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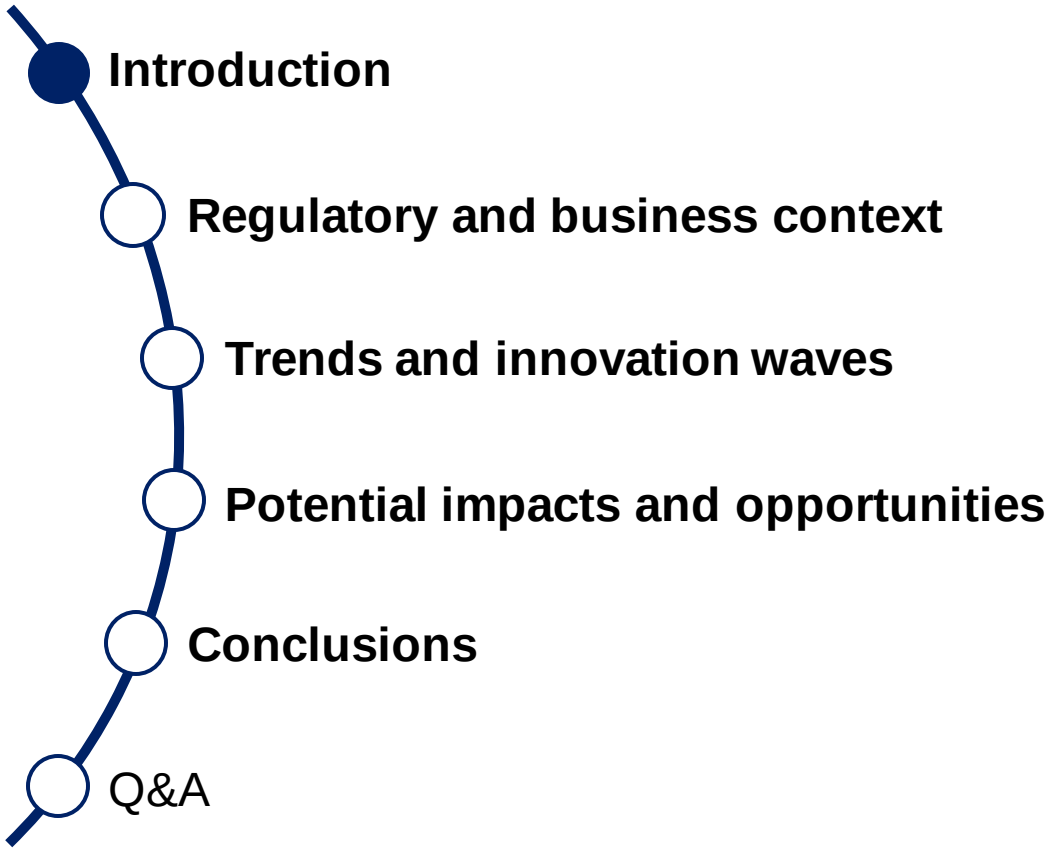
New Challenges and Opportunities in Risk Data Management

How to manage the “Disruptive Innovation”: Big Data, Blockchain and Artificial Intelligence

Milan, June 22nd 2016

Strategy | Consulting | Digital | Technology | Operations

Agenda



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Introduction

- In January 2013, the Basel Committee released a final set of “Risk Data Aggregation and Reporting” (RDAR) principles to enhance banks’ ability to identify and manage bank-wide risks
- During the last three years, major banks invested a lot of time and money into RDAR Programs to achieve the compliance with regulation
- Based on self assessment analysis, the Basel Committee highlighted that a lot of work has been already done, anyway banks have to continue the journey of continuous data management improving
- The current technological context, often so called «disruptive innovation», will strongly affect banks’ business model generating, from one side, new growth and development opportunities but, from the other one, potential risks to manage
- Objective of this document is to draw a «fil rouge» among new technology and highlight how banks can anticipate potential treats and generate sustainable value

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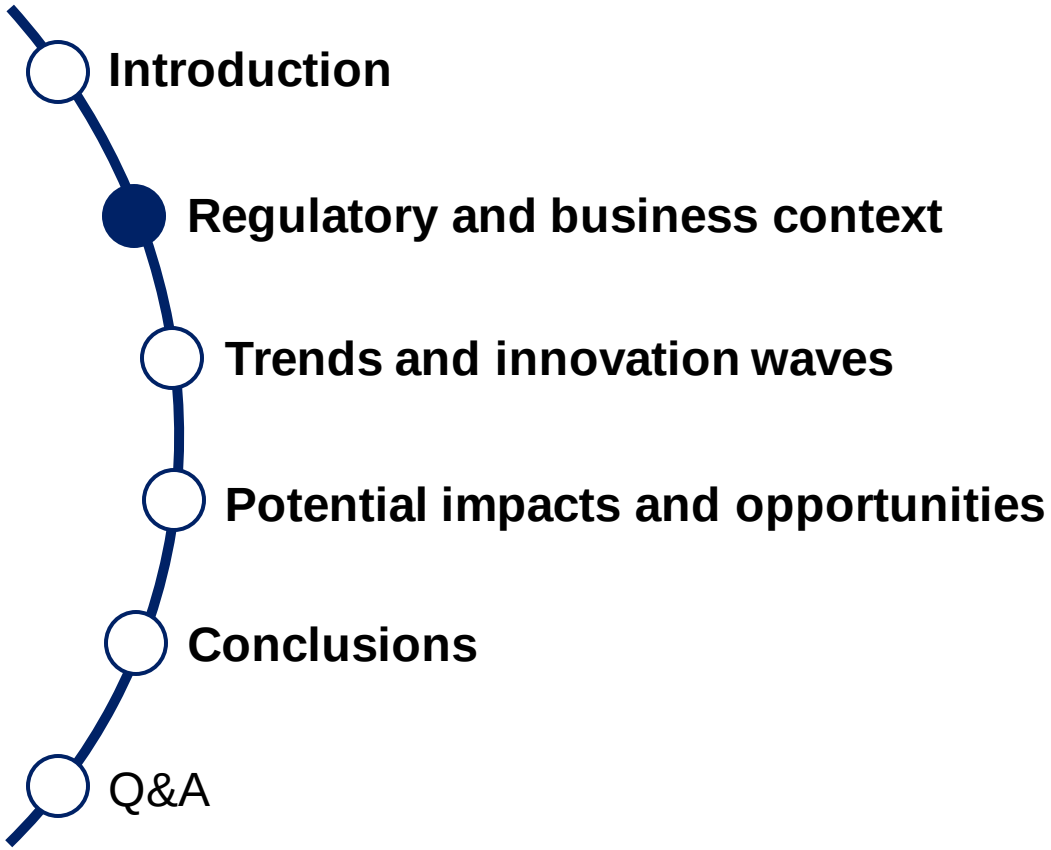
Agenda



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Regulatory and business context (1/3)

The Risk Data Aggregation and Reporting (BCBS 239) in a “nutshell”

The compliance with the principles…

Governance & Infrastructure

1	Governance	Coordination, validation and Information
2	Data Architecture and IT Infrastructure	Data architecture & quality management

Aggregation

3	Accuracy and Integrity	Automation and accounting quality
4	Completeness	Groupings, coverage and risk measures
5	Timeliness	Data availability delay
6	Adaptability	Ease of “ad hoc” queries
7	Accuracy	Consistency checks

Reporting

8	Comprehensiveness	Risk coverage
9	Clarity and Usefulness	Fit to recipient needs
10	Frequency	Responsiveness in normal & crisis times
11	Distribution	Timely and confidential

… enables banks to take efficient and timely risk decisions:

With an overarching **governance**:

- in line with the Group’s policies, objectives and profiles
- shared by division, functions and stakeholders

Built over a **data architecture** that can support across the Group the goals of reporting and aggregation in normal times as well as times of stress of crisis

Which relies on **risk data aggregation** capabilities that:

- demonstrate flexibility and completeness
- generate highly automated, up to date and timely data
- allow views by geographies businesses, legal entities, etc.

