Hazards31

IChemE ADVANCING CHEMICAL ENGINEERING WORLDWIDE

Treating Data as an Asset – Experiences of the Early Adopters

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ABS Group

ABS Group Process Safety and Risk Management

26 Books and guides written for the American Petroleum Institute (API), the Center for Chemical Process Safety (CCPS) and the Chemical Manufacturers Association (CMA)

CHEMICAL PROCESS SAFETY CENTER OF EXCELLENCE

We have a worldwide network of experts, resources and training materials related to a wide variety of regulatory, technical and industry practice topics that are directly relevant to process safety projects. This network allows our onsite personnel access to in-depth process safety management (PSM) expertise and resources that can help augment the individual's knowledge base to provide best practices and benchmarking for technical questions.

100+ experts

25 countries

45+ years

BROAD INDUSTRY EXPERIENCE

Our experts average more than 25 years of process safety and risk management experience servicing a wide array of industries with high-hazard processes.

Chemical · Petrochemical · Upstream/ Midstream Oil and Gas · Downstream Oil and Gas · Food and Beverage

Pharmaceutical · Mining · Pulp and Paper · Utilities · Agriculture

FULL RANGE OF PROGRAM DEVELOPMENT & IMPLEMENTATION SERVICES

Our award-winning Process Safety team helps clients develop, enhance and audit their PSM and RMP programs. As industry leaders, we have provided technical assistance to dozens of industry organizations by helping member companies interpret the PSM and RMP regulations and implement programs to achieve compliance. We were selected by the Independent Baker Panel to perform technical reviews and implementation assistance.

HAZARD ANALYSIS

1,100+ Analyses in Last 10 Years

- Process Hazard Analysis (PHA)
- Layer of Protection Analysis (LOPA)
- Safety Integrity Level (SIL)
- HAZOP, HAZID, What-if and FMEA Studies
- HazardReview LEADER™ Software

360+ Audits in Last 10 Years

COMPLIANCE AUDIT

- OSHA/EPA Regulations
- CCPS Risk Based Process Safety
- Health, Safety and Environmental (HSE)
- Seveso and COMAH
- International Regulations
- Company Specific Standards

150+ Large-Scale Incidents

INCIDENT INVESTIGATION

- Scaled Support of Investigations
- Evidence Collection and Storage
- Incident Scene Management
- Root Cause Analysis (RCA)
- Forensic Engineering
- Technical Inspections
- RCA Software Solution

PSM/RMP PROGRAM SUPPORT

Support for all OSHA/EPA Elements
Gap Assessment
Program Development
Staff Augmentation
Safety Culture Surveys
Procedure Development
Process Safety Information

MECHANICAL INTEGRITY

- Inspection, Testing and Preventive Maintenance (ITPM)
- Reliability Centered Maintenance
- Risk Based Inspections
- Computerized Maintenance Management Systems
- In-Service Inspections

PRIVATE & PUBLIC TRAINING COURSES

35,000 Students in Last 10 Years

- Complying with PSM and RMP
- Compliance Auditing for PSM and RMP
- PHA Leader
- Incident Investigation and RCA

CONSEQUENCE ANALYSIS

- Facility Siting (API RP 752, 753 and 756)
- Explosion and Fire Risk Assessment
- RMPlan Preparation
- Chemical Dispersion Modeling
- Explosion and Thermal Hazard Assessment/Mitigation

Presentation Outline

- Background
- Data Analytics and Data Management
- Treating Data as an Asset
- How to get started
- Lessons Learned – Success Factors
- Concluding remarks

