NATO Modelling & Simulation Group | MSG-197 Symposium
Emerging & Disruptive Modelling & Simulation Technologies to Transform Future Defence Capabilities
20 to 21 October 2022

Data quality - the foundation for effective modelling & simulation

Simon ALBERT
Defence Support Group | Land
simon.albert@babcockinternational.com

Dr. Timothy M. KING
Digital Solutions | Nuclear
tim.king@babcockinternational.com


Creating a safe and secure world, together.

November 2014: "The regulator said **Network Rail** had completed less work than it planned to do, including maintaining the track, and said there was **a lack of reliable data** on what work it had done."

identification of data quality as a top-level corporate risk (including safety implications) → driver to implement ISO 8000

babcock

https://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-60654251

Derailment of a passenger train at Carmont, Aberdeenshire

Report 02/2022 (March 2022)
Rail Accident Investigation Branch

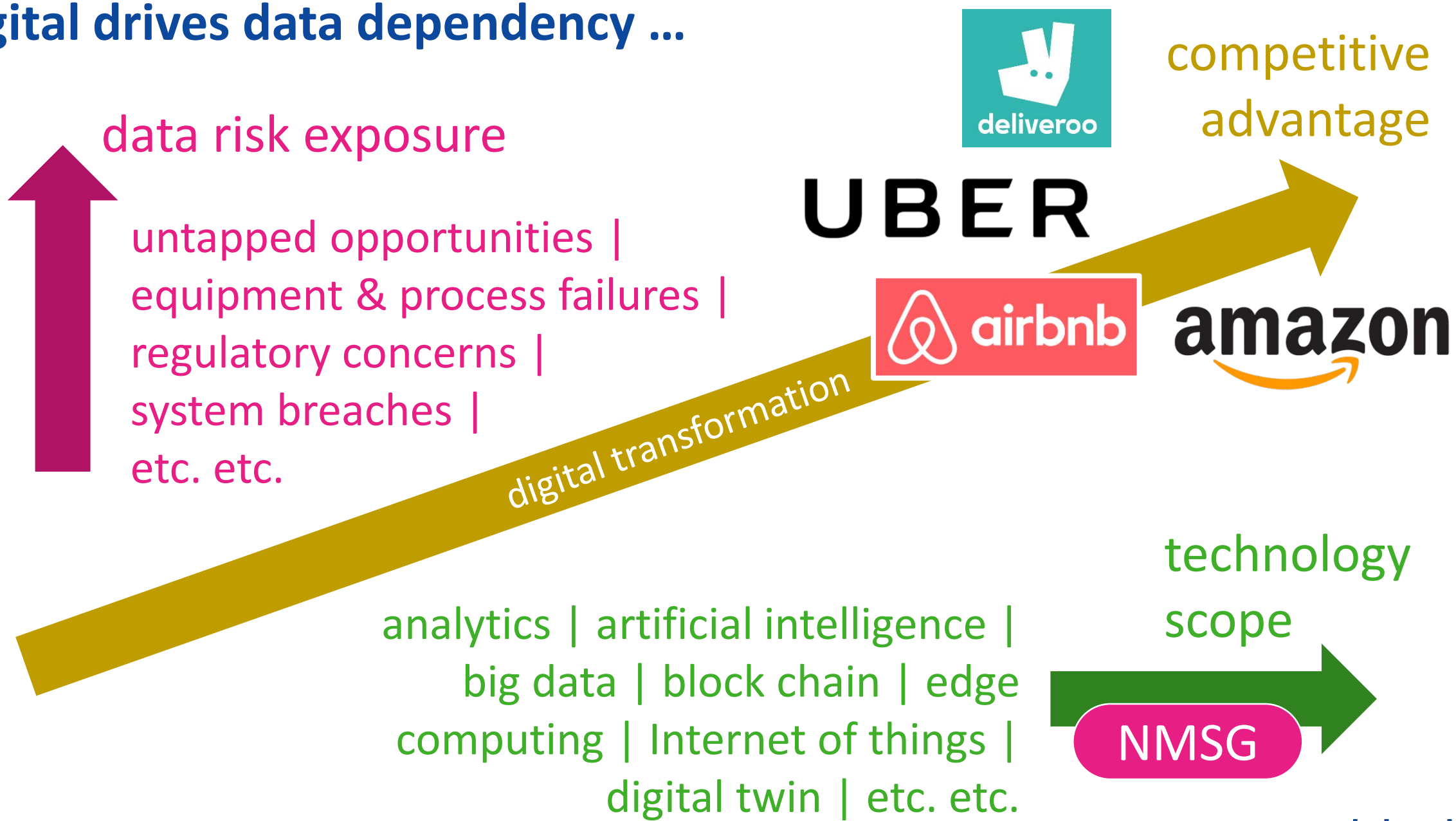
"[Some] information [for the] infrastructure maintenance database … was not … entered"

