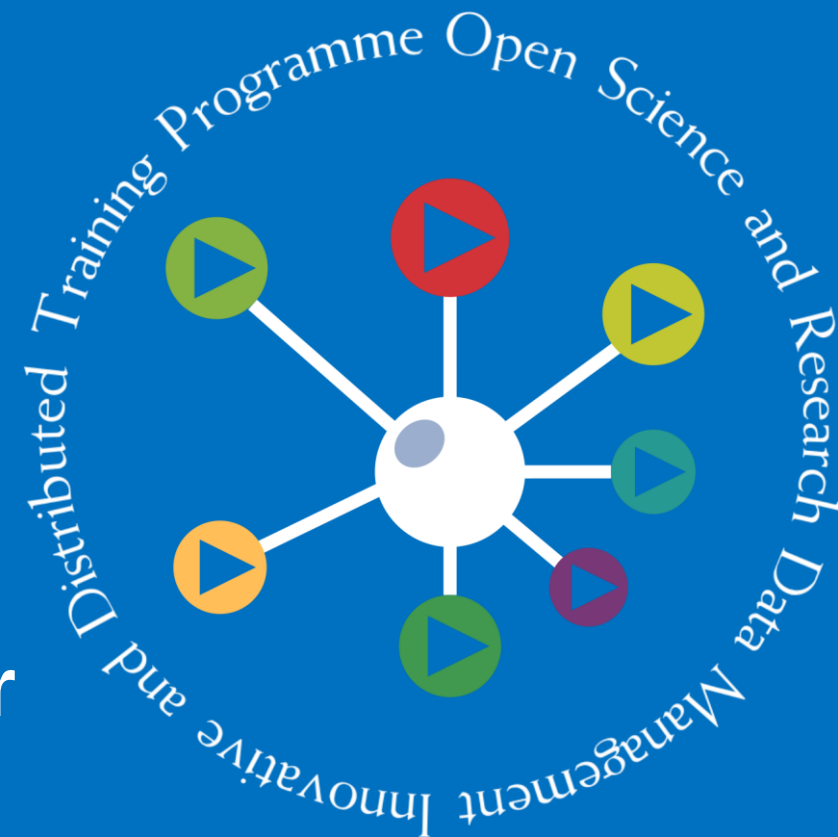


Day 3, Topic 2

Data Governance and Management

This module is part of the training session “TrainRDM Training week for PhD”, Bucharest



National College of Ireland, Dublin Ireland

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Introduction, Concepts, Rationale

Part I



Aims of presentation

- ✿ Provide overview of DGM section of Data Governance and Ethics module (normally 6 contact hours)
- ✿ Introduce DGM Concepts and Definitions
- ✿ Provide DGM Rationale and Goals
- ✿ Show strategic overview of DGM (who, how, what etc)
- ✿ Illustrate DGM building blocks
 - ✿ Roles and responsibilities
 - ✿ Operating Model
- ✿ Explain implementation method (using Ladley model)
- ✿ Consider DGM in a research organisational context
- ✿ Consider how to get getting your students involved with DGM

Overview of DGM section



Topic	Lecture Topic	Lecture Detail
1	Data Governance and Data Management I	Data governance and data management; Data management principles; Data lifecycle; Data quality; Data provenance; Data integrity and security
2	Data Governance and Data Management II	Data governance frameworks; Data governance within the DAMA Wheel; Policies, principles, rules, procedures, and standards; Data governance operating models and tools
3	Data Governance and Data Management III	Roles and responsibilities; Maturity levels; Ladley's 8-phase implementation process for data governance; Data risk identification and management

What do we mean by corporate governance?



