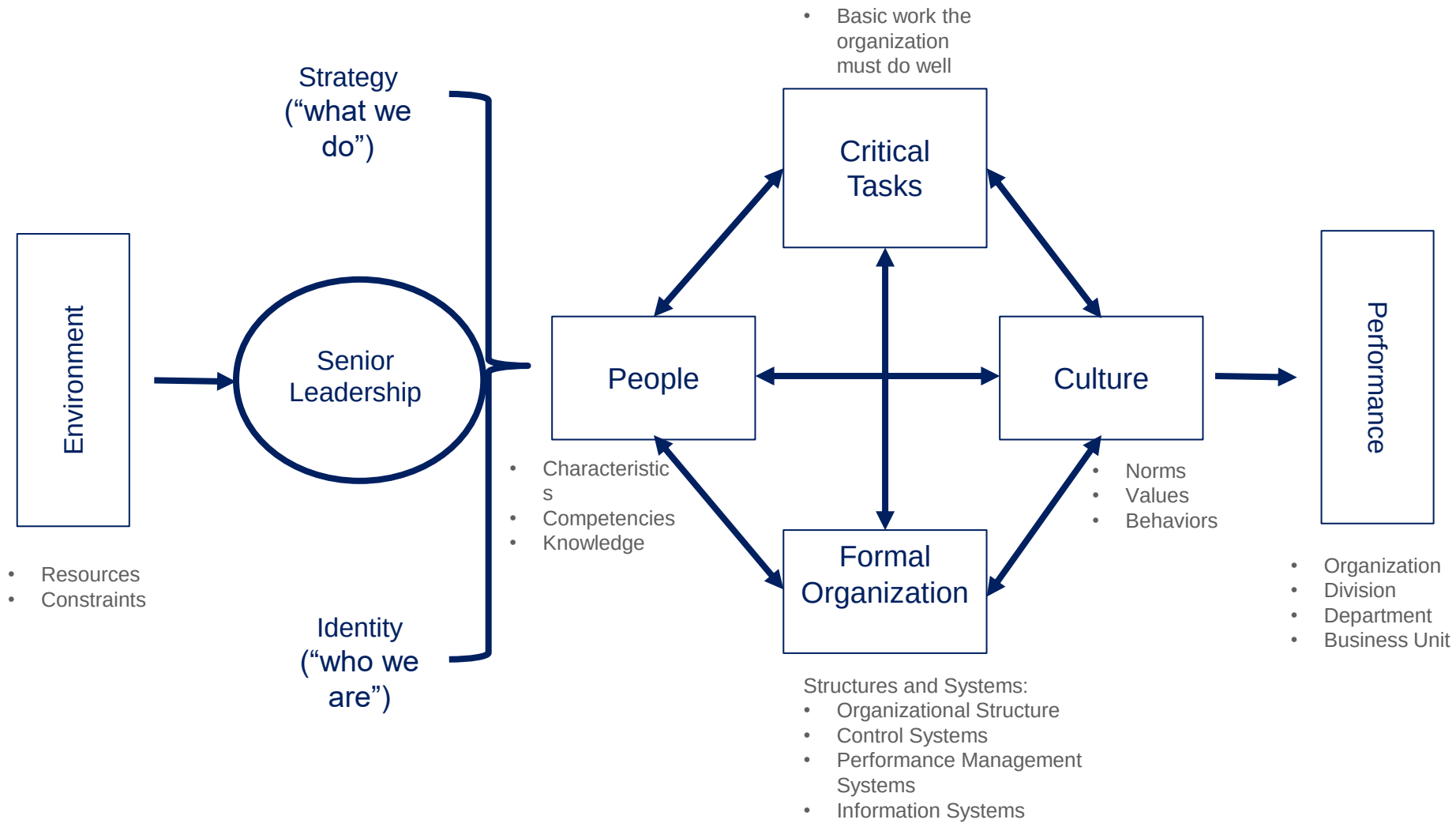

| | Buyers/Merchandising Team | Inventory Allocation Analysts | Logistics | Store Operations |
|---|---|---|---|---|
| Decisions | • Forecast which products to buy, how much, from where, etc… | • Allocate merchandise to different locations | • Forecast shipments to stores<br>• Allocate shipping capacity | • Forecast shipments<br>• Set staffing levels |