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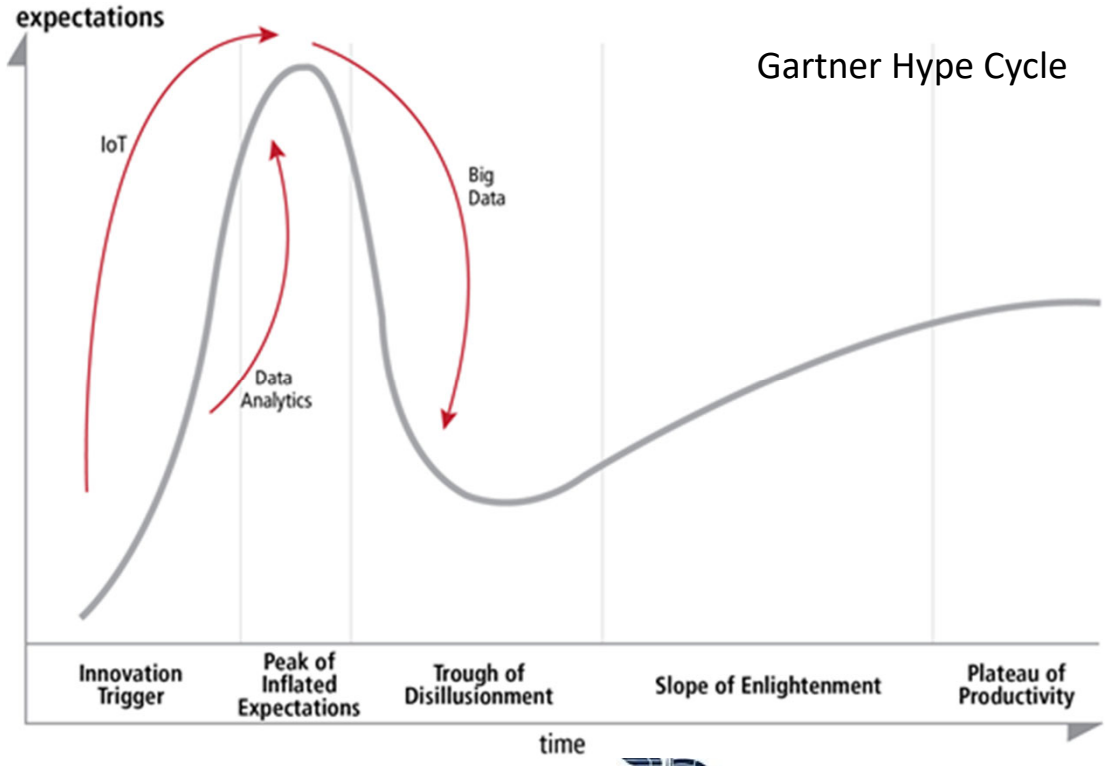
Background

- DA&M is the science of examining available data to inform and improve business and technical decisions.
- Driven by the 'Big Data' phenomenon and is becoming commonplace in many sectors
- In more technical applications (e.g., engineering, O&M) in oil, gas and chemical (OG&C) sectors are less mature – more customized, more challenging to get started.
- Forward-leaning companies are recognizing that applying DA&M has the potential to deliver significant performance improvements
- Eventually, the application of DA will become the norm, and those who are embracing it early are starting to differentiate themselves by how well they are applying it.
- This presentation summarises some of the key lessons from working with early adopters

Hype of "Big Data" and the "Internet of Things (IoT)"

- Has created believers and skeptics
- Many are adopting a wait-and-see approach
- Organizations must walk a fine line:
  - Avoid wasting resources on unproven hype
  - Implement game changing solutions before their competitors
- Eventually, the application of DA will become the norm



Gartner Hype Cycle

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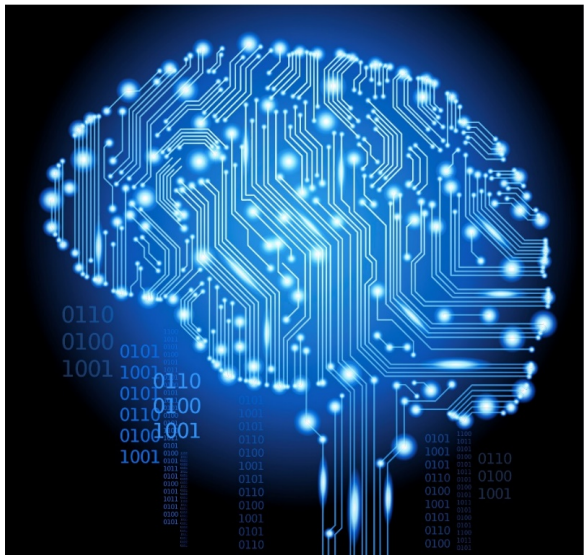
Data Analytics