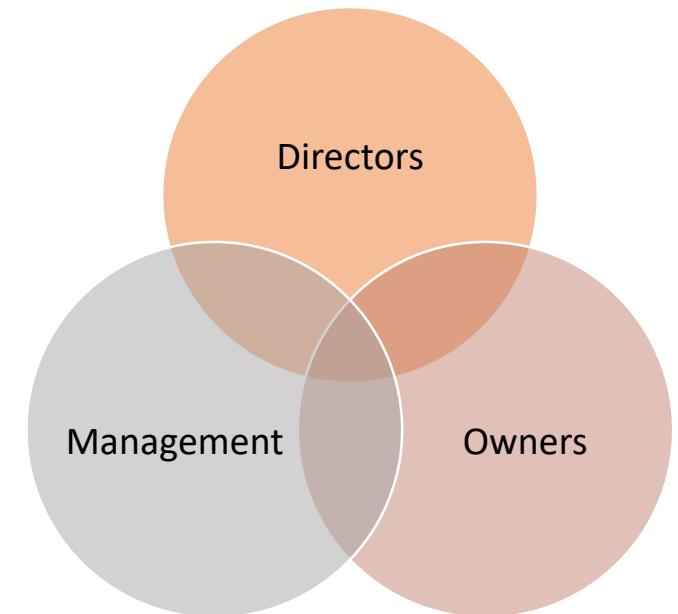
Corporate governance is the structure of rules, practices, and processes used to direct and manage a company.

A company's board of directors is the primary force influencing corporate governance.

The basic principles of corporate governance are accountability, transparency, fairness, and responsibility.

Corporate governance goes beyond day-to-day management by considering for instance ethical behavior, corporate strategy and risk management.

Bad corporate governance can cast doubt on a company's operations and its ultimate profitability.



[Corporate Governance Definition: How It Works \(investopedia.com\)](https://www.investopedia.com/terms/c/corporate-governance-definition.asp)

Strategic Overview

Part II



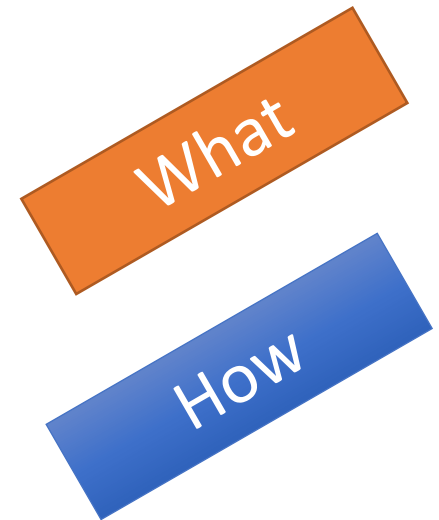
Data Governance: What?



🌐 **Data governance** (DG) is the process of

🌐 managing the availability, usability, integrity and security of the data in enterprise systems,

🌐 based on internal data standards and policies that also control data usage.

