Golden thread of Data – Integrating Project Controls

Abhi Datta
Turner and Townsend

1. Introduction and Context

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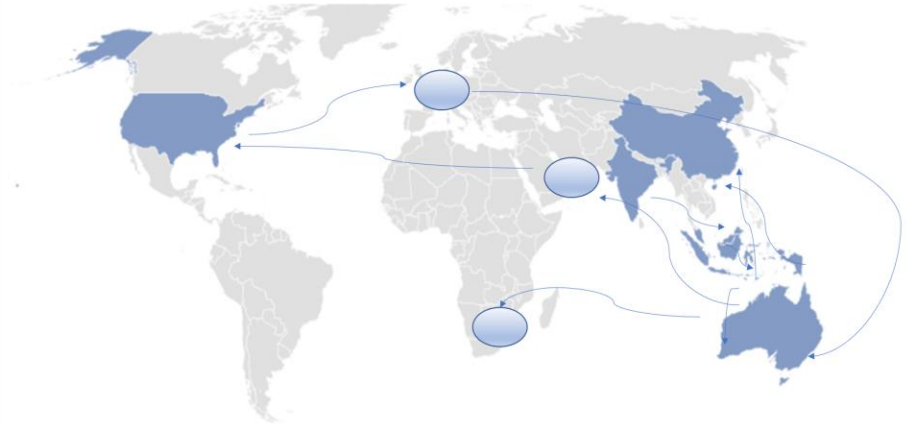
Project Controls EXPO

Abhi Datta

- Civil Engineer, Program Strategy, Program Project Controls (Asia, Europe, North America, Middle East Australia): Rail, Airports, Mining, Oil and Gas
- Performance Improvement
- Leading teams

Contractor ⟷ **Owners Team**



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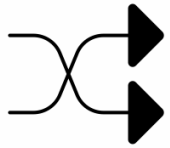
Why are we here – cutting through bias and opinions



- **Project controls we knew 5 years back is changing**

- **Data driven decision making is still not prevalent in mega projects**

- **How does it impact Mega project outcomes?**

- **What are some the actions that we can take?**

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Reflections on Data

Jim Barksdale, the former CEO of Netscape once said "If we have data, lets look at data. If we all have opinions, lets go with mine"

Outside bottled water, we didn't know in the past that strawberry Pop-Tarts increase in sales, like seven times their normal sales rate, ahead of a hurricane,' Ms. Dillman said in a recent interview.' And the pre-hurricane top-selling item was beer.*

"Never let truth get into the way of a good story"

How data drives outcomes

DATA-DRIVEN DECISION-MAKING—PATHWAY TO GAINING THE COMPETITIVE ADVANTAGE

In his article in *Harvard Business Review* (*HBR*), Walter Frick (2014) refers to the 2012 report by Andrew McAfee and Erik Brynjolfsson in *HBR* that highlights the benefits of data-driven decision-making, "Companies in the top third of their industry in the use of data-driven decision making were, on average, 5% more productive and 6% more profitable than their competitors." To reinforce his stance, Frick further quotes comments from McAfee's other post on HBR, "Data and algorithms have a tendency to outperform human intuition in a wide variety of circumstances." Also, the data-driven approach minimizes the risks generally associated with the process of making decisions.

2. Attributes of Megaprojects

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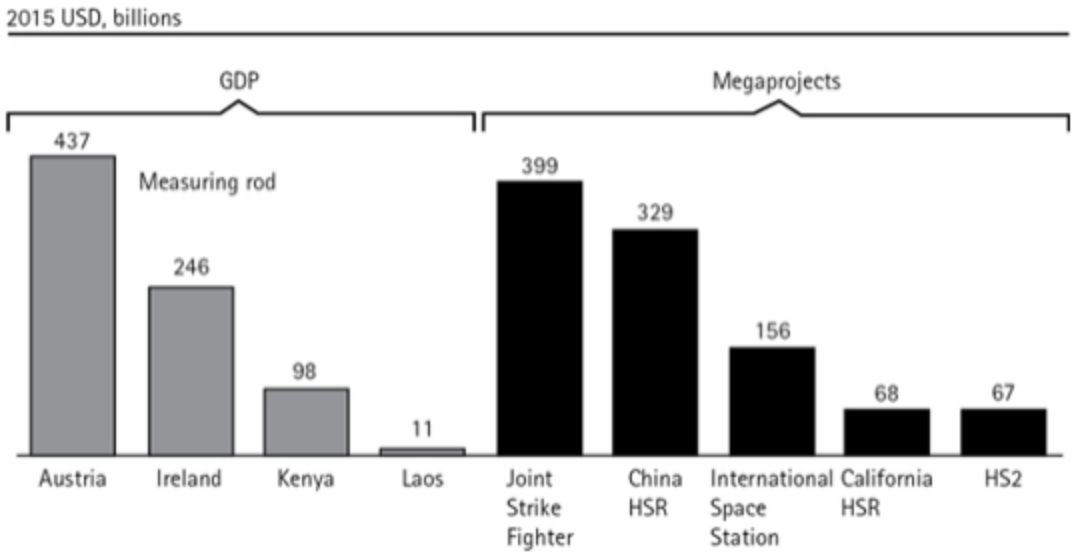
Why is it relevant to Mega Projects

Megaprojects are a different breed of projects due to their complex characteristics. They are not just larger projects. Mega projects are large-scale, complex ventures that typically cost $1billion or more, take many years to develop and build, involve multiple public and private stakeholders, transformational, and impact millions of people