Science of examining the available data to inform and improve business and technical decisions

- Promising field to emerge from the hype
- Transforming industries by improving
  - Safety
  - Environmental protection
  - Operational efficiency
  - Profitability



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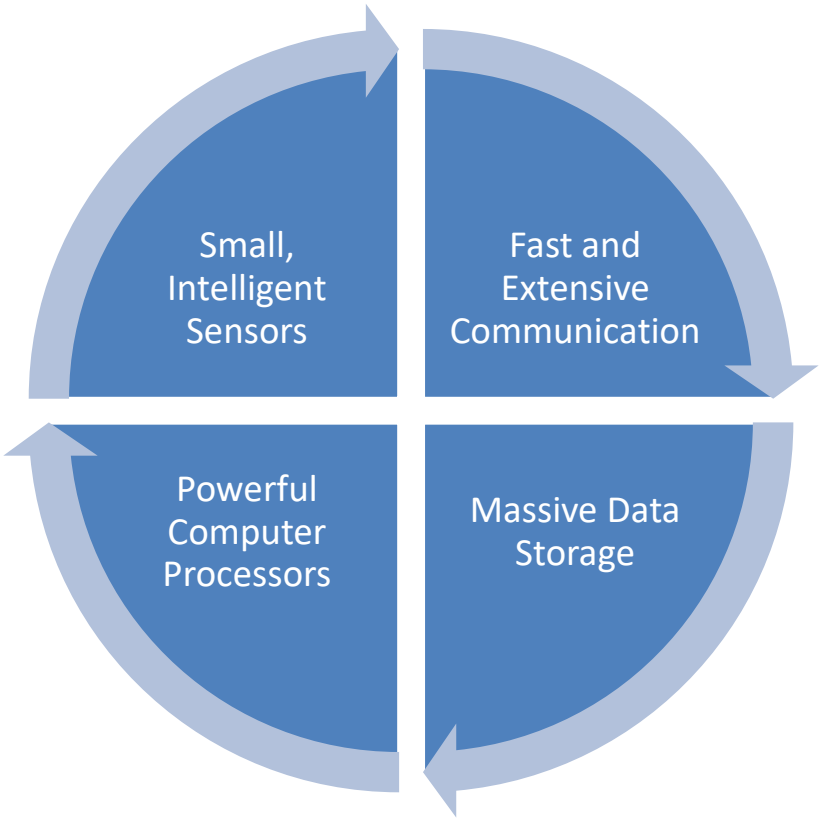
Key Enablers of Effective Data Analytics



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Data Management

Activity of maintaining and increasing the value of an organization's data

- Better data management yields a foundation for effective data analytics
- Not simply enabling storage of and access to organizational data
- Importance of proper data management increases as value of data increases



What is the value of the organization's "data asset"?