Based on risk reporting practices that deliver:

- the right accurate and comprehensive information
- in the right way
- to the right people(e.g. the Board and the Senior Management)
- at the right time and frequency

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Regulatory and business context (2/3)

BCBS 239: Progress in the compliance journey

PERDAR 2014 Self Assessment Rating*

Main highlights

- Banks tended to assess their performance as best in risk reporting, with weaker self-assessed compliance in data aggregation, and governance and infrastructure
- Since the publication of the Principles, banks have made some progress towards compliance, particularly when compared with their pre-crisis status (based on past self-assessments).

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(*) Source: Progress in adopting the Principles for effective risk data aggregation and risk reporting - December 2015

Regulatory and business context (3/3)

BCBS 239: Current identified weakness and challenges

Highlights

Defining key terminology	Many of the requirements in the Principles focus on the concept of **materiality**, eg material business lines, entities and risks. The concept of **materiality is bank-specific** and depends heavily on a bank's **business model** and **risk exposures**.
Data architecture and IT projects	**Completing large-scale infrastructure projects on time** continues to be seen as the most **significant obstacle** to full compliance. Gains in infrastructure would enable the compliance not only with Principle 2, but also with data aggregation ones
Accuracy and adaptability of risk data	Significant gaps in terms of **data accuracy and adaptability** were also identified. Principle 3 (**accuracy/integrity**) and Principle 6 (risk data aggregation **adaptability**) had some of the **lowest** reported compliance **ratings**.
Risk reporting	Banks consistently rated themselves highly on risk reporting practices. However, **weaknesses in areas of data accuracy** then mean that **risk reports** themselves will be **inaccurate**. The Committee has continually stressed this type of **interdependency** between the Principles, but it is still unclear whether this has been fully internalized by banks

*Those countries which have already designated **domestic systemically important banks** (D-SIBs) have made similar observations*

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Source: Progress in adopting the Principles for effective risk data aggregation and risk reporting - December 2015

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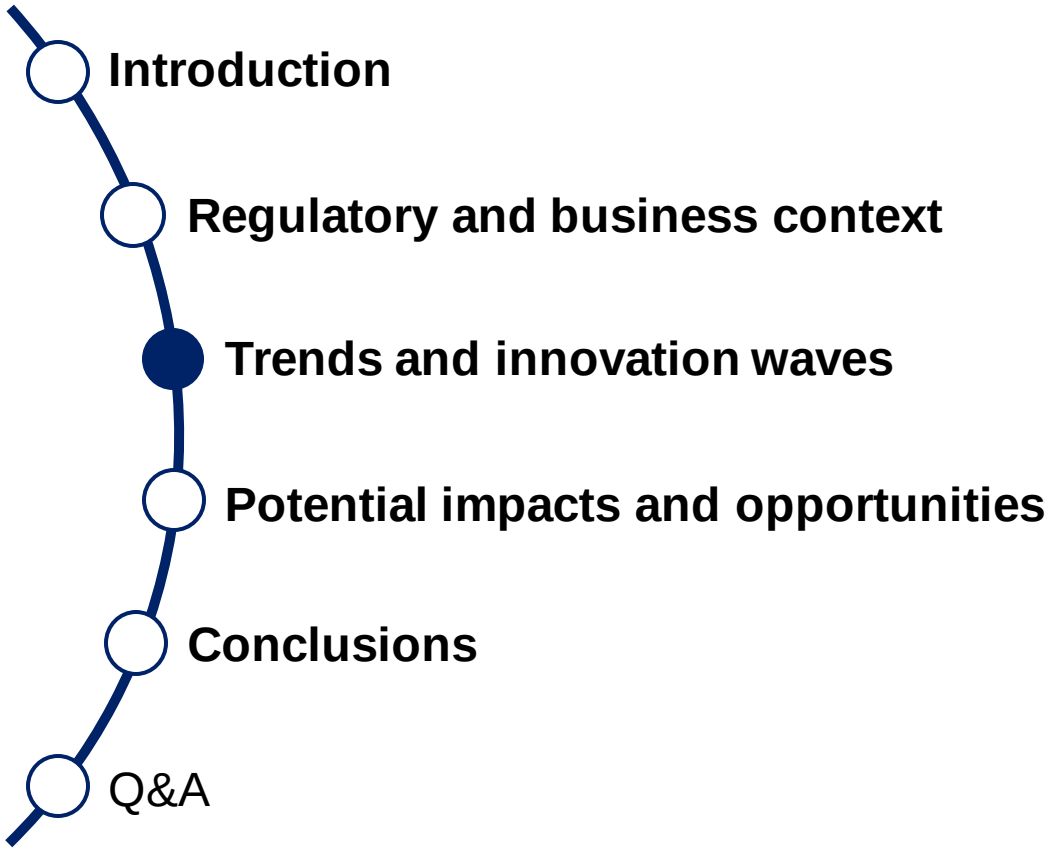

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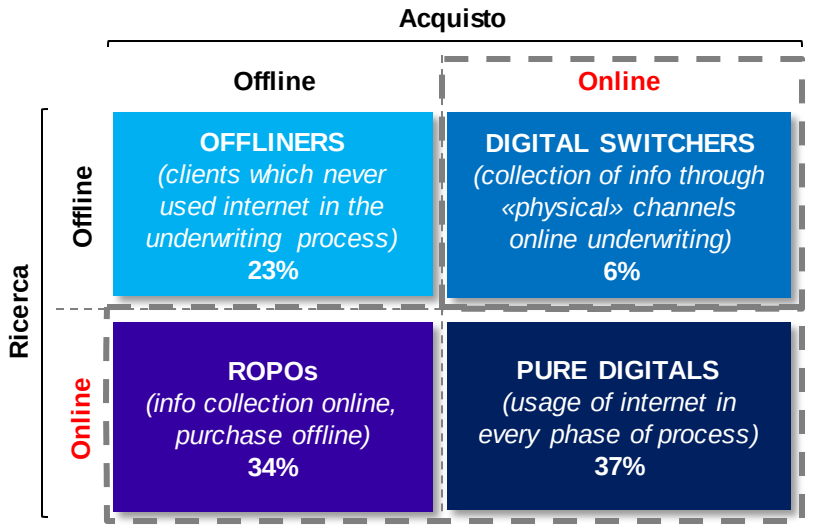
Trends… (on digital)

77% of clients pass through digital channels at least one time during the banking product and service purchase

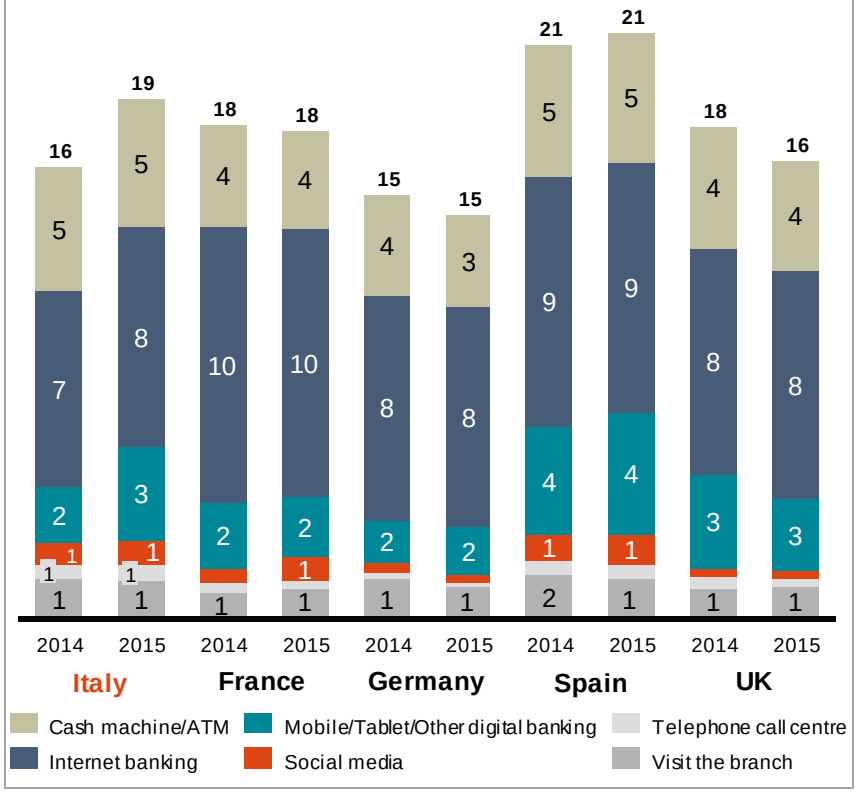
Banking products and services purchase channels (2015)