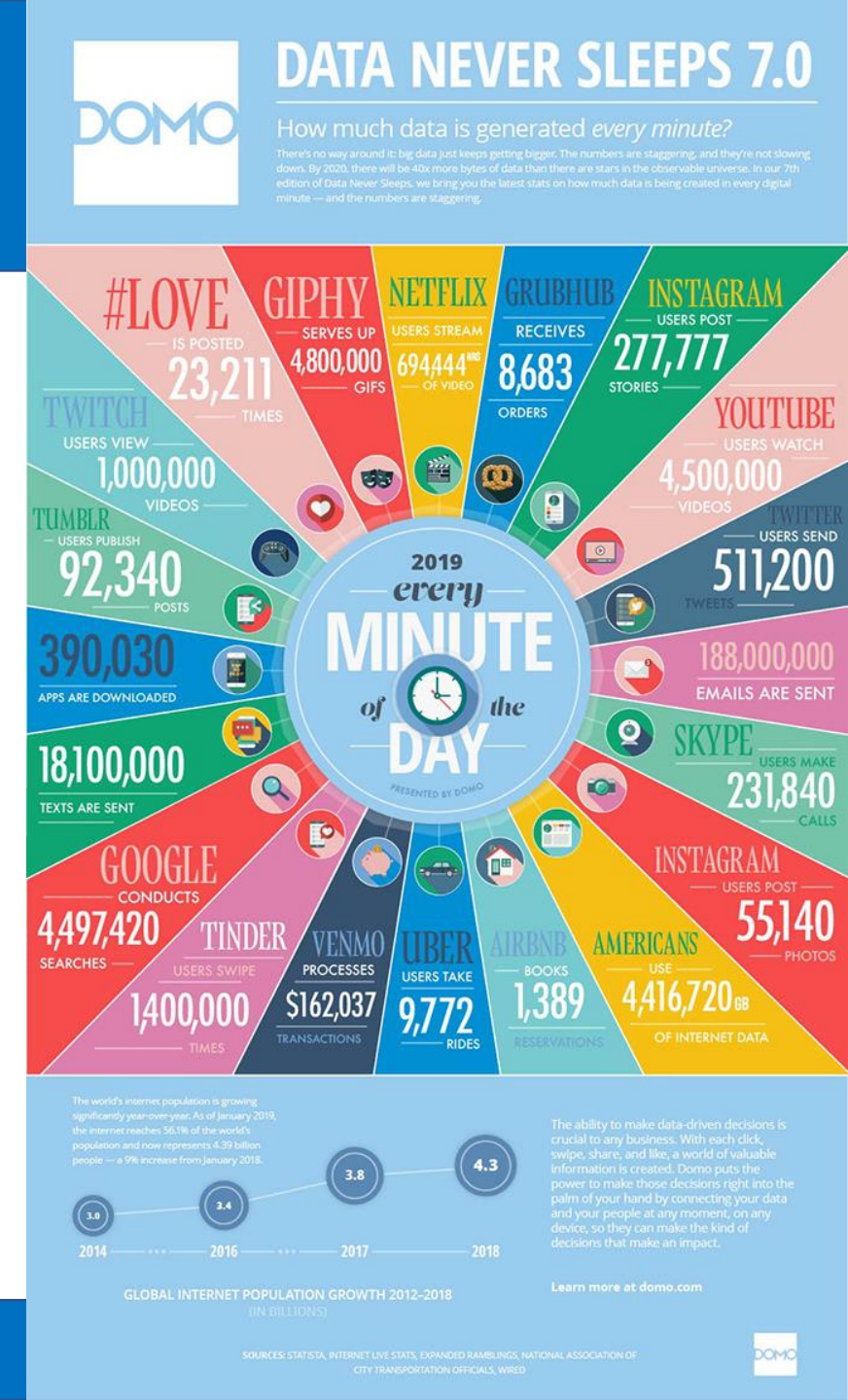


Source: <https://www.techtarget.com/>

Data never sleeps"

- ❖ The amount of data in the world is estimated to double every 18-24 months
- ❖ How much of it is used (or useful?)
- ❖ In 2019, every internet minute saw
 - ❖ 4.5 million Google searches
 - ❖ 55,000 Instagram posts
 - ❖ 694,000 Netflix streams
 - ❖ 4.5 million YouTube views
- ❖ Enormous increase in corporate data

Source: <https://www.domo.com/learn/data-never-sleeps-7>



Data growth and the need for corporate governance



✿ More data presents opportunities for organisations to improve...

✿ Business intelligence

✿ More efficient and better-quality control in manufacturing and service delivery

✿ More effective provision of supports within organizations such as planning, IT etc

✿ Customer relationship management

✿ Strategic and business planning

✿ ... but also to higher risks from ...

✿ Data losses and data breaches leading to loss of reputation and financial losses including fines

✿ Threats of hacking, ransomware, system failure

✿ Existential threats to business models from competitors

Example of poor corporate and research data governance



Former Cambridge Analytica chief receives seven-year directorship ban

Alexander Nix handed penalty for 'potentially unethical' behaviour linked to scandal



▲ Cambridge Analytica's former chief executive Alexander Nix has been barred from acting as a company director for seven years. Photograph: Tolga Akmen/AFP/Getty Images

Alexander Nix, the former boss of Cambridge Analytica, has been banned from serving as a company director for seven years over "potentially unethical" behaviour linked to his position at the centre of a global scandal.

https://www.theguardian.com/uk-news/2020/sep/24/cambridge-analytica-directorship-ban-alexander-nix?CMP=Share_AndroidApp_Other

Mindf*ck Cambridge Analytica And The Plot

N FILM

THE GREAT HACK

The Great Hack

2019 | 15 | 1h 54m | Documentaries

Explore how a data company named Cambridge Analytica came to symbolize the dark side of social media in the wake of the 2016 U.S. presidential election.

READ AN EXCERPT

<https://www.penguinrandomhouse.com/books/604375/mindfck-by-christopher-wylie/>

Data Governance: Why?