"… the Network Rail Weather Service (NRWS) … tool … was not used by controllers … because the NRWS had not been optimally configured … and controllers had not been provided with the procedures or training …"

data … technology … processes … people

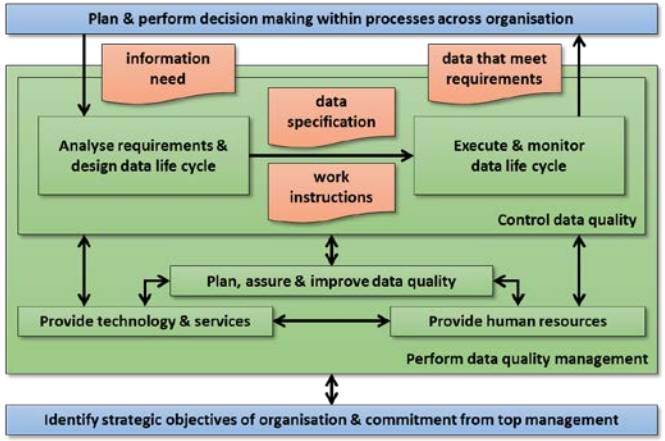
babcock

Digital drives data dependency …



babcock

Delivering a sustainable approach to data quality …



foundations

standards

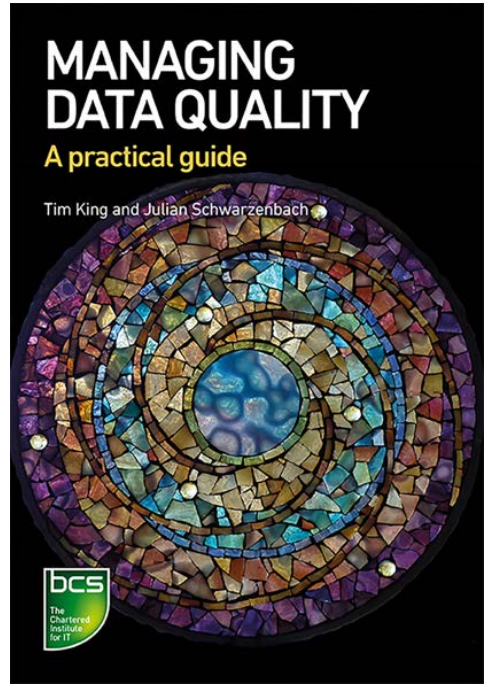
people, processes & technology

approach

guidance

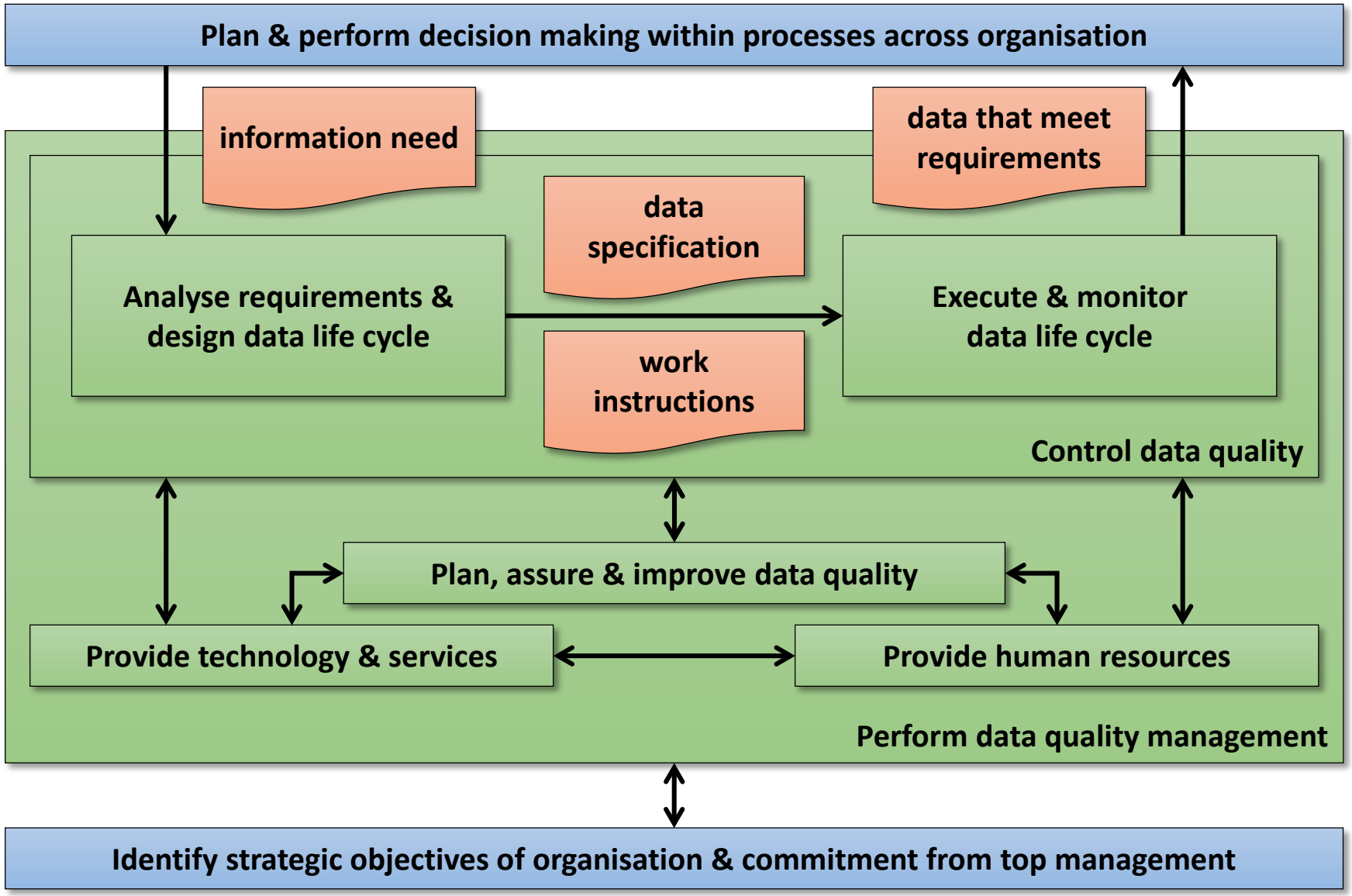
adaption

practicality