Source: Online survey Nielsen on 2.437 banking clients, 18-74 years old

In Italy interactions through mobile and internet banking are growing

 # monthly interactions between clients and banks (2015)



Source: Digital Customer Experience in the purchase process, Accenture Digital; Global Consumer Pulse Research (Industry Report)

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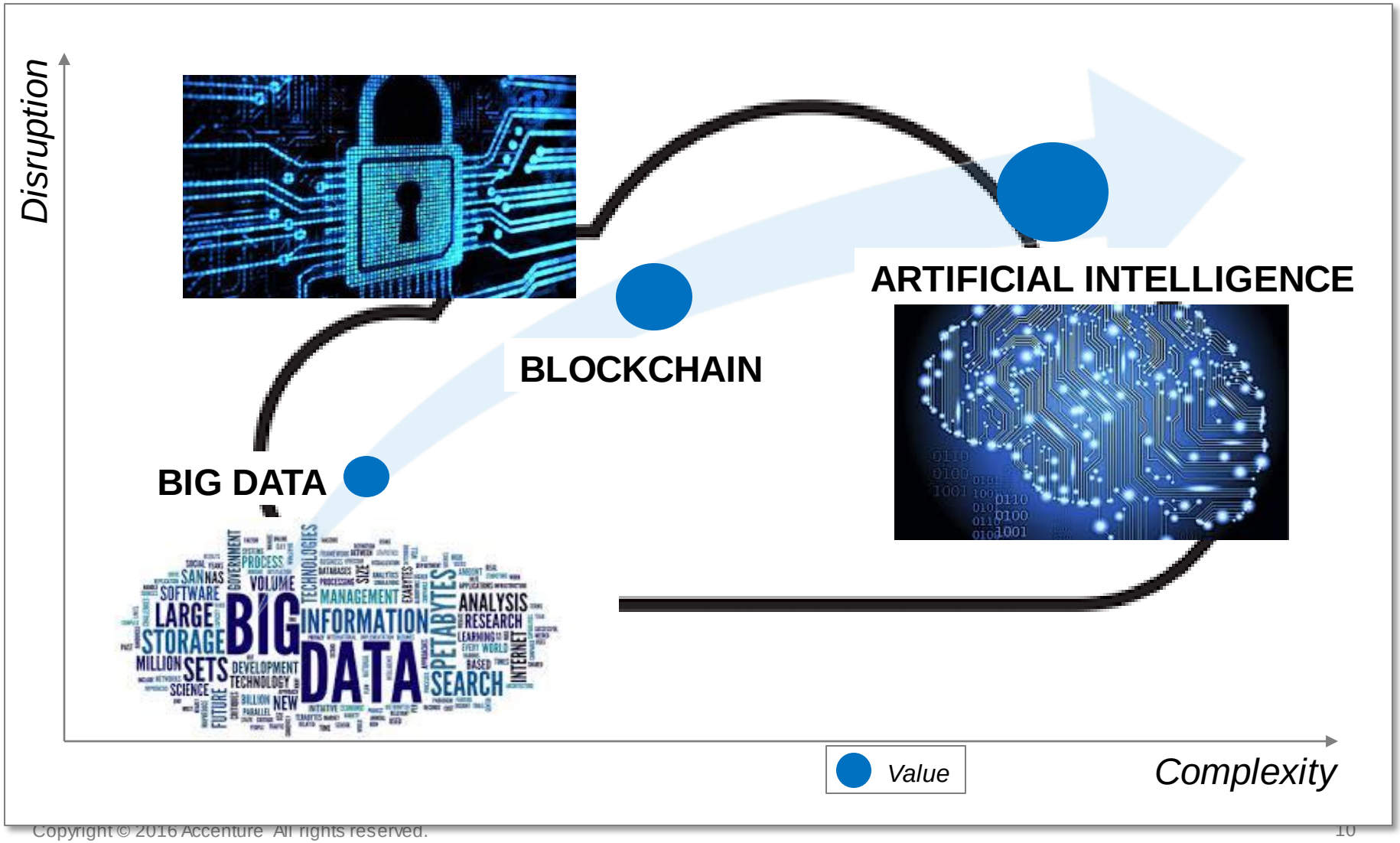
… and innovation waves



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Big Data
The 4Vs model

The Big Data revolution is generating the diffusion of new data in terms of size, relevance, type and time: it's time for organizations to capture the huge value behind them

Relevance of data

from: Informatoin — *Mountain of data*

… to: Insight — *Useful insights*

Size of data

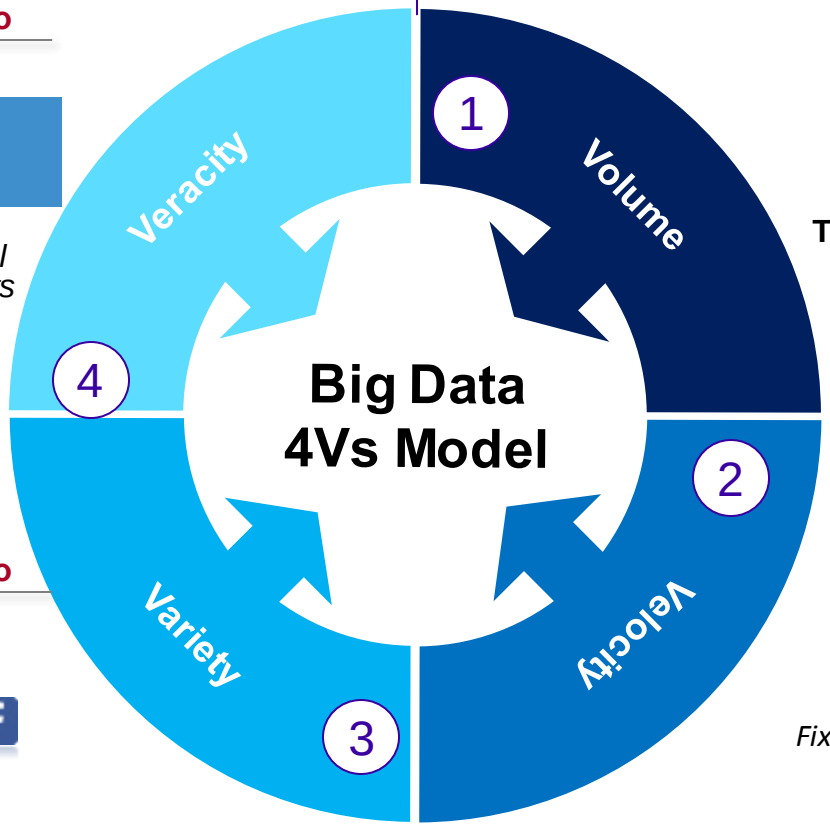
from … to …

Zettabyte

Terabyte

≈ 1.000 Gigabyte

≈ 1.000.000.000.000 Gigabyte



Different types of data

from … to …

Business/ structured data

Various types/ unstructured data

Real time streaming data

from … to …

Fixed frequency data input

Continuous lowing data input

Monthly based reporting

Real time reporting

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Big Data
How FS Industry is affected by them

According to recent surveys and market evidence, the Financial Services industry is increasingly embracing the Big Data revolution with the aim to get competitive advantage reinventing themselves

How widespread is the use of Big Data?

71% of FS Industry is **approaching Big Data** and predictive analytics

60% of Banks worldwide will **process majority of their transactions in cloud** by 2016

How much is this bet?