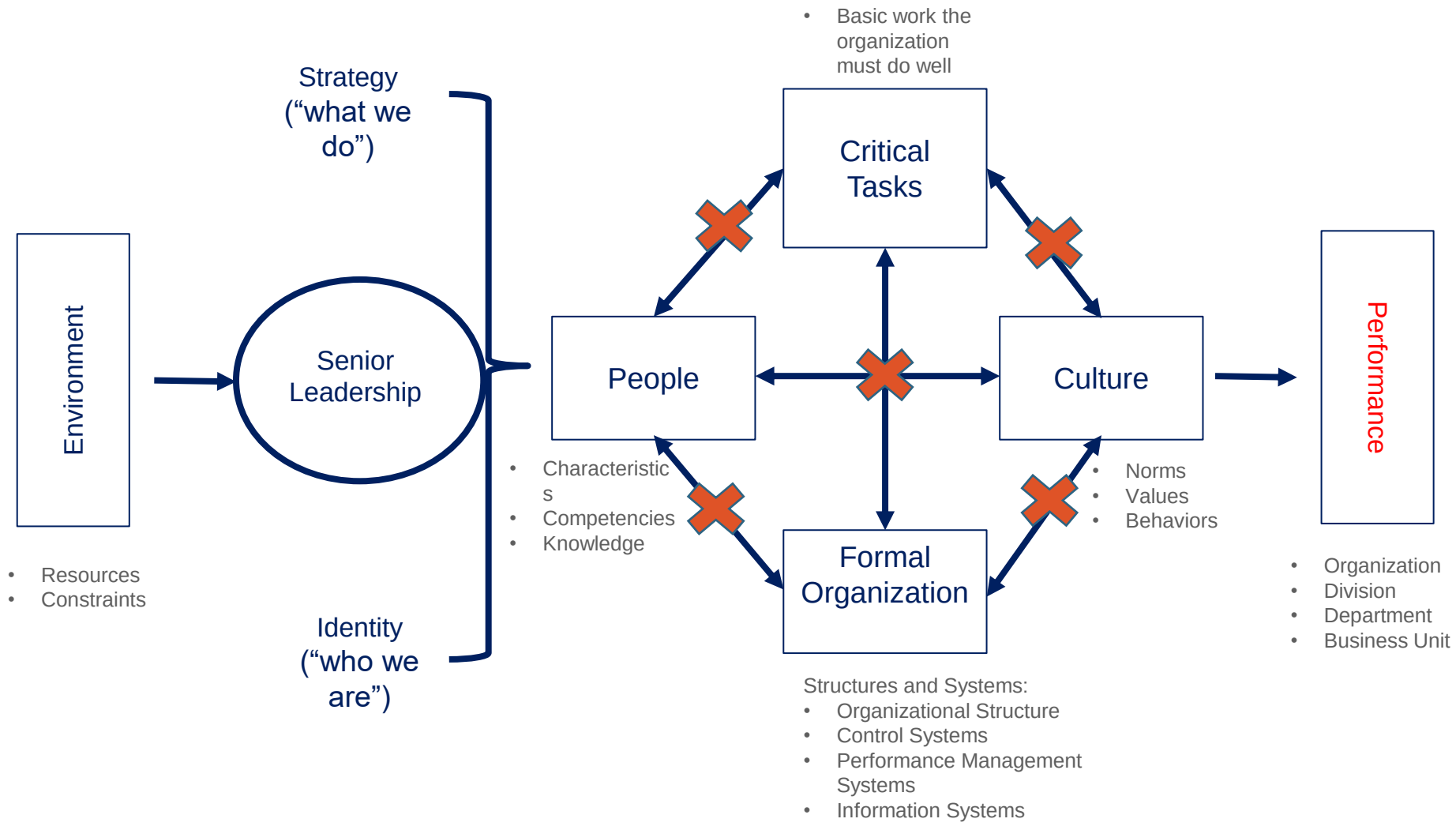

| | Buyers/Merchandising Team | Inventory Allocation Analysts | Logistics | Store Operations |
|---|---|---|---|---|
| Decisions | • Forecast which products to buy, how much, from where, etc… | • Allocate merchandise to different locations | • Forecast shipments to stores<br>• Allocate shipping capacity | • Forecast shipments<br>• Set staffing levels |
| Initial Impacts | • More frequent ordering and deliveries | • Model remains a "black box" lots of human intervention and overriding | • Not enough time to react to more frequent changes within season<br>• Worse forecast accuracy<br>• More complex logistics requirements | • Not enough time to react to more frequent changes within season<br>• Worse forecast accuracy<br>• Worse staffing decisions increased overtime and labor costs<br>poor service |

- *Data and analytics allows for better matching of supply and demand*
- *But… it also creates more interdependencies within supply chains*
- *Creating responsive supply chains requires new modes of data transparency, coordination, and control*