Mega Projects vs GDPs



14 SEP QUANTITY HAS A QUALITY OF ITS OWN: STRENGTH IN NUMBERS

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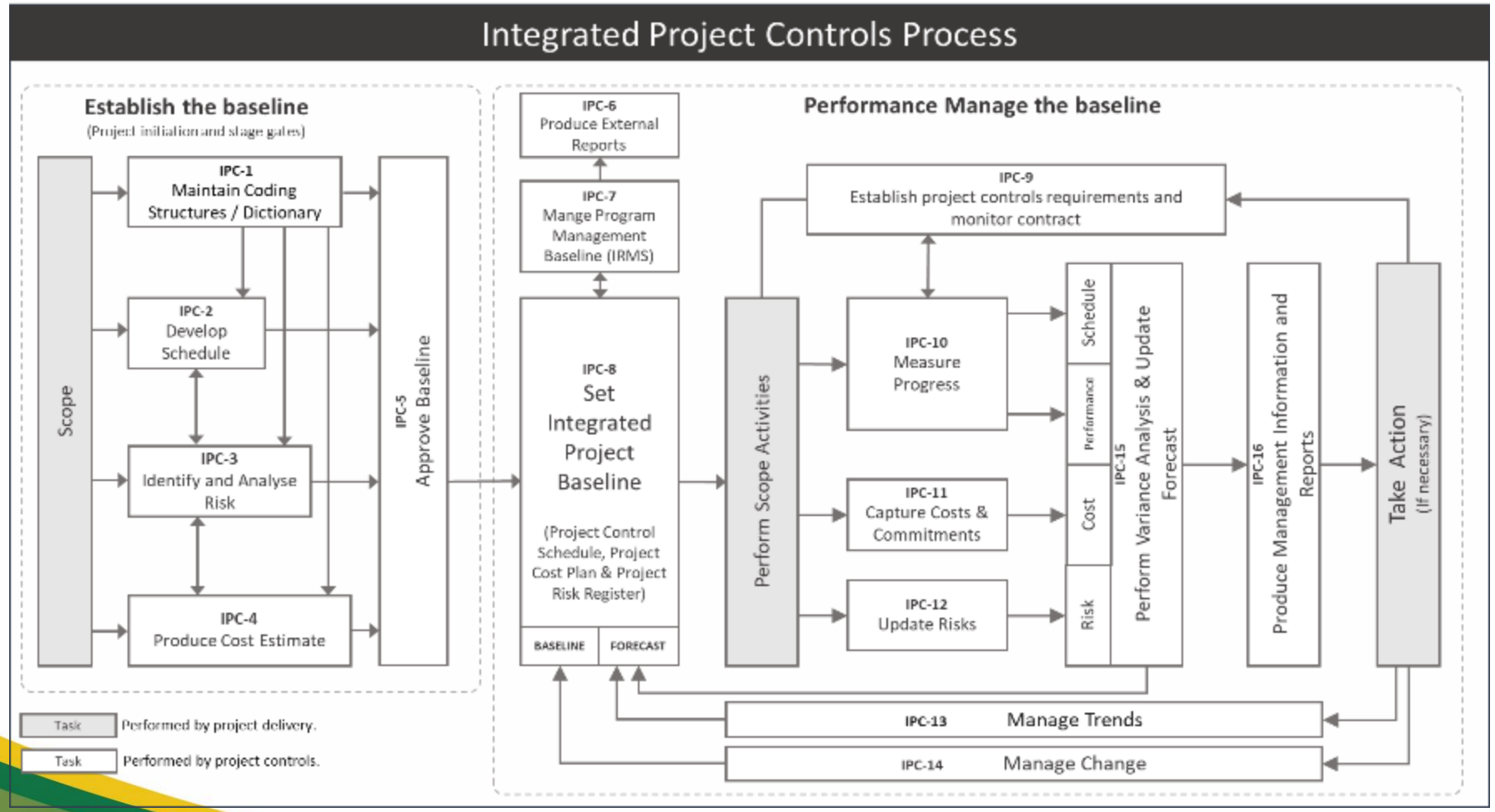
Golden Thread of data - Integrating Project Controls?



Scope definition guides project control effectiveness; same applies to data driven decision making

3. Strategic considerations with case studies

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What decisions are taken on a project or program and how?

To undertake the project or not?

To move from one stage to the next or not?

To hire or not hire a project human resource?

To select a best supplier from alternatives

To approve or reject a change request

To approve or reject a deliverable

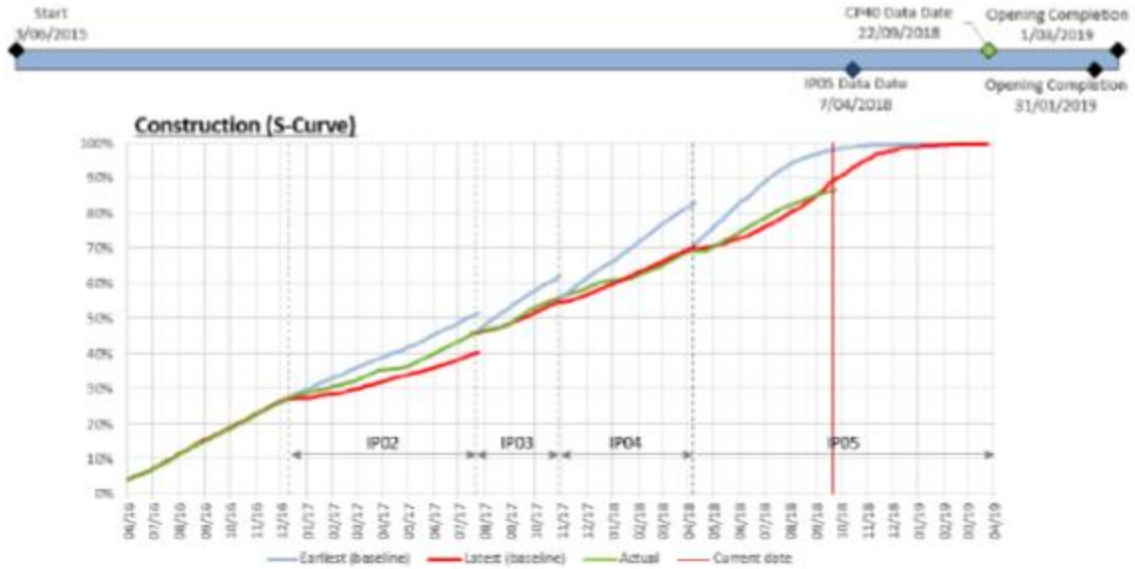
What contracting strategy is to be used on the project?

Optimism Bias or misrepresentation?

Megaprojects suffer from optimism bias as its project team consistently underestimate costs

and overestimates benefits.

They fail to learn from their mistakes despite the increased number of projects and researchers claiming the presence of optimism bias leading to a ‘performance paradox.’