Some examples of goals that a DG programme might seek to achieve

Improve strategic direction of organisation

- Get better value out of customer and client information

More effective operational processes

- Reduce costs by removing duplicated effort in data collection and maintenance
- All for better data analysis and better decisions

Reduce organisational friction

- Set clear data responsibilities between different business and support areas
- Protect the needs of various data stakeholders within and without organisation

Ensure organisational accountability and compliance

- Improve organisational capacity to address data issues through education and trainings
- Allow for transparency by adoption of standard, repeatable data processes

Data Governance: How?



Effective data governance operates through policies, standards and tools that seek to

- ✿ Facilitate and improve the internal and external **communication** about data
- ✿ Provide for the identification and minimization of data-related **risks**
- ✿ Establish and control internal **rules** for data use
- ✿ Ensure the implementation of industry, national or international compliance **requirements**



Data Governance vs Data Management



Data Management is the process of gathering, storing, organizing and maintaining data created and collected by an organization.

Data Governance determines the overall practice of data management. It is regarded as the “management of data management” and envisages a separation between those governing and those managing

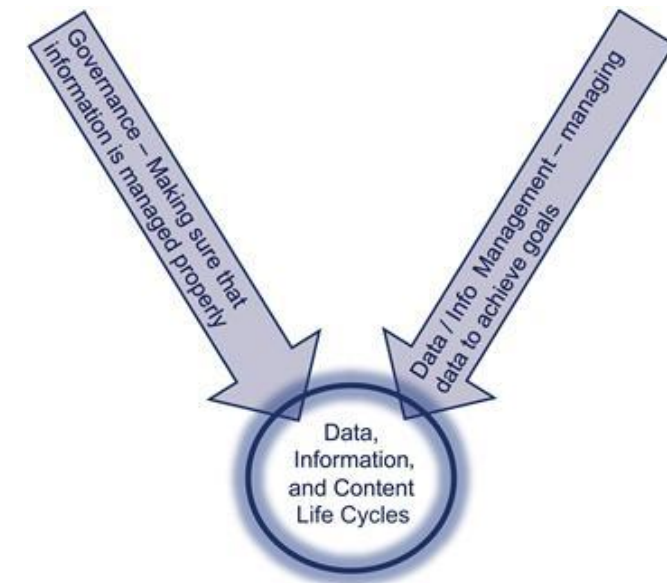
“Doing things right” vs “Doing the right thing”

Even if an organisation has no specific Data Governance practices, things still get done. But are the right things being done?

The issue is whether a clear structure and roles need to be defined through agreed policies, operational processes and procedure

Why the importance of documenting what these are?

- Induction and training of staff
- Accountability and audit
- External consumption (media, regulators)