# Culture, Systems, and the Organizational Architecture



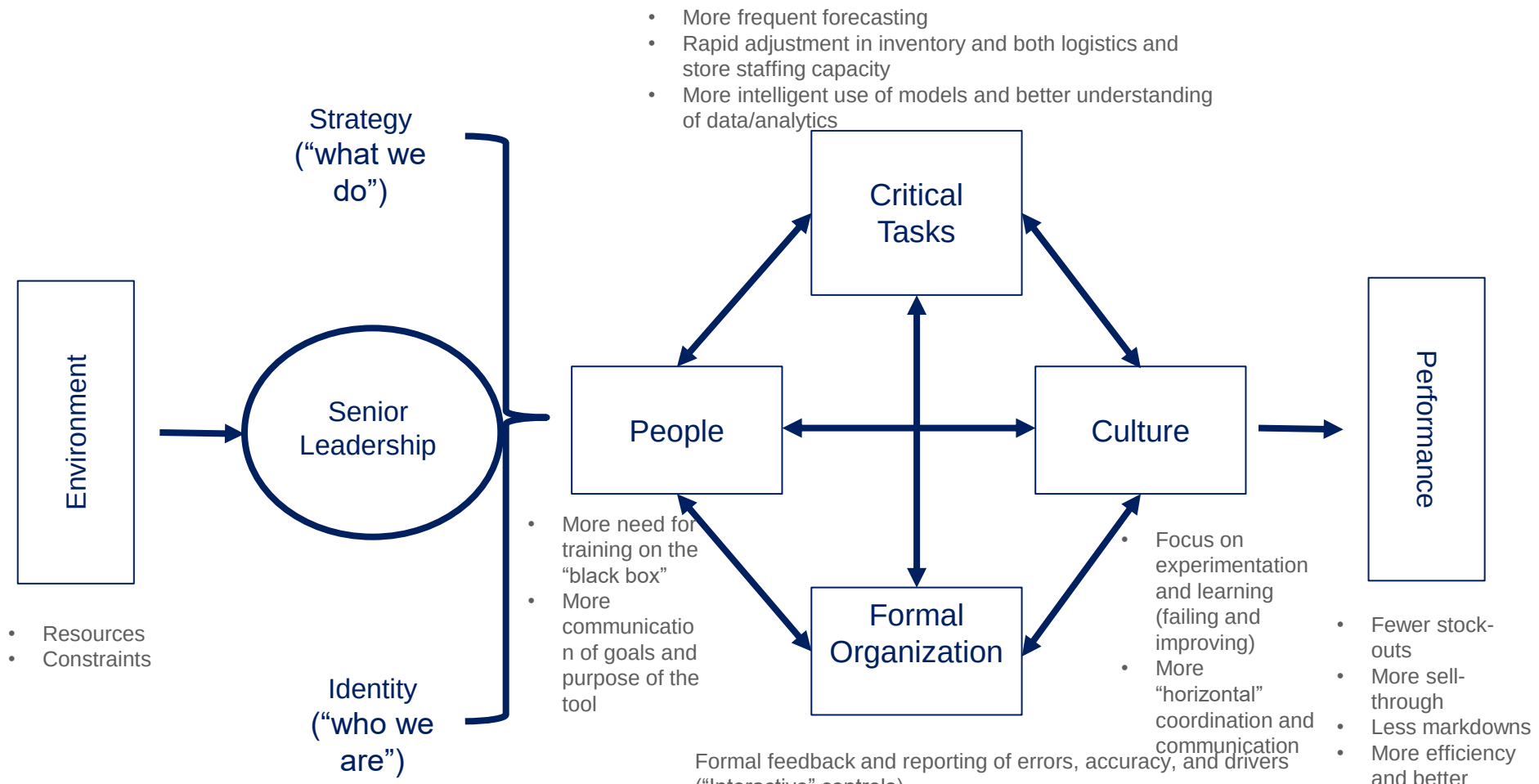
# Culture, Systems, and the Organizational Architecture




*Performance gaps arise when any of these elements are out of alignment*

- Profit plans
- Variance analysis
- Benchmarking

# What changes would you make to the organizational architecture to support the new tools?




- More frequent forecasting
- Rapid adjustment in inventory and both logistics and store staffing capacity
- More intelligent use of models and better understanding of data/analytics

- Resources
- Constraints

- More need for training on the "black box"
- More communication of goals and purpose of the tool

- Focus on experimentation and learning (failing and improving)
- More "horizontal" coordination and communication

- Fewer stock-outs
- More sell-through
- Less markdowns
- More efficiency and better profitability

Formal feedback and reporting of errors, accuracy, and drivers ("Interactive" controls)

"Auditing" quality of decisions based on model, especially on important items (stronger internal control)

Motivate on broader goals across supply chain

# A few new themes worth exploring…

- Firms and their supply chains are becoming more customer-centric
  - Higher expectations of end consumers
  - More complex requirements for value creation and pressures for upstream risk management from brands and regulators
  - Data, analytics, and digital technologies are rapidly improving the ability to match supply and demand (in theory, if not in practice)
- Lack of visibility and coordination remain a significant problem
  - Valuable data resides throughout supply chains, but incentives and lack of communication prevent it from being where it is most needed

# Data Trading as a Potential Solution



1:1 Model




Platform Model

- Value of data is *relative* and highly context dependent
- New governance and contracting requirements (ownership and control of data in the context of privacy issues)

***Sam Palmisano, Chairman, Center for Global Enterprise – former-CEO, IBM***

"Technology has enabled companies to rush towards Big Data, and I understand the excitement.

But sometimes, smart leaders need to get away from the herd.

They need to encourage their people to think about data at a granular level.

Exactly what data do we need to improve performance? Exactly what data do we have that would be valuable to others?"

# Thank You



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