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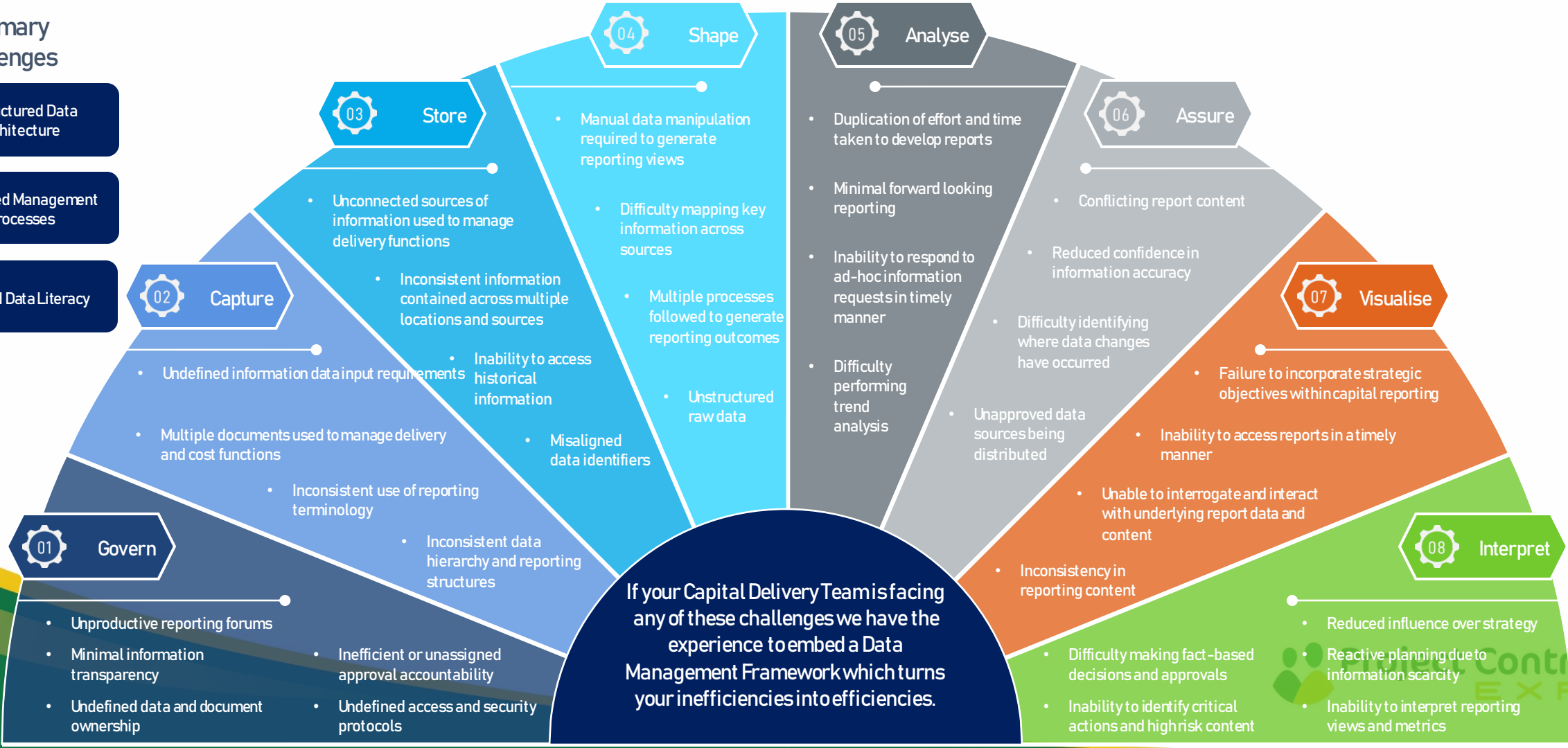
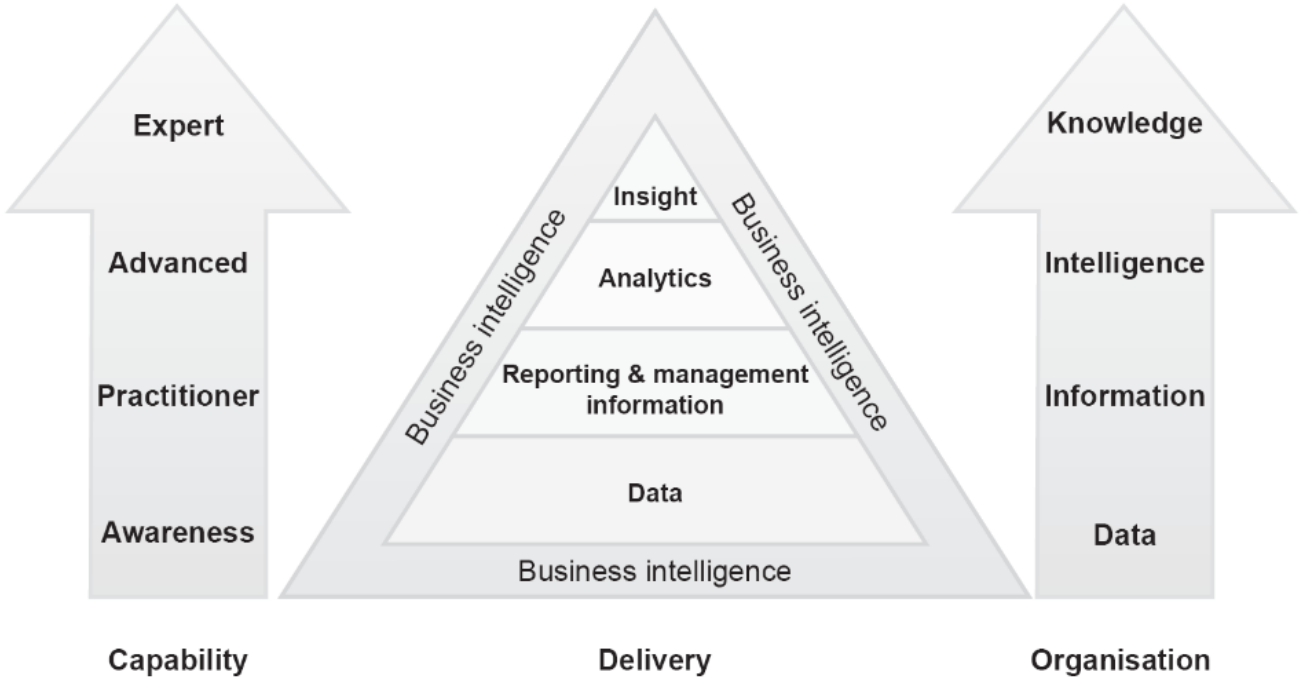
Data which supports capital delivery is becoming both more accessible and essential in business decisions, however there are a number of typical challenges which lead to inefficiencies and reduced confidence

3 Primary Challenges

- Unstructured Data Architecture
- Undefined Management Processes
- Limited Data Literacy





"Information is a source of learning. But unless it is organized, processed, and available to the right people in a format for decision making, it is a burden, not a benefit."