Big Data investment in 2015 by Financial Services companies **$6.4 billion**

Increase in Big Data spending estimated for **2015-2019** **+26%**

70% of FS Industry players report that **Big Data has a critical importance** to their firms

54% of FS firms have appointed a **Chief Data Officer** into their organizations

What is the market sentiment?

Total **investment growth** (2014 vs 2013) in new Technology firms (**Fintech**) **+215%**

Global **Fintech** financing activity in **2015** **$12 billion**

How is the market moving?

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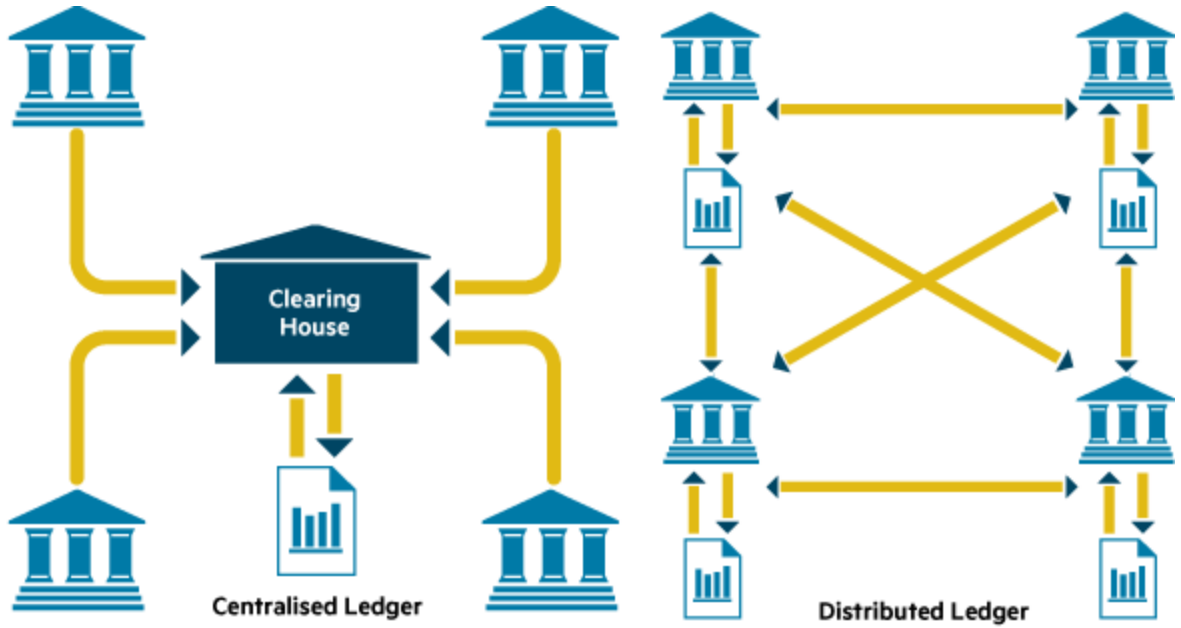
Blockchain
What is it?

"Blockchain is a distributed (decentralized) digital network that enables the exchange of value - including financial assets, contracts and data - in a secure environment"

By design, blockchain builds trust into every transaction, enabling greater security, cost efficiency and optimized reconciliation processes.

ILLUSTRATIVE



The technology could cut bank infrastructure costs for cross-border payments, securities trading and regulatory compliance ***by $15 billion to $20 billion a year by 2022****

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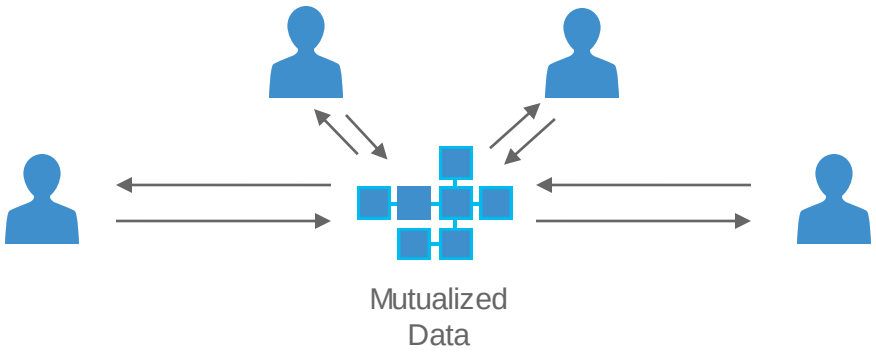
(*) Source: Santander InnoVentures Report (2015)

Blockchain
How does it work?

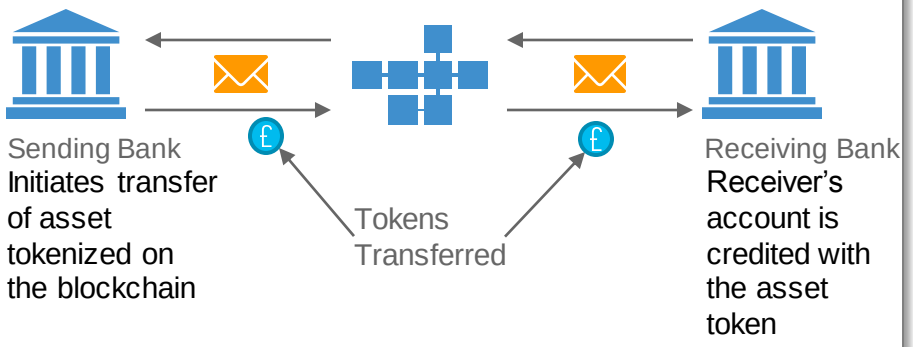
There are two basic approaches to utilizing blockchain solutions: utilize where assets are tokenized and value is transferred via the blockchain and utilize where data is mutualized to improve coordination between actors.

Mutualized Data Blockchain



- Data is stored on a blockchain in immutable fashion; data lineage / data quality are key benefits
- Participants in a business process have controlled access to the same data
- Blockchain solution provides choreography of business process and identity-linked actions, status, decisions

Tokenized 'Value Transfer' Blockchain



- Assets digitally recorded on the blockchain as tokens
- At the point of parties agreeing a transaction, digital assets are exchanged between wallets
- Settlement is immediate and final
- Gross settlement occurs on a DvP basis

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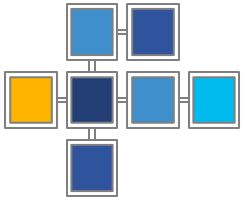
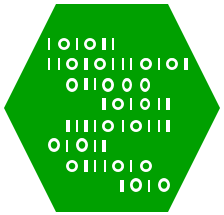
Blockchain
Consensus Mechanism

A ‘consensus mechanism’ is used to ensure that all of the nodes in the network have the exact same data and only valid transactions are loaded onto the distributed ledger.



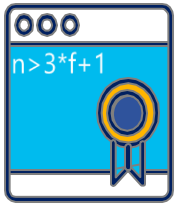
Proof of Work

Bitcoin utilizes a proof of work consensus mechanism. The work in proof-of-work comes from the computing power exerted by miners to generate valid blocks. Proof-of-work yields a system where all users have to trust the benevolence of pool operators to secure the currency.



Proof of Stake

Transactions are validated by stakeholders. Unlike proof-of-work, stakeholders take on the role of miners and blocks are signed by these stakeholders. A stakeholder is a node that have possession of part of the asset.



Practical Byzantine Fault Tolerance (PBFT)

A high-throughput centralized distributed ledger consensus solution which offers a low-latency mechanism for validating transactions. When a transaction is signed by a node, that is a positive confirmation that it was accepted by the network.

ZKP

Zero Knowledge Proof

Consensus mechanism based on an approach for mathematical proofs where a fact can be proved without sharing any information about the fact itself. This approach enables full privacy.

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Blockchain

For what can it potentially be used?

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Blockchain

What Makes this technology so innovative?