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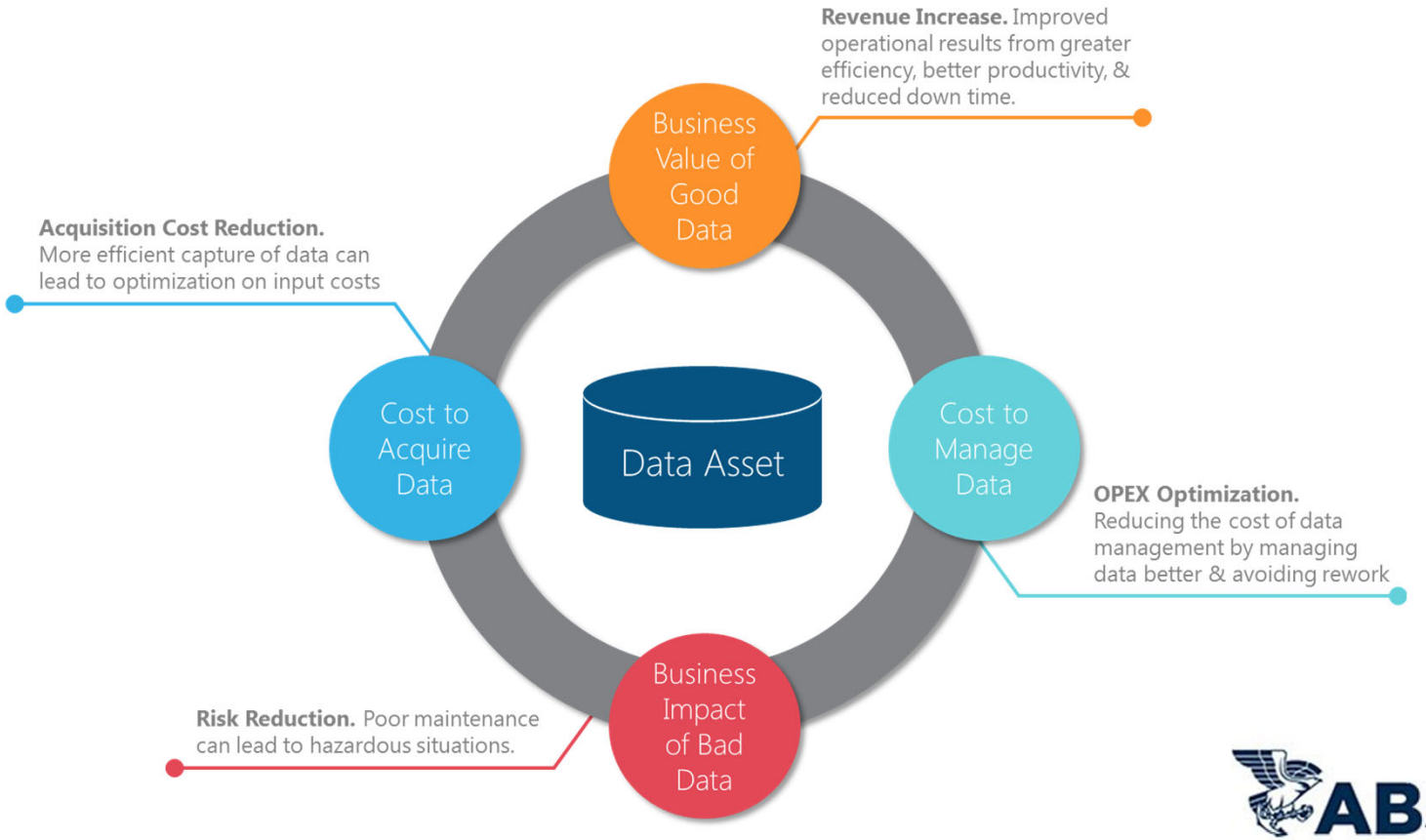

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What is the value of the organization's "data asset"? Offshore Safety: Deep Water Horizon Accident Findings

- BOEMRE should consider promulgating regulations that would **require real-time, remote capture of BOP function data** … (BOEMRE 2011)
- The simulation was **flawed in that it did not use the most accurate data set available from the well**... (NAS 2012)
- The **real-time data from the rig were being recorded but not monitored on shore**… (NAS 2012)
- The **regulatory community has not made effective use of real-time data analysis**… (NAS 2012)
- As a result, the **recorded flow data is believed to be unreliable** during this period… (DHSG 2011)

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What is the value of the organization's "data asset"?

Potential Applications

- Remote/isolated physical assets:
  - Limited pre-scheduled times for maintenance
  - Hidden damage causes costly delays
- Data-driven, self-aware physical assets:
  - Asset sensors & analytic capabilities selected from the outset to enable optimization
  - Asset performance & health continually
  - Continuous predictive insights that anticipate short and long term issues
  - Asset performance optimization over total lifespan
- Nanotechnology in paints/coatings/materials and acoustic fibers help detect vibrations