—William Pollard (1828–1893), English Clergyman

Relevance - alignment to, and support for, the corporate strategy (or vision, if there isn't a strategy);

Awareness - staff know it exists, and where to locate it;

Value – in terms of both its usefulness and impact

Execution – the ease in being able to apply it to deliver a positive outcome

Some principles for Project Data strategy

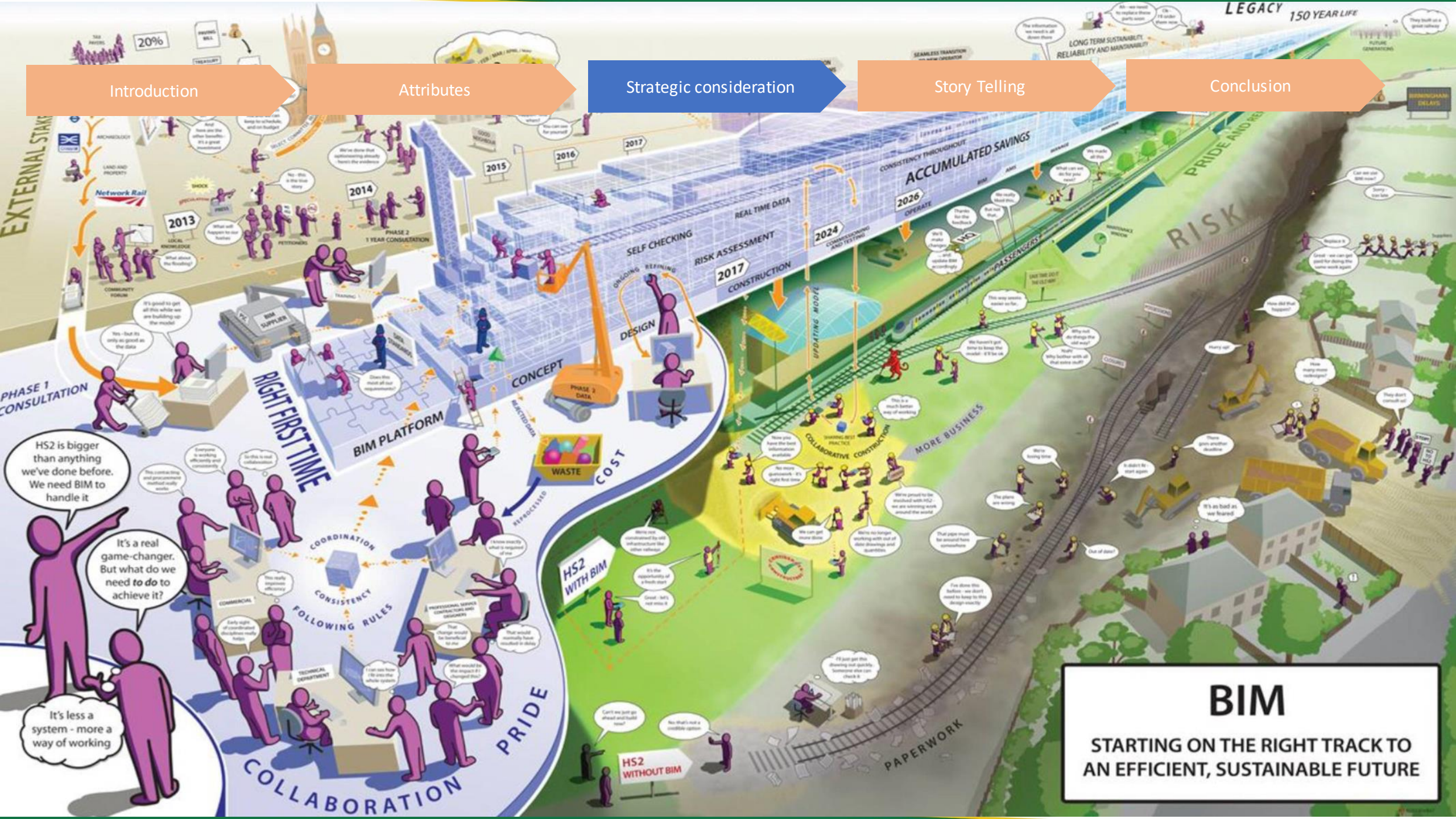
- Data is enabling project decision making
- Data source can be tracked and trusted
- Data has good quality
- Data is managed across different functions
- Data is secure
- Data is available to relevant decision makers

Components of a data strategy

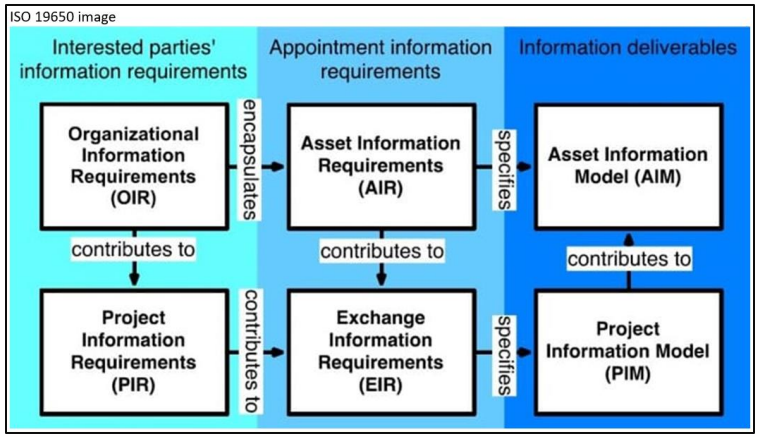
There are some key elements you would expect to find in a data strategy:

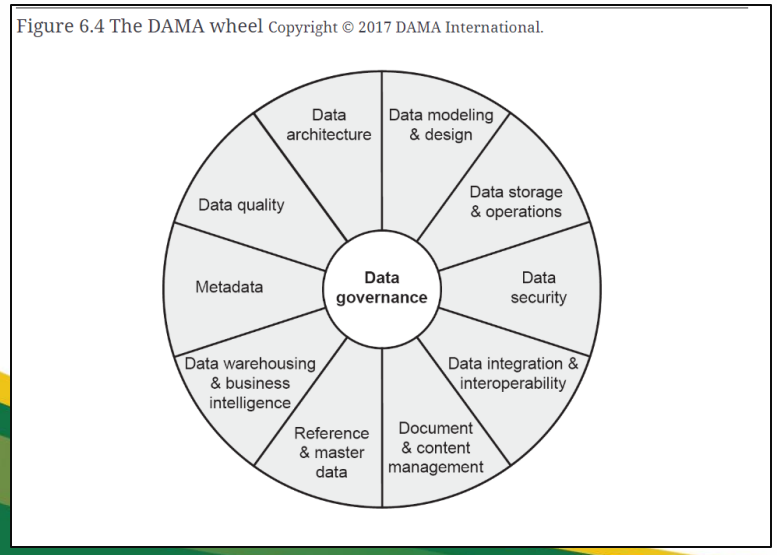
- a strong data management vision;
- a coherent business case to support investment (even if that is just resources within the organisation, these still come at a cost);
- some guiding principles, values and alignment to the corporate vision;
- clearly articulated goals related to data;
- evaluation criteria and metrics to track success;
- clarity on the data strategy programme vision to be delivered;
- clarity of roles and responsibilities.

Introduction | Attributes | Strategic consideration | Story Telling | Conclusion



Data standards and interoperability





- **Common data standards are essential to effective data governance and are the lynchpin of the data management capability**
- **Data must be structured in a way that sources are known , defined, secure but accessible as needed to utilise it**
- **Data quality is the essential standard to certify that data is reliable to use or highlight deficiencies**
- **A Red Amber Green indicator for data source and quality can be used to show the data quality**

'You can have brilliant ideas, but if you cant get them across, your ideas wont get you anywhere'
Culture Eats Strategy for Breakfast

4 categories of cultural barriers

- Values and beliefs
- Cultural ethnocentrism
- Impact of change on individual
- Cultural norms

How to communicate the Data Strategy?

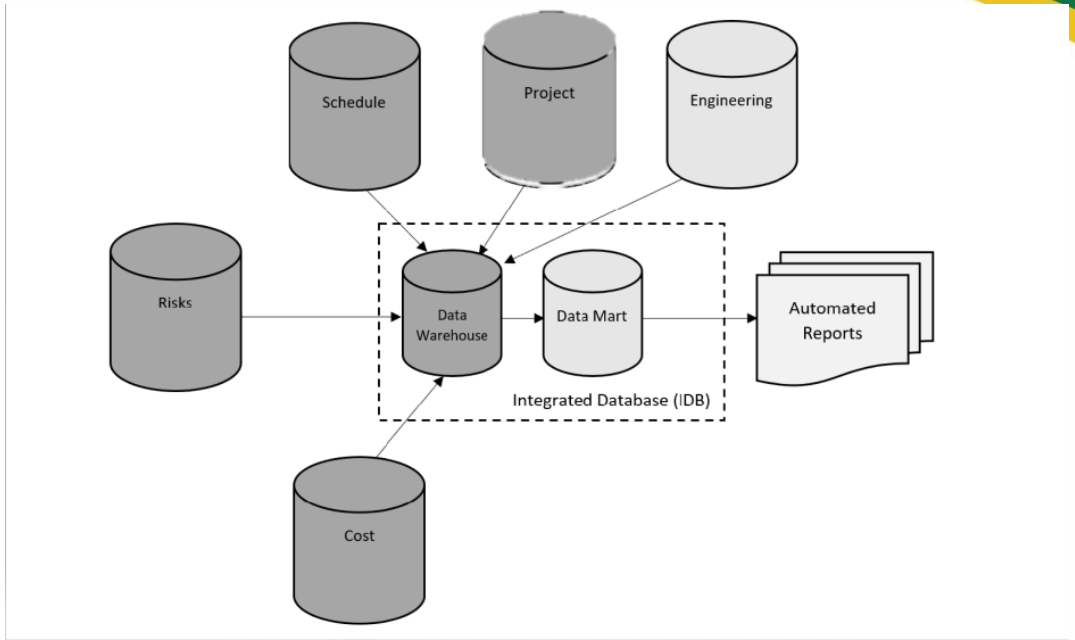
- **Context** – why a data strategy, what is its alignment to the corporate strategy, why now and what it is seeking to achieve
- **Scope** – be clear on what is to be delivered, by when and how
- What is required to deliver it – **resources, dependencies, sponsorship, accountabilities**
- **When** it will be achieved
- **The value** it is expected to deliver
- **How** is information exchanged within projects?