Access

Open network; anyone can add Blocks and review the entire Blockchain from inception

Open

Source Technology is freely available to anyone

Trust

Allows individuals and businesses trust each other to transfer value and information via an identified address

Redundancy

Blockchain ledger is replicated on servers across the globe; no single point of failure

Disruptive

Disintermediates 3rd parties and their associated transactional fees

Anonymity

Allows anonymous exchange of digital assets and data

Real Time

Blocks can be verified and added to the Blockchain in near real time; reduces arbitrage risk or data-sync problems

Secure

Uses cryptographic algorithms based on private/public key encryption

Safe-keeping

Maintains

comprehensive life-cycle asset, contract and data ownership without having physical possession

Decentralized

Maintained by a global network of nodes; obviates the need for a central authority

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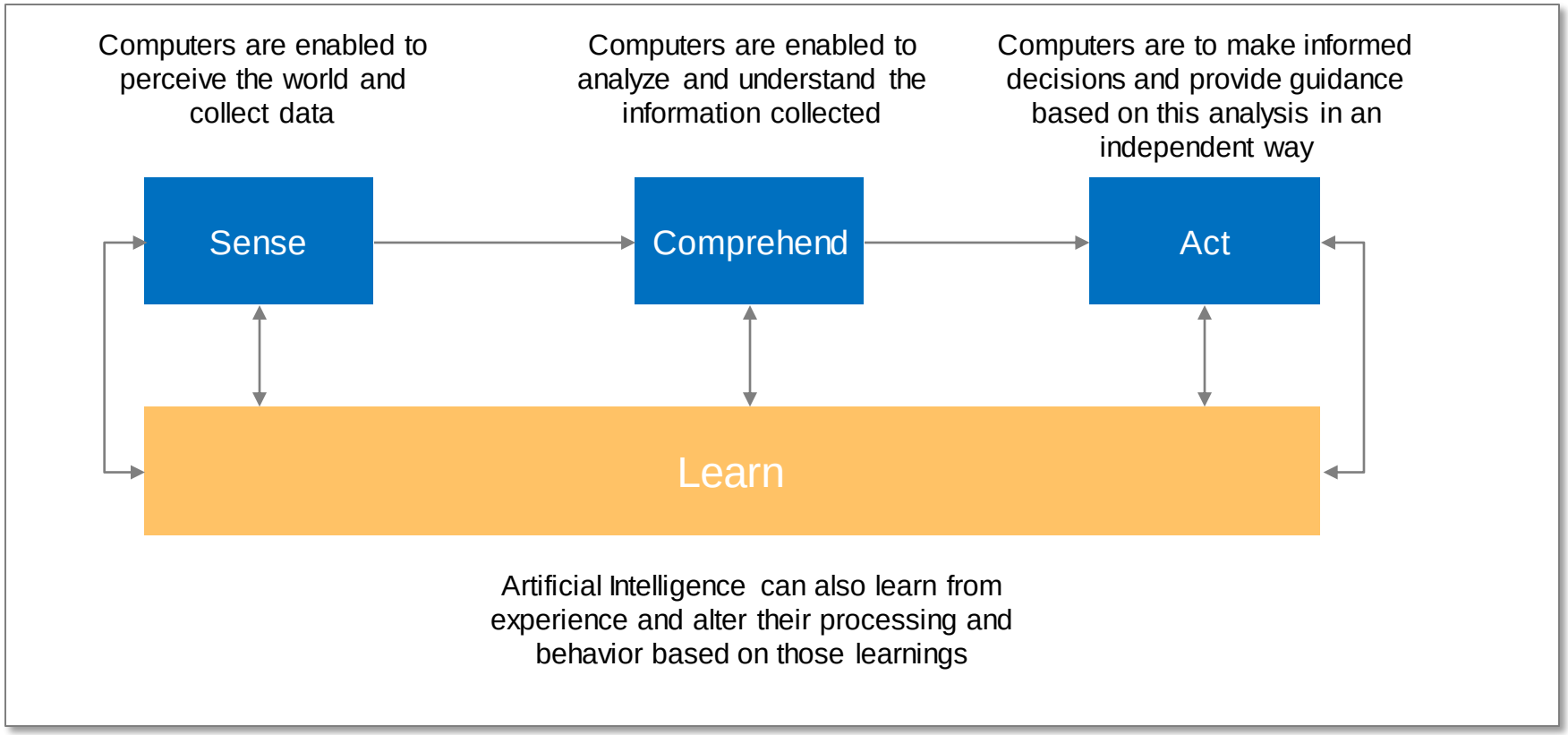
Artificial Intelligence
Overview

Artificial Intelligence - which Accenture defines as information systems and applications that can sense, comprehend and ac - has captured the attention of C-suite executives, not just technologists and research scientists.



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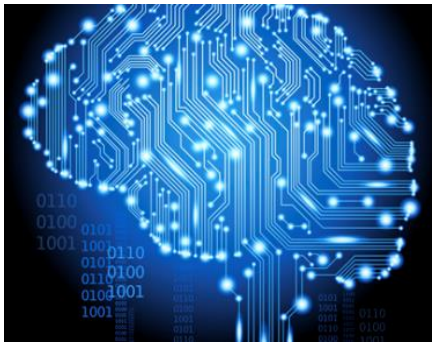
Artificial Intelligence
Focus on Machine Learning

Machine learning is a subfield of computer science that evolved from the study of pattern recognition and computational learning theory in artificial intelligence

"Field of study that gives computers the ability to learn without being explicitly programmed"…

Sir Arthur Samuel 1959



- Supervised Learning
- Unsupervised learning
- Semi supervised learning
- Reinforcement learning
- Deep learning
- Transduction
- Learning to learn

Source: Balamanikandan.v (LKM – Chennai)

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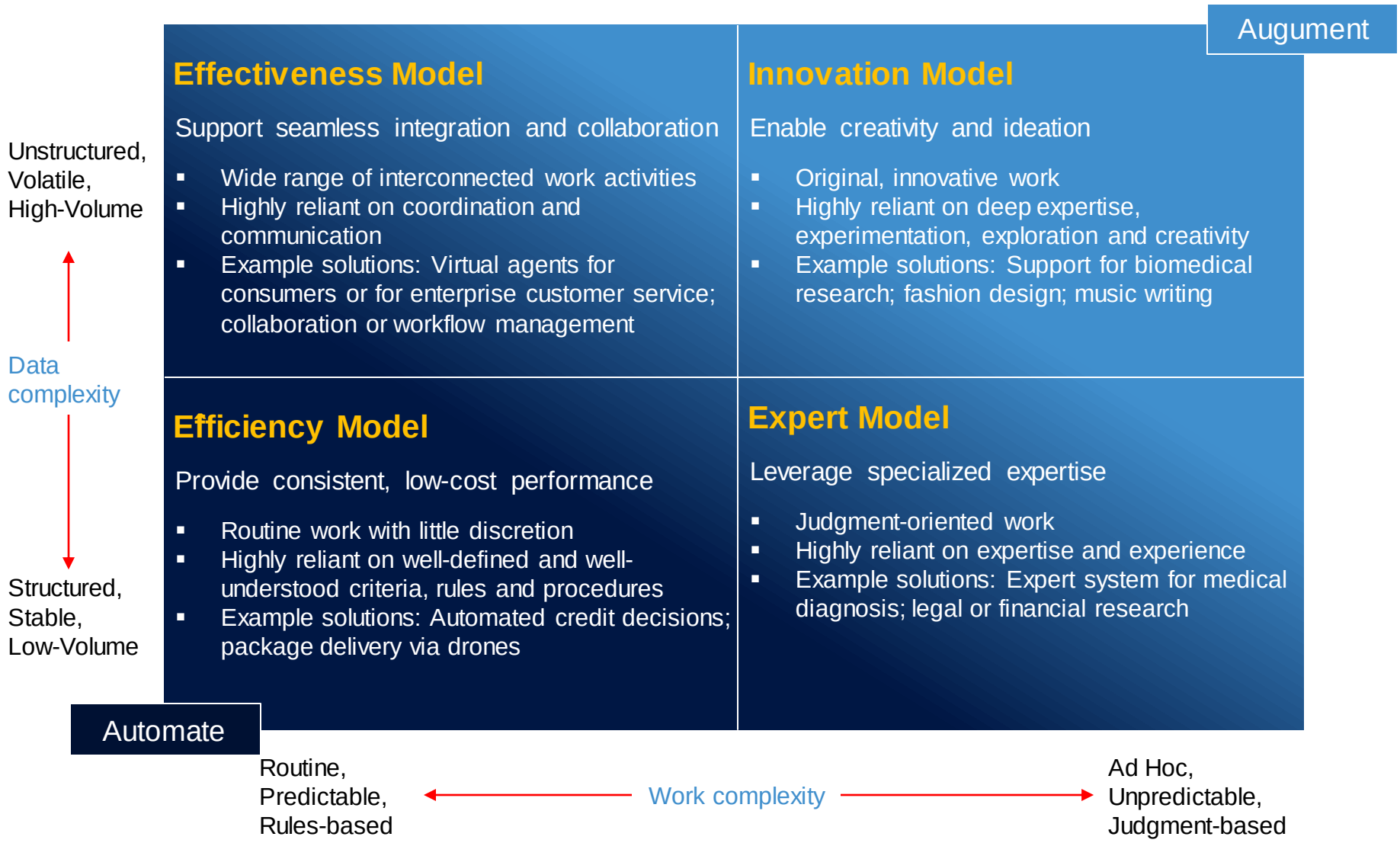
Artificial Intelligence
Activity model – General purpose