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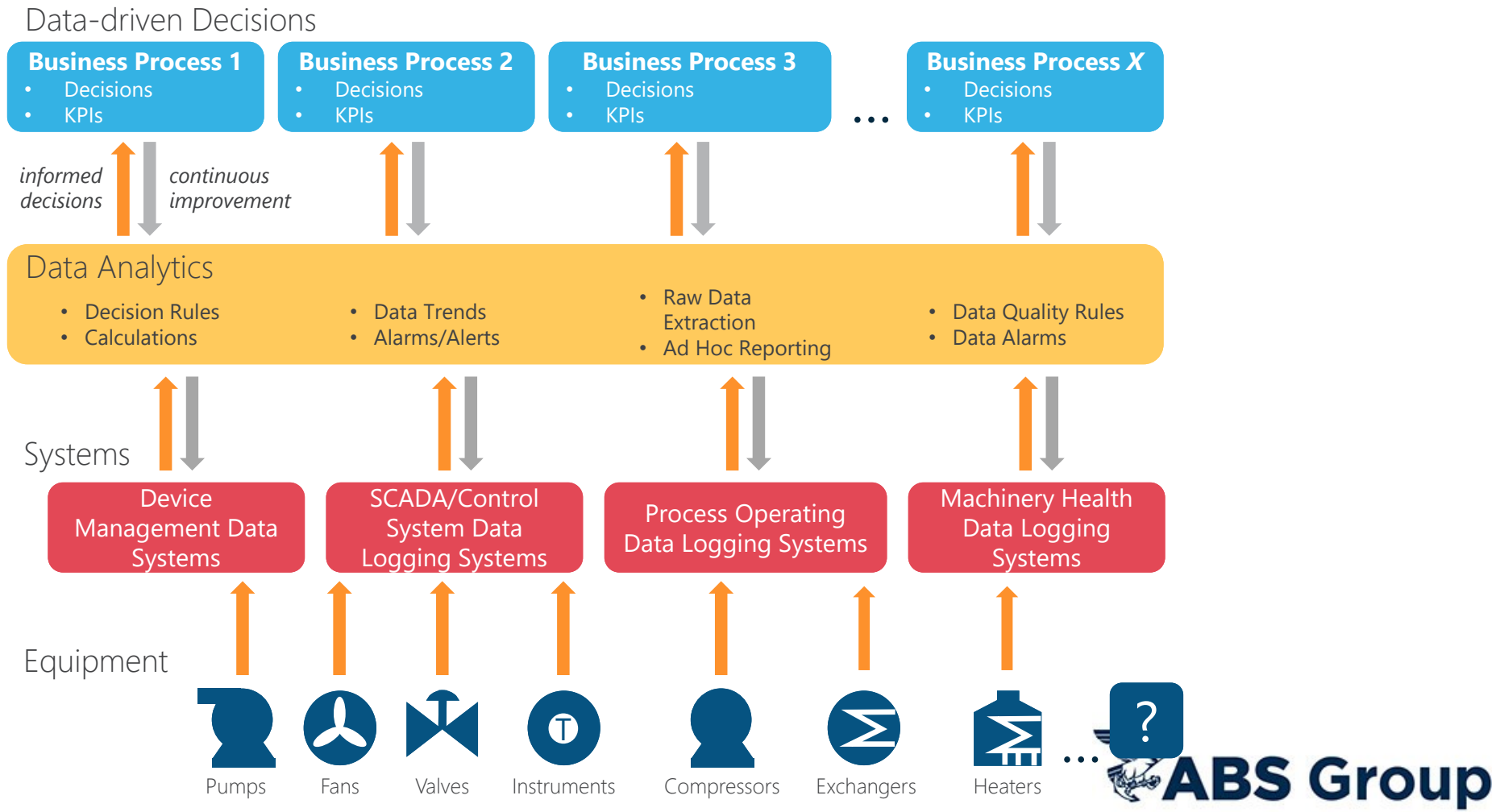
Data Quality Issues

- Data **accuracy** is the degree to which the data reflect reality.
- Data **precision** is the level of detail expressed in the data.
- Data **relevance** describes how closely data fit the purpose for which they are used
- **Volume** is the problem of having many records and/or fields in a dataset. The higher the data volume, the harder it can be to comprehend features of the data and the longer it may take for computers to process the data.
- **Variety** is the problem of data being inconsistently formatted or unstructured.
- **Velocity** of data occurs when new data are continually becoming available and, therefore, must be processed continually to be relevant.