Case study 1 - Data storage rather than strategy – very static

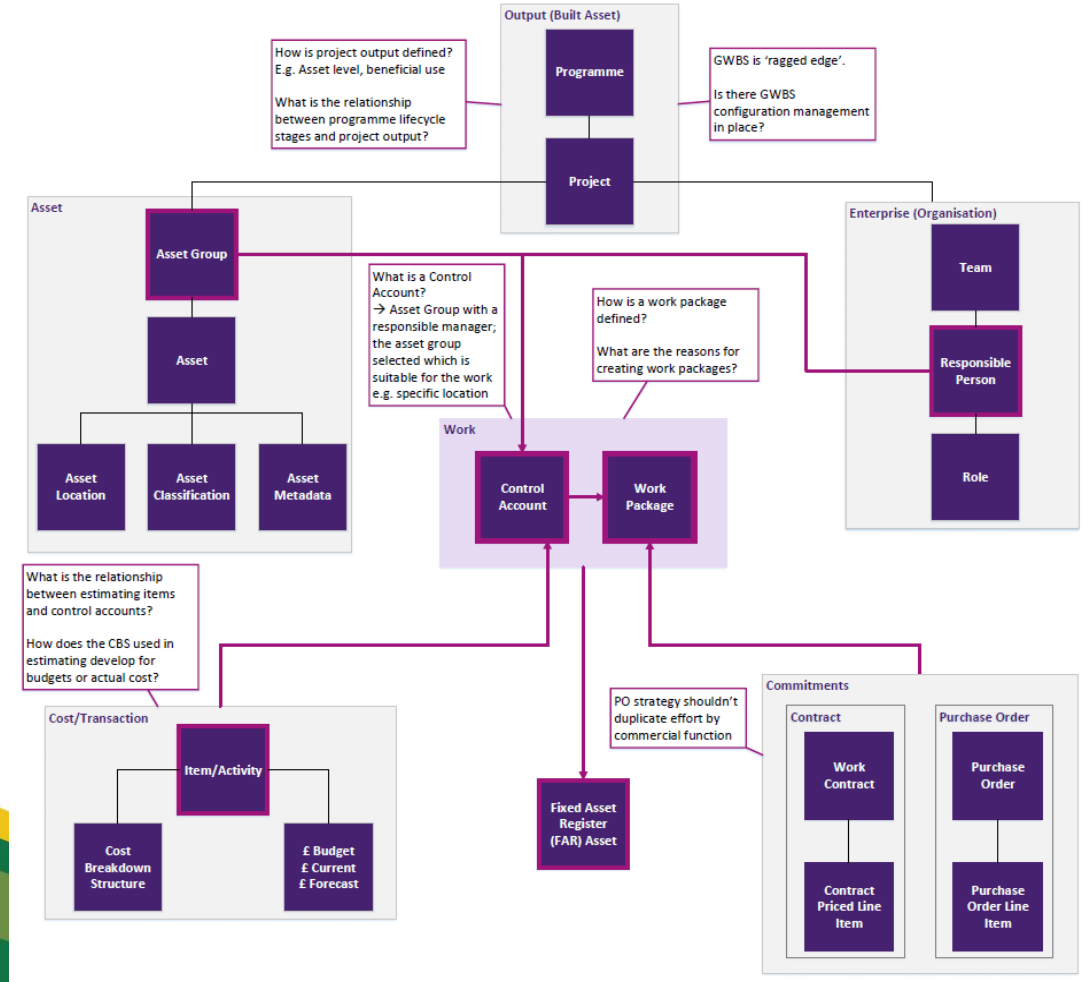
A historical database allows project teams to create standardized reports on key performance indicators, trend metrics over time, and analyse the data to observe common trends in project performance

There are many challenges to overcome in the development of an integrated database: establishing data input standards; maintaining the data quality; establishing and maintaining the necessary data security; resolving database errors in a timely manner; and developing effective metrics.

Integrated Data Base (IDB), was originally intended to be used to provide a single source of truth for project data related to that work. By 2019, the scope of the database expanded to include all projects executed by the client and include nearly all data areas relevant to project management. The IDB now consists of multiple databases that together integrate data from a large number of internal systems, including Oracle's Primavera P6 for schedule data, Hexagon's EcoSys for cost data and TIBCO's EBX for additional project information, risks, actions and issues.



Case Study 2 - Focus is on integrating systems – without a holistic view on data strategy



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Case Study 3 – Excellent documentation

- An excellent strategy document sitting on the shelf

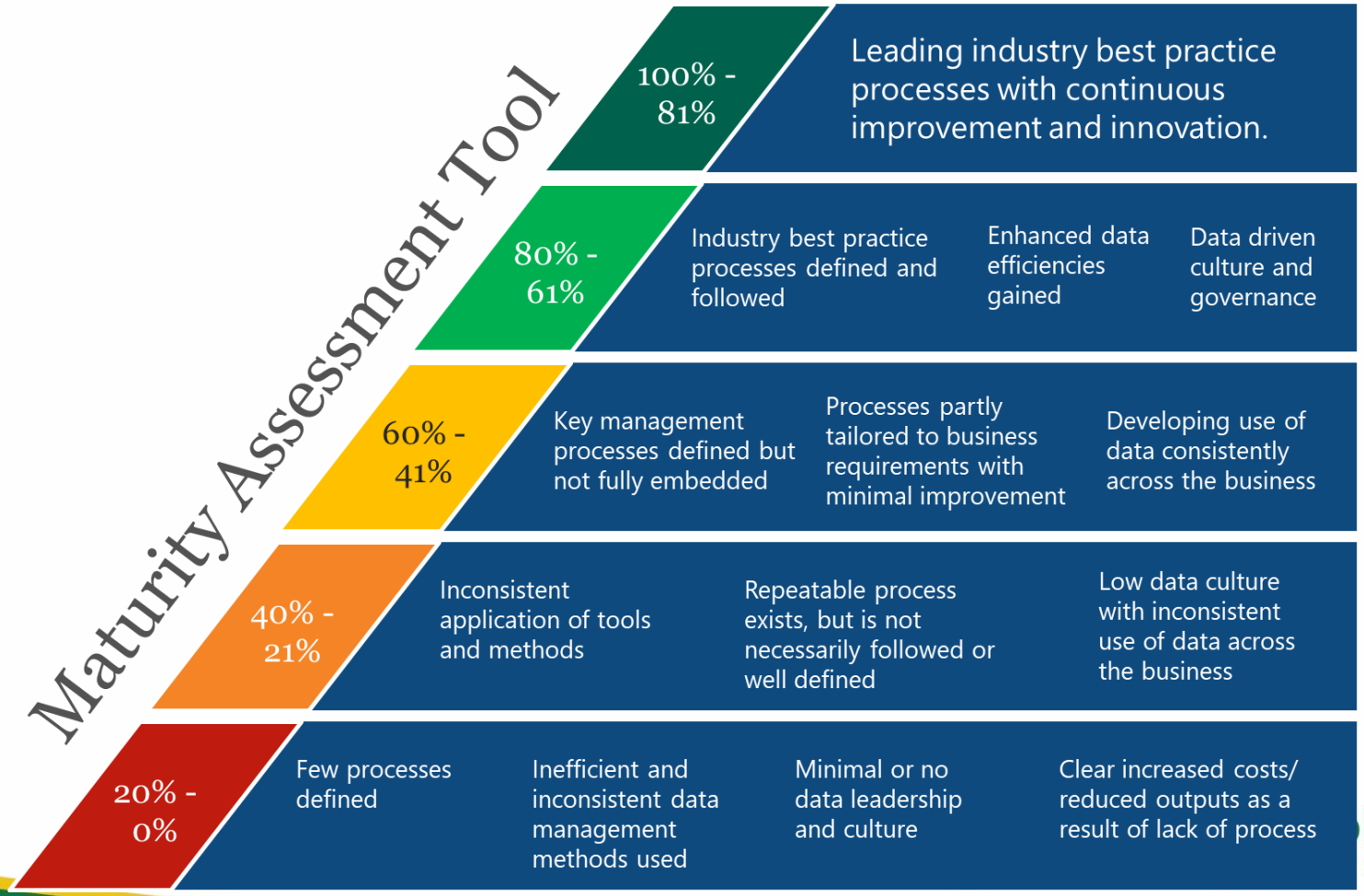
Assessment scorecard to identify key areas for improvement across 8 primary categories per the data management framework is generated based upon information provided through interviews and workshops