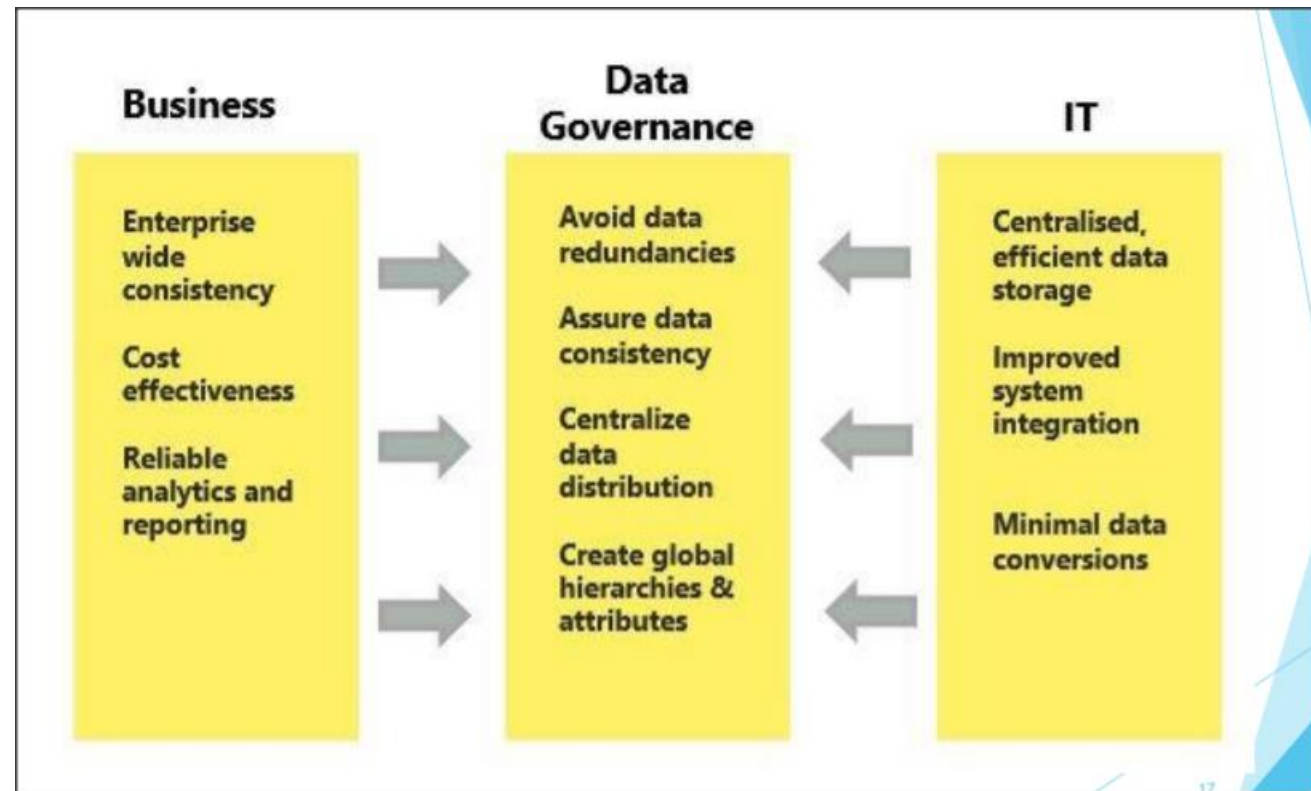


separation between those governing and those managing (Illustration from Ladley)

Data Governance as partnership

DG requires a partnership between business and IT to

- Provide an effective and consistent means of distributing data to those who need it for business purposes
- Calibrate and empower access to appropriate use of data
- Providing quality assurance about data
- Avoid retaining or gathering redundant data



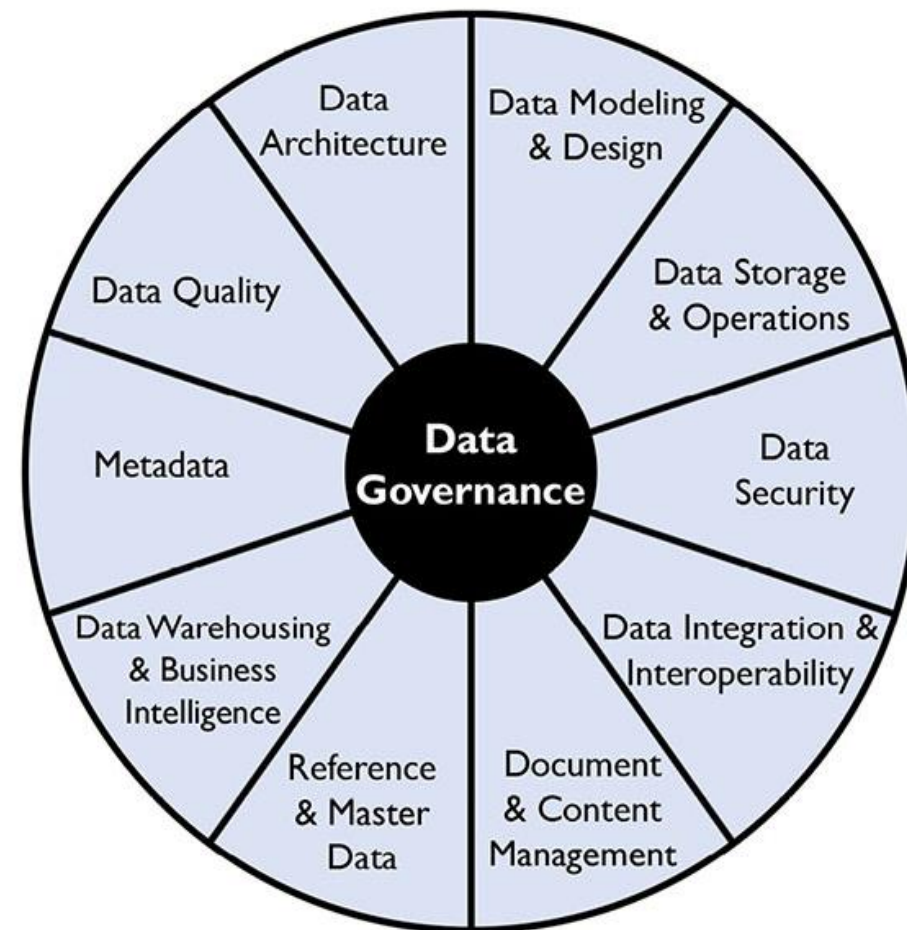
Data Governance should be business led with IT input not the other way around