Data-driven Decisions
Business Process 1
• Decisions
• KPIs
Business Process 2
• Decisions
• KPIs
Business Process 3
• Decisions
• KPIs
...
Business Process X
• Decisions
• KPIs
informed decisions
continuous improvement
Data Analytics
• Decision Rules
• Calculations
• Data Trends
• Alarms/Alerts
• Raw Data Extraction
• Ad Hoc Reporting
• Data Quality Rules
• Data Alarms
Systems
Device Management Data Systems
SCADA/Control System Data Logging Systems
Process Operating Data Logging Systems
Machinery Health Data Logging Systems
Equipment
Pumps
Fans
Valves
Instruments
Compressors
Exchangers
Heaters
?
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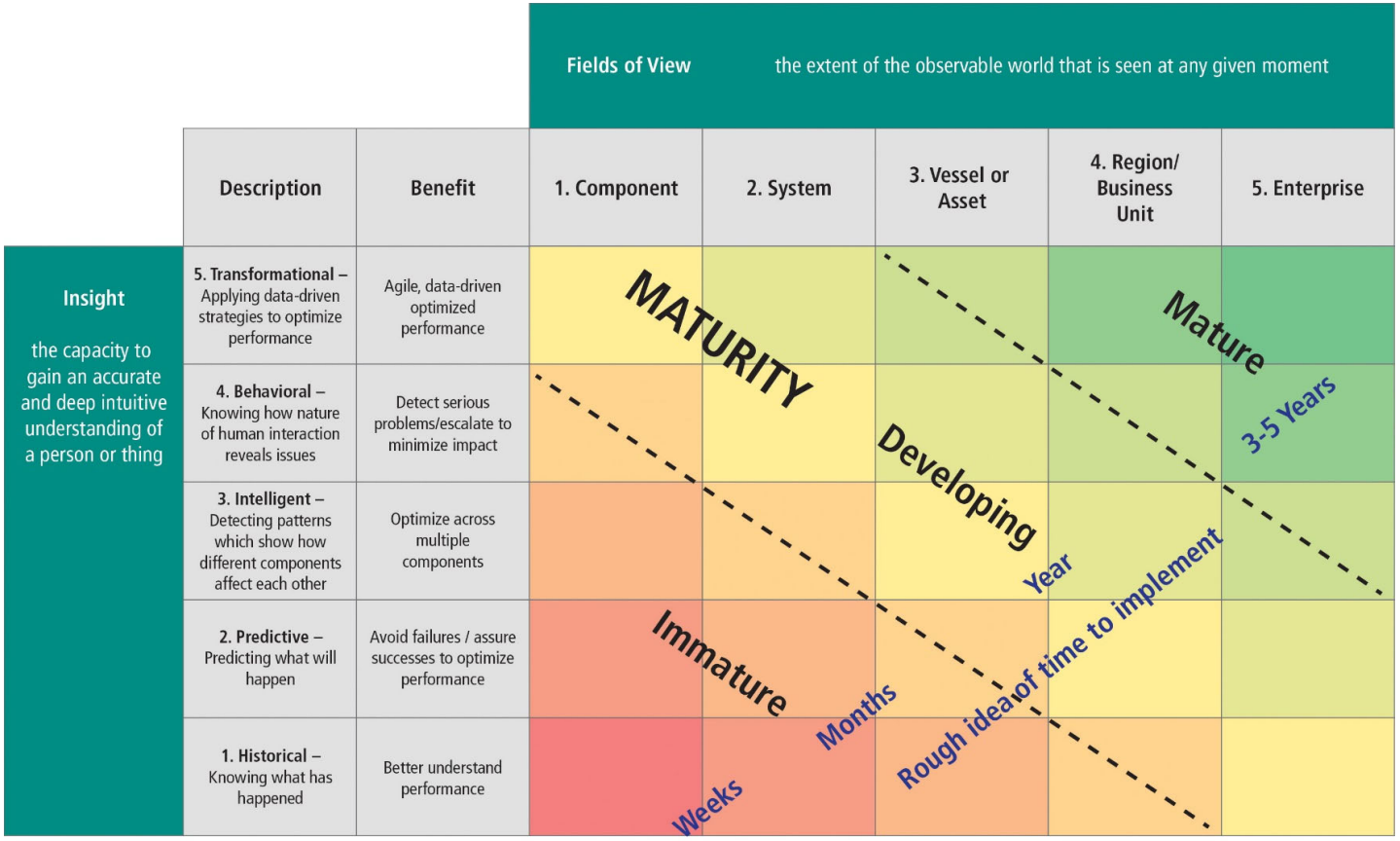
How to get started - Maturity Assessment