Assessment Considerations

1. Ratings given against 34 assessment areas
2. Ranging between 4 and 5 assessment areas for each category
3. Ratings a given from 0-10 based upon the maturity assessment criteria illustrated
4. Assessment is concluded upon based domain knowledge
5. Information captured from interviews and workshops drives assessment outcomes.

Output: Data maturity assessment report card

Benefit: Identify highest priority improvement opportunities



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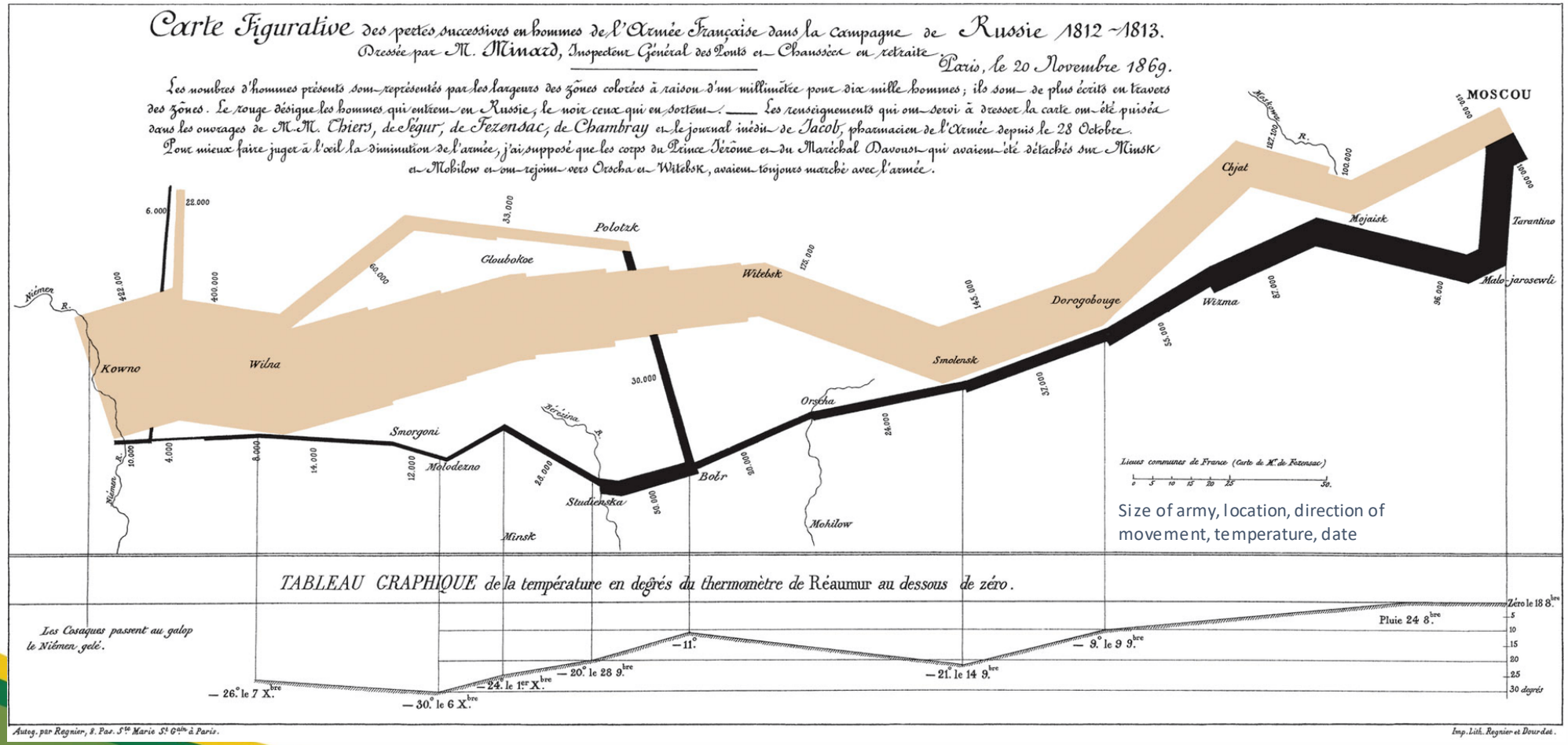
Story telling with data



Size of army, location, direction of movement, temperature, date

Visualization by: Charles Joseph Minard, 1869

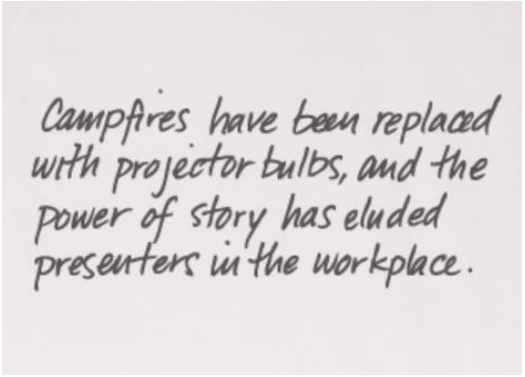
Dashboards and art of story telling

Importance of Effective Data Reporting

Data storytelling is the ability to effectively communicate insights from a dataset using narratives and visualizations. It can be used to put data insights into context for and inspire action from your audience