- ❖ Data Governance should be business led with IT input not the other way around
- ❖ Like other management processes, it must balance strategic and operational needs.
- ❖ This balance can best be struck by following a set of principles that recognize salient features of data management and guide data management practice.
- ❖ An organisations management should start with identifying its data principles that might include
 - ❖ Effective data management requires **leadership commitment**
 - ❖ Data is an **asset** that needs to be planned and accounted for like other assets
 - ❖ Managing data includes **managing the risks** associated with data not just the opportunities
 - ❖ Data management requires an **organisation-wide perspective** that must drive Information Technology decisions, not the other way around

Data

- Data governance enables an organization to determine proper action regarding data and data processing, clear definitions, decision making rights and responsibilities and then escalation path or mediation process where issues arise.
- The Data Governance function guides all other data management functions.
- DG includes the **people, processes and technologies** required to ensure good quality data, its effective management and overall governance
- These can be grouped in a number of knowledge areas
- Should reflect the organisational circumstance; not a case of “one size fits all”.



DAMA-DMBOK2 Data Management Framework

Copyright © 2017 by DAMA International

DGM Building Blocks

Part III



Data Strategy

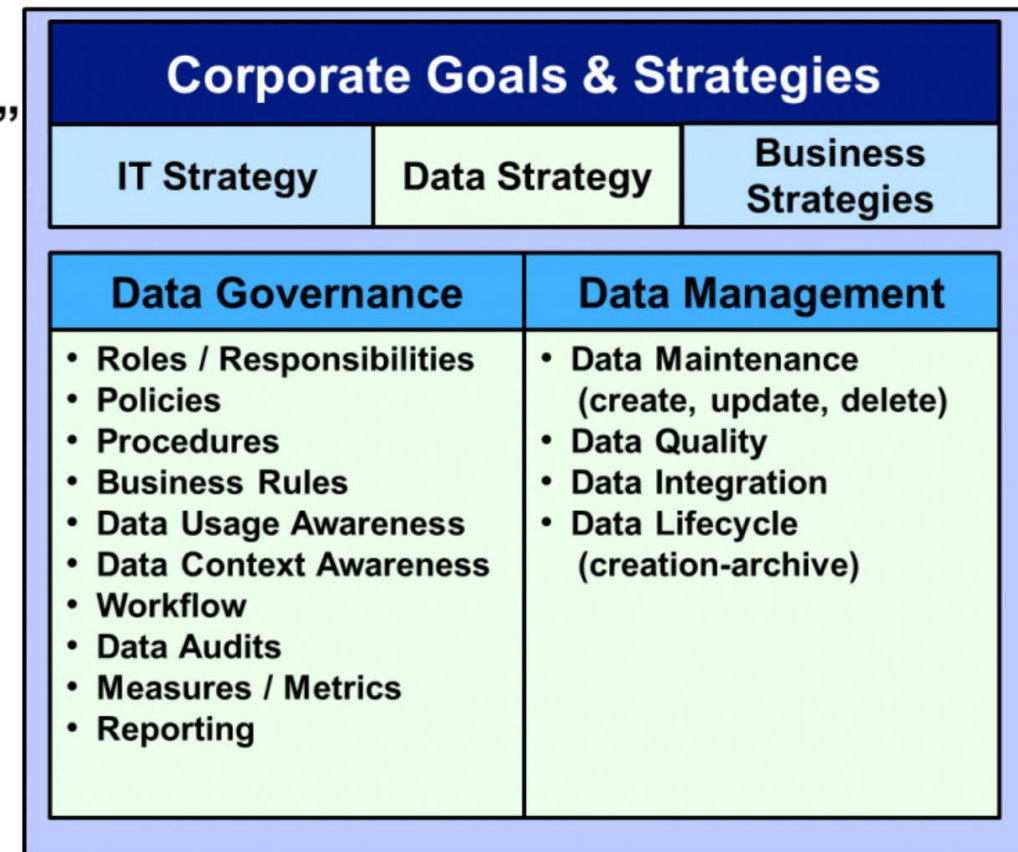


A strategy is “a set of choices and decisions that together chart a high-level course of action to achieve high-level goals. ... A strategic plan is a high-level course of action to achieve high-level goals.” (DMBOK)

“Data strategy must come from an understanding of the data needs inherent in the business strategy: what data the organization needs, how it will get the data, how it will manage it and ensure its reliability over time, and how it will utilize it.”

“Why”

“Who,
What,
When,
Where”



“How”
Conventional
MDM

Data principles



✿ The DMBOK defines (organisational) data principles as:

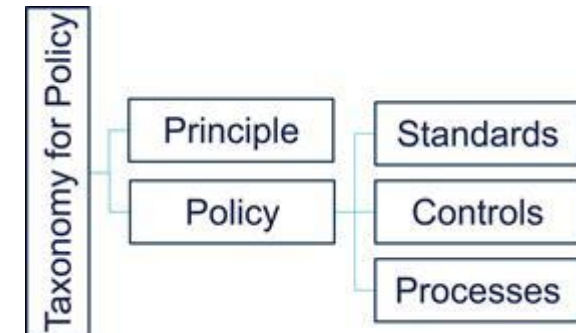
✿ A fundamental law, doctrine, premise, or assumption

✿ A rule or code of conduct

✿ Principles are statements of philosophy (or core beliefs) around policies and behaviours around data governance to be used as guidance for procedures and decision-making efforts (Ladley)

✿ While principles are to some extent generic (e.g. “data should be treated as an asset”), they must be adapted to the circumstances of an organisation.

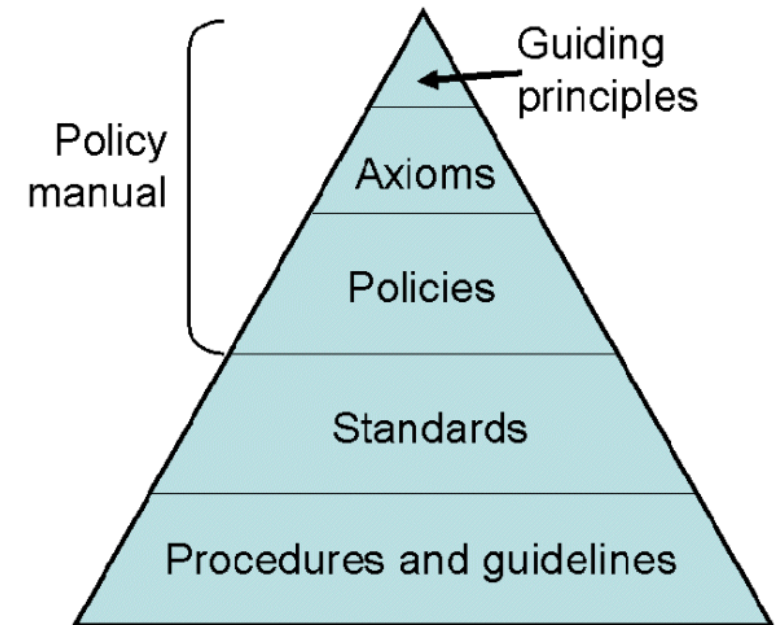
✿ They should be combined with policies to produce specific standards, controls and processes that make up DG&M operations.



What is a data management policy?



🌐 A **data management policy** addresses the operating **policy** that focuses on the **management** and **governance** of **data** assets and is a cornerstone of governing enterprise **data** assets.