babcock

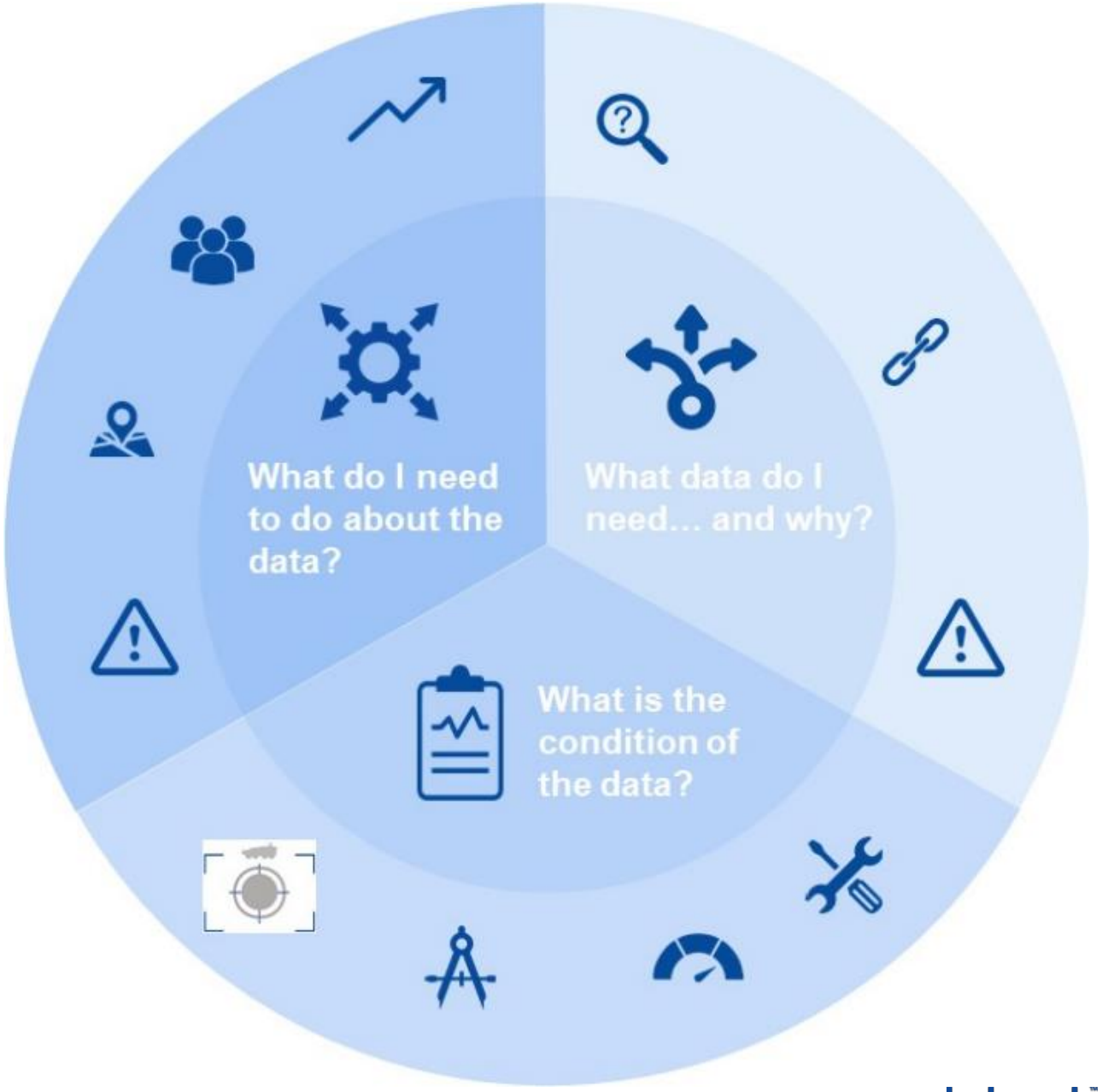
ISO 8000 … a framework for systematic, systemic data quality



- quality is conformance to requirements
- ultimate impact is on the decision-making capability of organizations
- proven by worldwide implementation across various sectors