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Success Factors for Data Analytics (http://www.abs-group.com/Knowledge-Center/Insights/)

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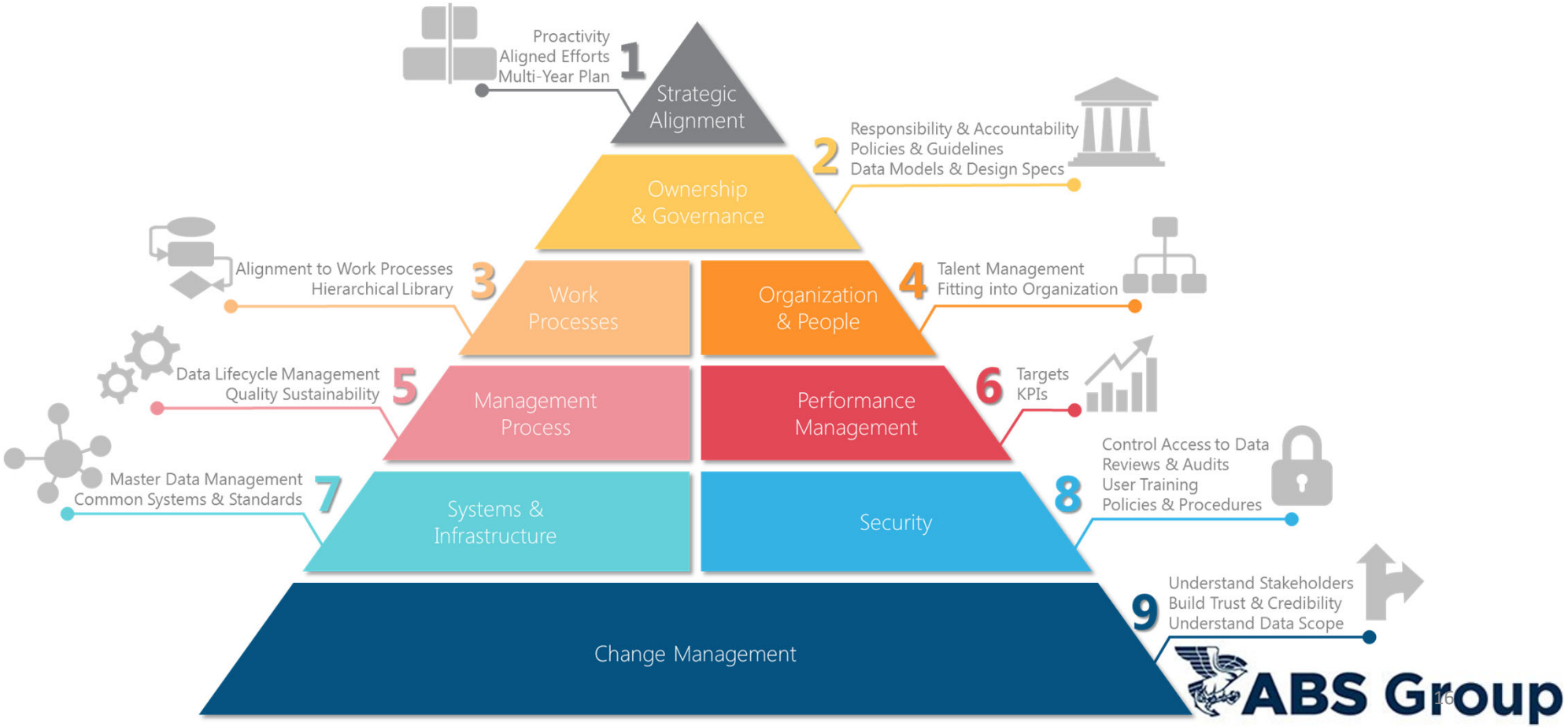
Success Factors for Data Management



Concluding Remarks

- Data Analytics
  - Benefits have the industry-wide potential to run into the billions of dollars per year
  - Applications range from basic equipment optimization to enterprise-wide asset performance improvement
- Data analytics and data management recognized as "good investment" vs. "cost of doing business"

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