Psychological Power of Storytelling

- Storytelling has come a long way since the days of cave paintings, but its psychological power still holds true
- When someone hears a story, various parts of the brain are engaged:
  - Wernicke's area (language comprehension)
  - The amygdala (emotional response)
  - Mirror neurons (empathy)
- When multiple areas of the brain are engaged, the hippocampus (short-term memory storage), is more likely to convert the story into a long term memory
- Rather than presenting your team with spreadsheets of numbers and data, consider engaging various sections of their brain.
- Using data storytelling, you can evoke an emotional response on a neural level that can help your message be remembered and acted upon



Harvard Business School, 2021


Presentations today are boring because there is nothing interesting happening. They have no contrast and hence, interest is lost.

The clock is ticking on Long Island

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Why Controls (through Data integration) is the Golden Thread?

Data

Outcome Metric	Project With Integrated schedules	Projects Without Integrated Schedules	Correlation Significance
Absolute Cost (Cost Index)	Avg: 0.96 SD: 0.19	Avg: 1.02 SD: 0.20	t = 2.4 P>|t| = 0.02
Percent Schedule Slip	Avg: 8% SD: 31%	Avg: 26% SD: 60%	t = 3.3 P>|t| = 0.01

Outcome Metric	Project That Applied CPM	Projects That Did Not Apply CPM	Correlation Significance
Percent Cost Growth	Avg: 0% SD: 16%	Avg: 6% SD: 25%	t = 3.1 P>|t| = 0.01
Percent Schedule Slip	Avg: 14% SD: 48%	Avg: 26% SD: 54%	t = 2.2 P>|t| = 0.03
Absolute Cost Performance (Cost Index)	Avg: 0.97 SD: 0.21	Avg: 1.02 SD: 0.21	t = 2.2 P>|t| = 0.03

Research

- **IPA reported that "good Project Control practices reduce execution schedule slip by 15%. Project Controls cost range from 0.5% to 3% of total project, (including cost accounting), therefore, to break even, Project Control needs to improve cost effectiveness by around 2%."[3] Another study conducted by the IBC Cost Engineering Committee of IPA around the same time frame, showed "cost improvements for the projects in the study were more than 10%. It is noted that Net Present Value also benefits from schedule improvements."**

- **Scope creep**
- **Insufficient project tracking** such as milestones, budget and resources;
- **Poor communications** including a. No clear communications pathways or structures b. Frequency of communications are unplanned c. Lack of communicating critical information
- **Poor planning** Risk planning, Schedule planning Strategic planning , Assumption

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Gap between Knowing and doing is greater than the gap between ignorance and knowledge.

This emphasizes the importance of measuring performance at each project stage

The first step towards addressing the knowing-doing gap is to acknowledge that the gap is real. The knowledge-doing gap is evident in the case of megaprojects as they suffer from a performance paradox where the project team fails to learn despite many opportunities to do so.

Australian context

Rail, road projects with big cost overruns could be reassessed post-COVID *(media update 9th Nov 20)*

Mega transport projects around Australia have suffered cost overruns of $34 billion over two decades and will not provide a post-pandemic stimulus salvation, a new report from the Grattan Institute says. The report shows that six projects across Australia are responsible for $24bn of the $34bn in cost overruns since the beginning of this century. It warns the recent rise of $2bn mega projects has now been replaced by “mega projects” worth $5bn or more, causing construction capacity constraints. Led by Grattan Institute’s Marion Terrill, the report calls for an audit of mega projects around the country, new rules to force a continuous disclosure of costs to parliaments, and public project reviews to provide lessons for future builds.

NORTH EAST LINK (2021 – 2027)

In 2008 the then-Brumby government said a new link to connect the M80 and the Eastern Freeway should be built, and would cost $6bn. Eight years later, the Andrews Government said it wanted to proceed with the mega-project, which would cost $10bn. Costings for three route options were revealed in 2017, and were estimated at $7bn-$23bn. The chosen route was estimated to cost $16.5bn – which has since revised down to $15.8bn after a business case was completed.

WEST GATE TUNNEL (2017- 2023)

In 2016 a deal between tolling giant Transurban and the Andrews Government was signed for a $5.5 billion road between the West Gate Freeway and CityLink, as well as a Port of Melbourne link. When a final contract was signed it was a $6.7 billion project, and has been plagued by delays due to contaminated soil that are likely to add at least another $1 billion. Legal proceedings are ongoing over who pays.

Australian context

INLAND RAIL (2018 – TBC)

The 1700km freight railway line connecting the ports of Melbourne to Brisbane was initially flagged as a $4.4bn project in a 2010 report by the Australian Rail Track Corporation. In 2015, a full business case showed a likely cost of $9.9bn. Infrastructure Australia assessed the benefit cost ratio at 1.1 and said “an increase in project cost could have a significant impact on the final BCR”. Proponents of a different route say it could end up costing $16bn.

SUBURBAN RAIL LOOP (2022 – TBC)

Described in the Grattan Institute report as an egregious example of a large project being announced without appropriate scrutiny, it will be Australia’s most expensive transport infrastructure project but was announced with little scrutiny, three months before a state election. Slated as a 90km loop connecting Cheltenham in the southeast with Werribee in the southwest, built over 30 years, costing more than $50bn.

MELBOURNE METRO RAIL TUNNEL (2018 – 2025)

The $11 billion project began construction in 2018, and the Auditor-General noted that early works cost $150 million more than anticipated. Last month, a deal was struck between the project builders and the Andrews Government to pay for $1.5-2bn in blowouts. The state is expected to pick up the largest share of the extra costs and more claims could still be made by the consortium.

- Convey the message that Data Strategy and Project Controls are inherently linked
- Have executive buy in
- Focus on data driven decision making; 'data share' maybe before every meeting?
- Integrated controls with data strategy
- Culture of data and controls; focus on data capability
- Knowing Doing Gap awareness

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