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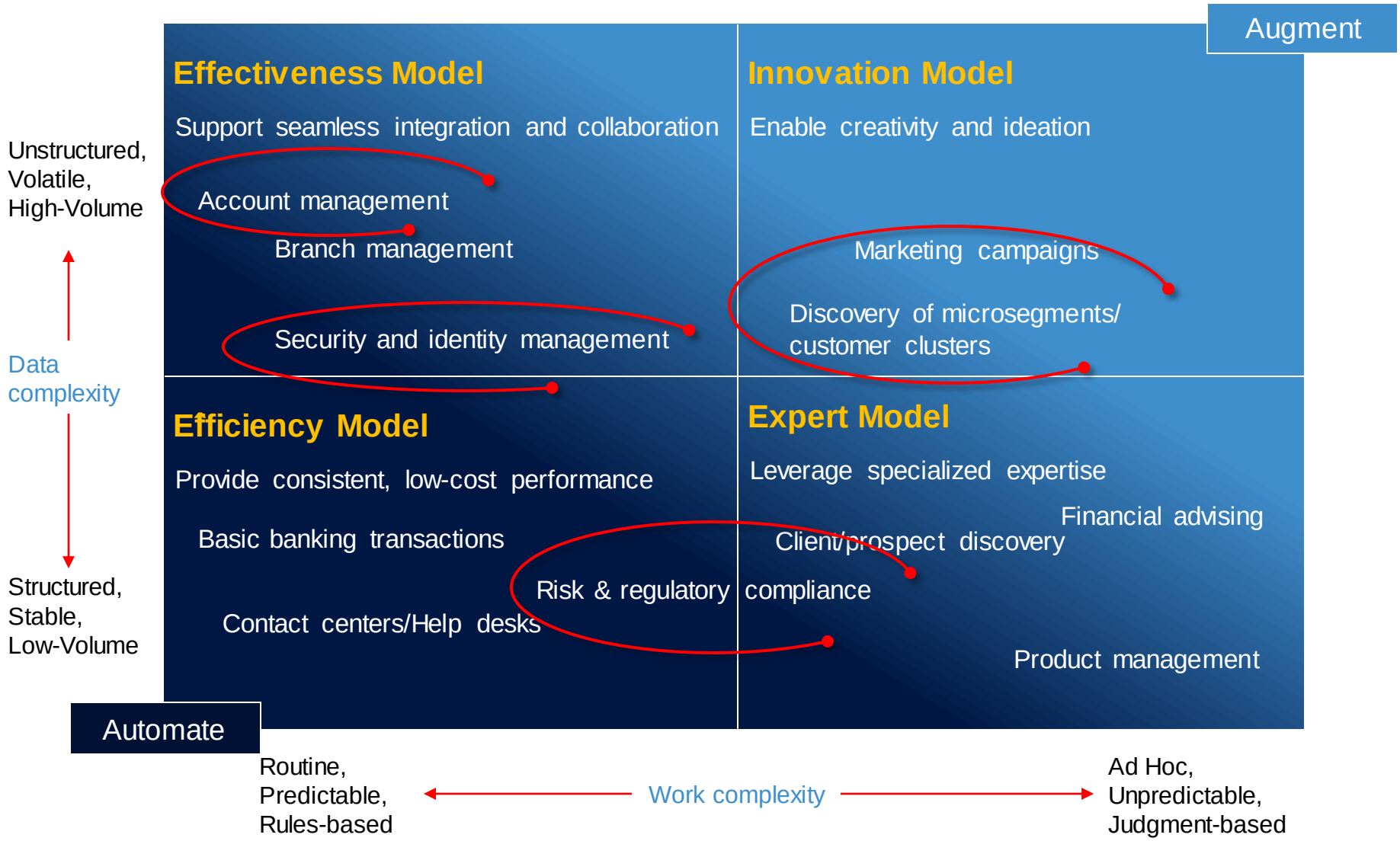
Artificial Intelligence
Activity model – Banking examples



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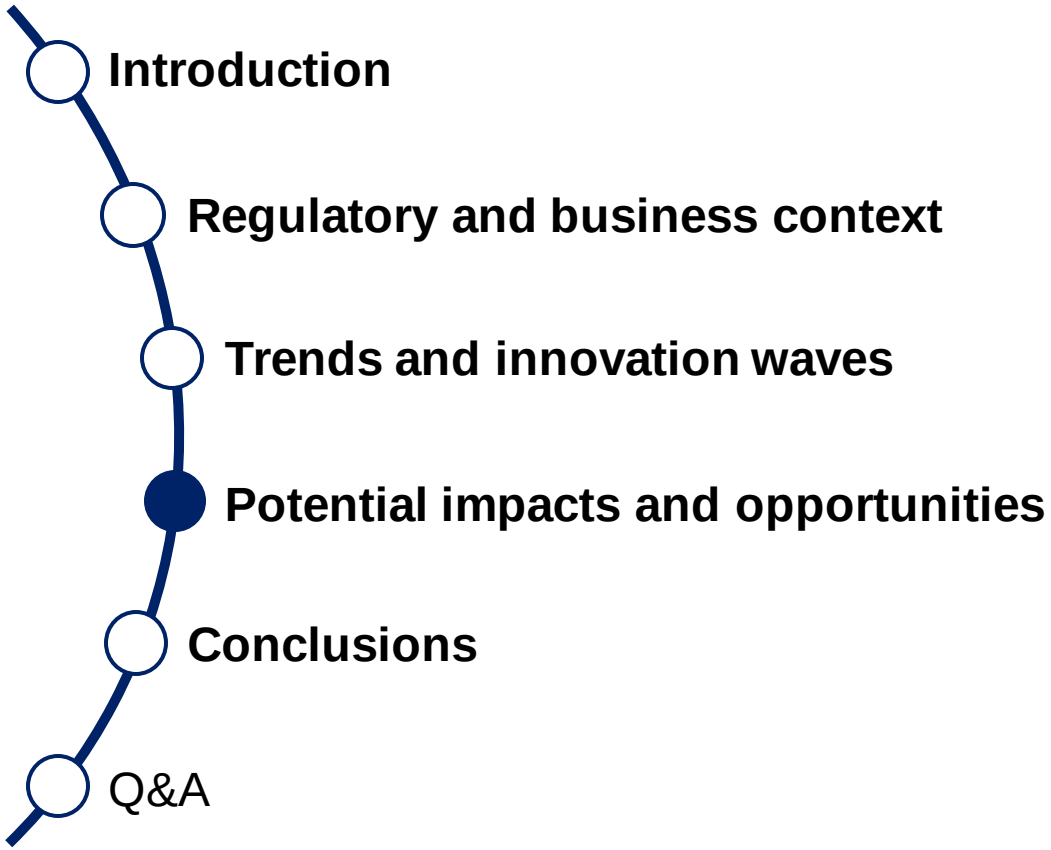