Our derived approach …

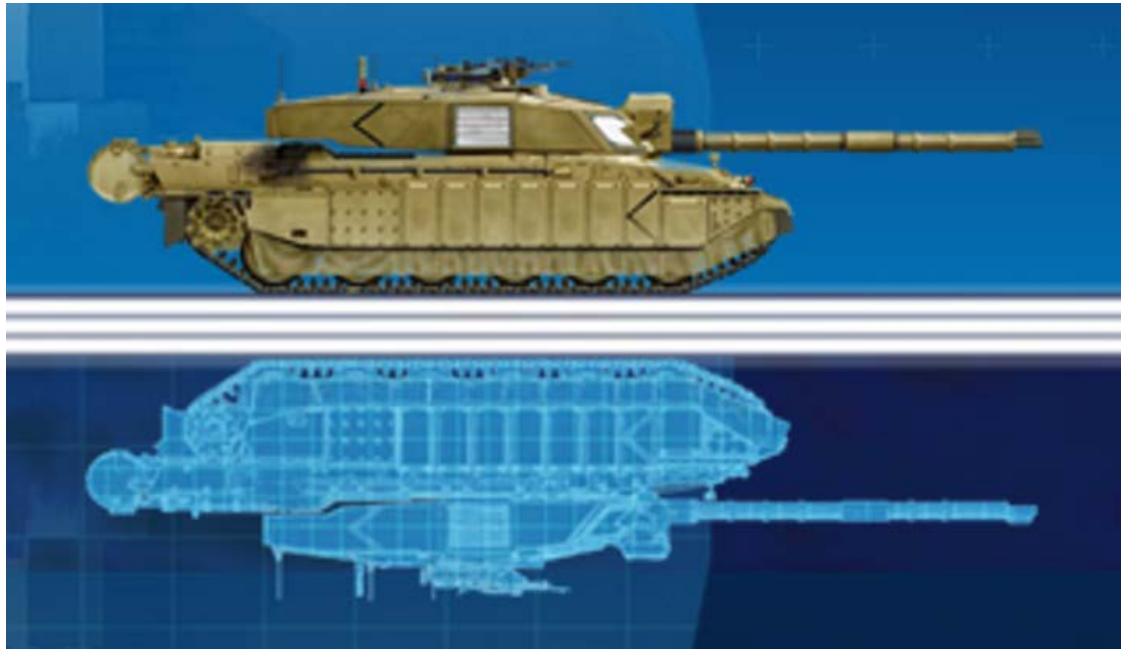
- a required investment of sustained effort to address the three core components of data quality
- the questions are able to give answers at different levels of detail as appropriate to the criticality of the data
- an iterative cycle
- proven with practical implementation …



Theme 1: Probability

Proposition: The likelihood of an information item having an impact on modelling and simulation is dependent on the condition of the item.

- critical inter-dependence between asset management (ISO 55000) and data quality (ISO 8000)
- using data for modelling & simulation drives improvement in data quality
- no data set is perfect
- the causes of issues, and the levers for improvement, cover people, process and systems



syntactic, semantic and pragmatic quality

Theme 2: Impact

Proposition: The importance of an information item is determined by the organizational need and is, therefore, always relative.

- understanding of data flows: different data has different value to different users at different times
- a data architecture framework: informs interventions
- early, proactive intervention to lay solid foundations for enduring, through-life outcomes and benefits

"What costs money are the 'unquality' things"

Theme 3: Mitigations

Proposition: Interventions need to be scoped, prioritized and implemented by using a programmatic approach.

- digital twins exploit extensive modelling & simulation capability but put further demands on data quality
- previous technology approaches are potentially unable to meet these data quality requirements
- investment mitigates the risks but requires effective management

"All models are wrong; some are useful"

Our conclusions

Value

- data quality underpins delivery of organizational performance
- insight & foresight for decision making
- data needs to be treated as an asset

Systematic

- hazards are inherent in data sets
- resources are constrained
- take a programmatic approach

Systemic

- common challenges but unique needs
- proportionate and relevant interventions
- foundation for digital transformation

data quality is not an end point but a journey of continual improvement

babcock

babcock™

Questions?