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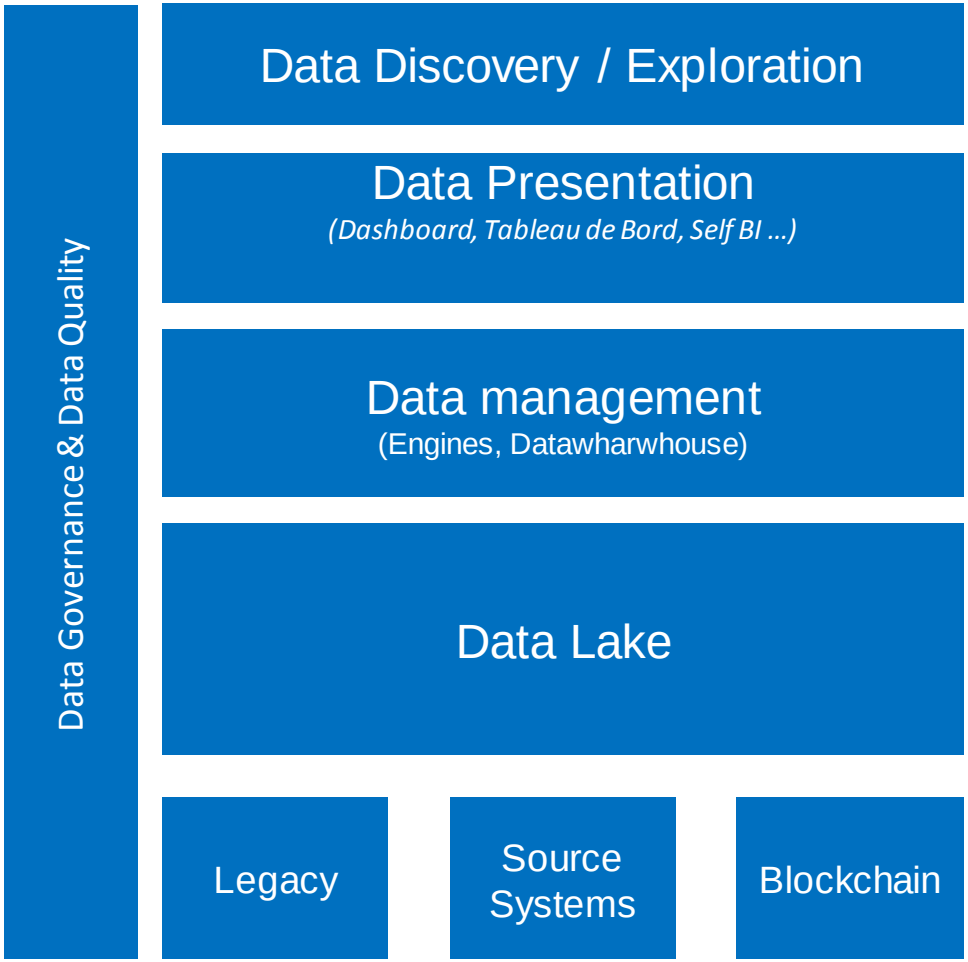
Impacts on IT

From a CFO-CRO DWH to an «open» Data Lake



Data Discovery/ Exploration

- Users access, browse, explore and analyze data in all the different stages and aggregation levels

Presentation

- Users view reports, through dashboards, that will provide data as support for business decisions

Management

- Data are elaborated, aggregated, enriched through specific algorithms and engines to provide synthetic measures and results

Lake

- Data from legacies are collected as provided by golden sources, in order to allow a full flexibility from this point on in terms of data analysis, data quality and data elaboration

Legacies/ Source Systems / Blockchain

- Golden sources for the Banks, contain and manage data required for core banking activities and represent the point of origin of the information

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Impacts on Organization
New roles

Data Officer

Designs Macro Data Governance processes, assignees roles, responsibilities and is **accountable for the reliability of data** used for regulatory and financial reporting purposes

Data Governance Coordinator

- **Coordinates** and meets regularly the **actors** with a role in the Governance framework
- **Oversees the reporting process** in order to guarantee that all the involved actors use the appropriate data sources, methodology and tools

Data Owner (Business)

- **Defines the Data Business requirements** for a proper and effective reporting
- **Defines** together with the Data Steward **the Data checkup activities** on the reporting creation process and makes sure that those are performed correctly

Data Quality Steward

- **Writes Data Quality standards** for the entire data management process and **defines the Data Dictionary**
- **Manages the Data Quality Process** for reporting: coordinates, monitors and addresses the corrective measures according to the Data Quality Policy

Data Manager

- **Guarantees that data required for reporting** purposes (regulatory and managerial) are always **available and reliable**
- Oversees the quality of data used for reporting purposes and **takes action to solve potential issues**

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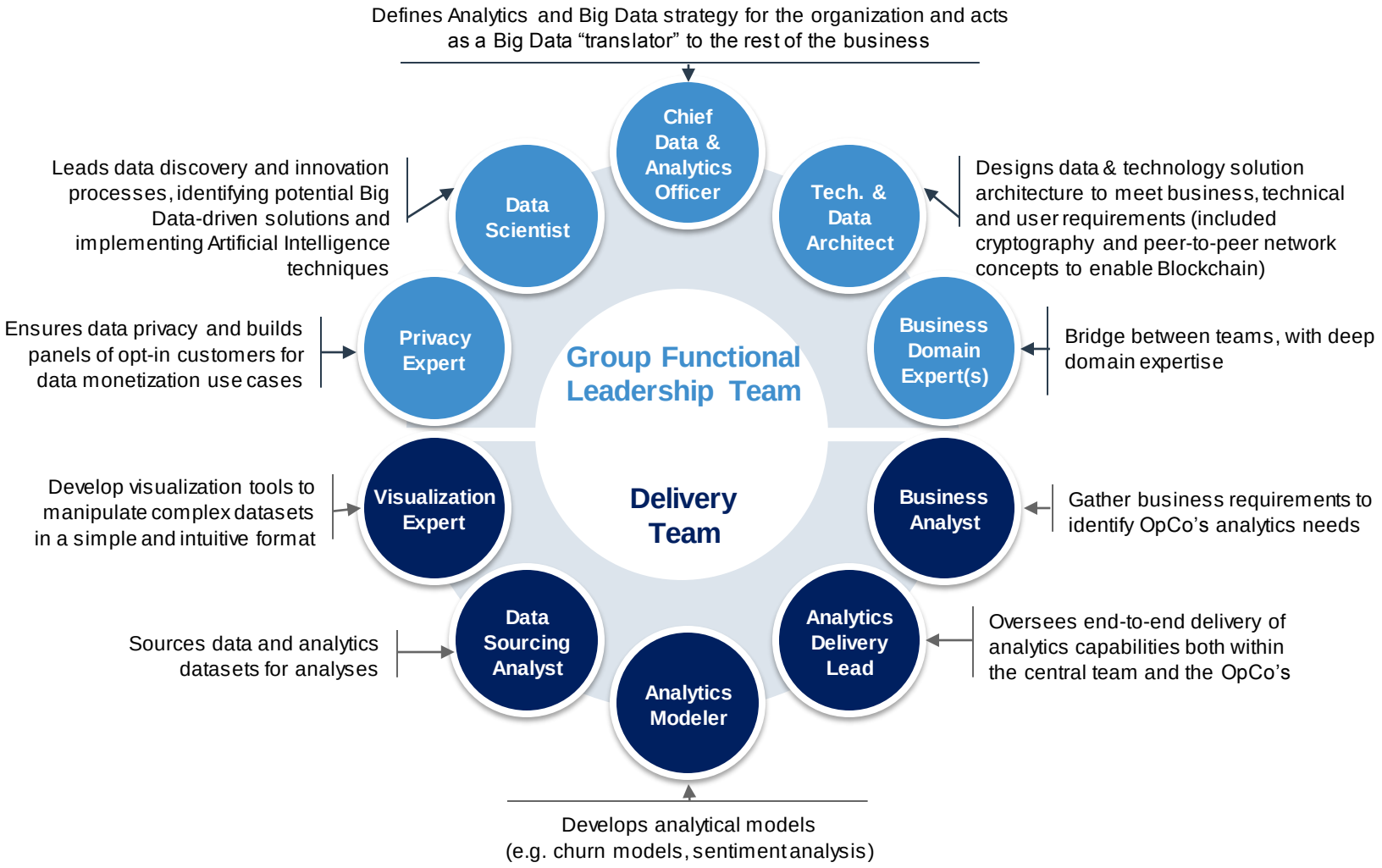
Impacts on People

Do you speak «innovation»?



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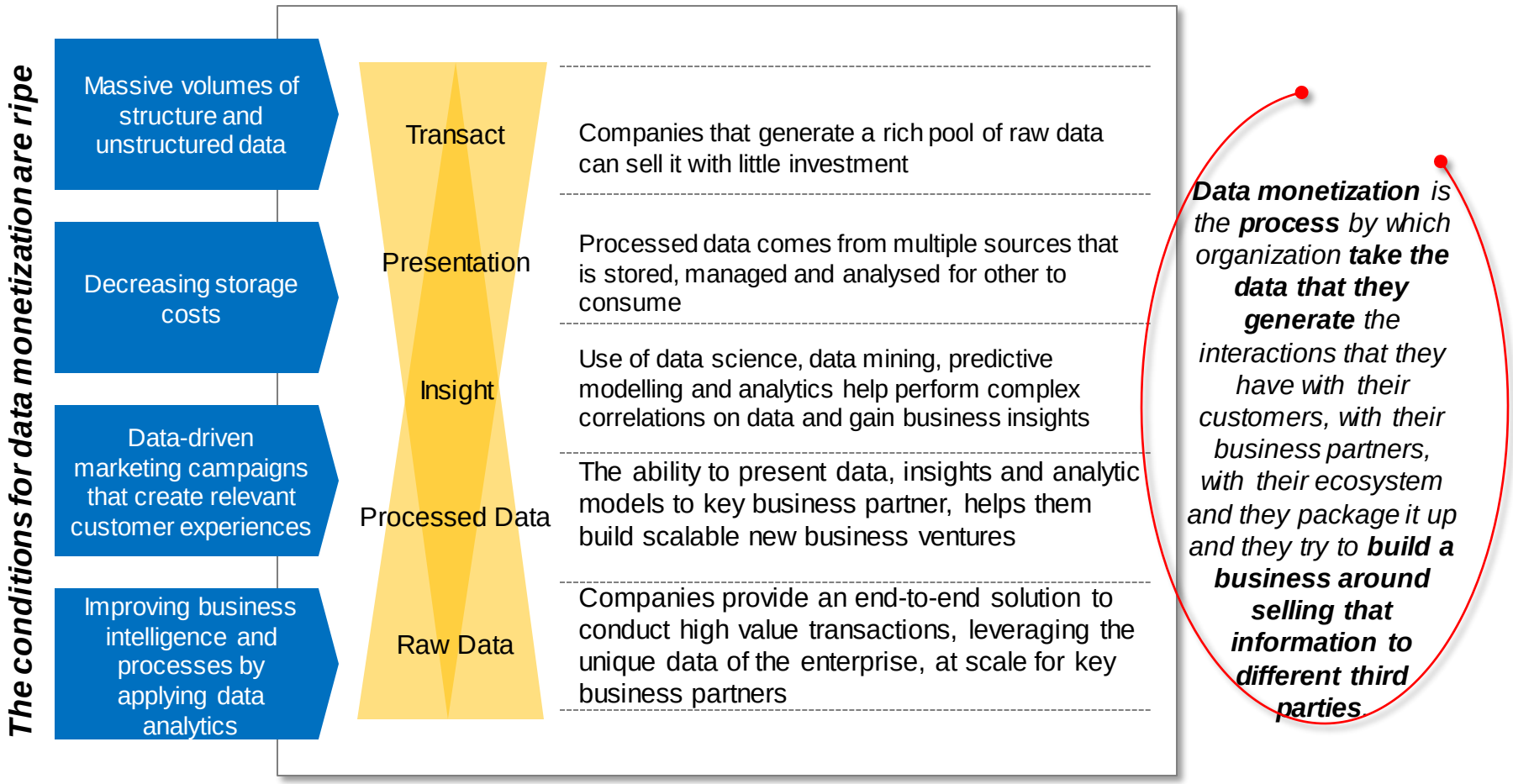
Potential benefits
Data monetization

Companies are becoming increasingly aware that they are sitting on huge amounts of under-utilized data and looking for ways to increase its value.



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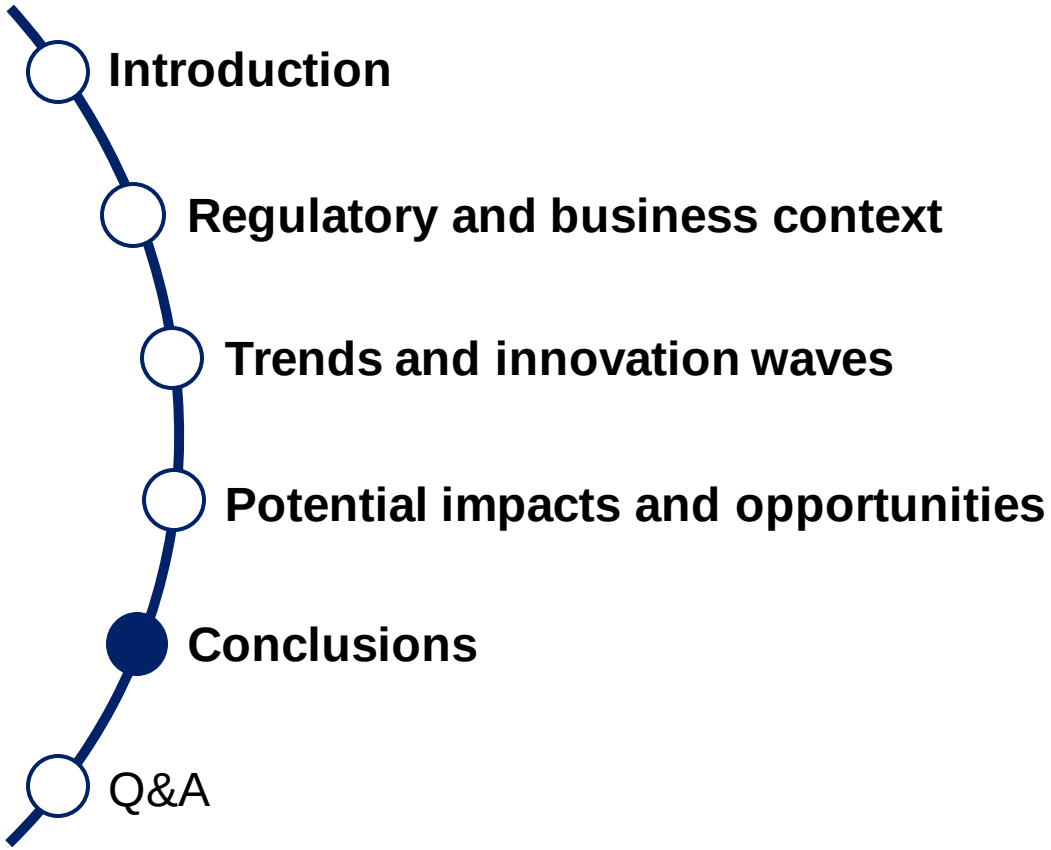

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Conclusions

The 4 Imperatives…

Leveraging the proliferation of data and new technologies to get a new perspective on the business

Providing asset-powered agility to address constantly shifting analytics and innovation needs

Applying as much as possible Artificial Intelligence techniques (e.g. machine learning and data science techniques) to deconstruct and predict potential customer behavior and enterprise performance

Embedding analytics into the operating model and aligning the organization, processes and technology to enable a scaled, data-driven enterprise

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The future is not near…it's now

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