Data Standards

- A standard is defined as “something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality.”
- By adopting a standard, an organization makes a decision once and codifies it in a set of assertions (the standard). It does not need to make the same decision all over again for each project.
- DG standards should be mandatory. Enforcing standards should promote consistent results from the processes using them.
- Drafted by data management professionals but reviewed, approved and adopted by the Data Governance Council.
- Data standards must be effectively communicated, monitored, and periodically reviewed and updated.
- Examples of data standards might include:
 - Data Architecture: Enterprise data models, tool standards, and system naming conventions
 - Acceptable use policies
 - Data Quality standards (timeliness, accuracy)
 - Data security standards
 - Use of data for data analytics and presentation purposes



Text source: DMBOK (2017)

Data Procedures

- ❖ Data management procedures assign responsibility for custody and security of all company data, allowing the company to control data consistently across various departments.
- ❖ Can take several forms depending on data type and purpose (regulations, guidelines, constraints, documentation, access, disposal, standards)



DGM Operational Model

Part IV



DG operating model

So far, we've considered a range of artefacts that might be developed as part of a DG programme such as data strategy, principles, policies and standards.

But how are we going to implement a DG/DM system in practice?

We need to consider an **operating model** or framework that sets out

- 🌐 Defined roles and responsibilities,
- 🌐 Clear decision-making processes.

In short, we need to describe how people and functions will collaborate to deliver the aims and principles of the DG programme.

Remember, “one size doesn't fit all” and while the DG have common goals, their operating models will vary according to an organisation's functions, its geographical scope, its culture, its organisational structure, the “maturity” of its data systems, its motivation for change etc. etc.

Importance of assigning roles and responsibilities to DG

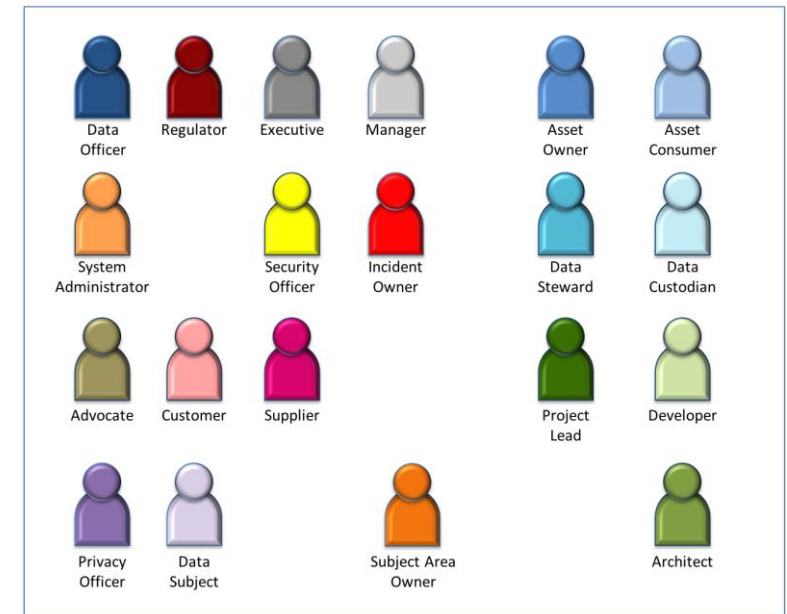


- ✿ “Like any other activity within a company or government entity, there needs to be a **formal statement of roles**. The official designation of accountability and responsibility are key factors to the survival of DG. Most important to new DG programs is the concept of **accountability for data**. This is most likely a very new role. ... In many organizations, the responsible parties have a formal role as designated “stewards” or “custodians.”
- ✿ The organization around DG also requires a **hierarchy** of some sort to enable issue resolution, monitoring, and direction setting. Rarely does this hierarchy of DG become a stand-alone area (i.e., there is rarely a data governance “department”). Most of the time, the DG organization is a **virtual organization** made up of business and IT personnel.” (*emphasis added*)

Wide variety of Roles and responsibilities around data

An organisation's data roles will vary depending of many factors including size of organisation

- ❑ The smaller the organisation, the more likely it is that roles will multi-task.
- ❑ In a larger organisation, you might find a range of roles that are business, IT or data management specific:
 - Chief Data Officer – covered in following sides
 - Data Protection/Privacy Officer – to be covered in Privacy and Data Protection
 - Data Steward – covered in following sides
 - Data Architect - designs technical plans for a construction of data
 - Data Policy Officer - implements new regulations or processes that help improve efficiency or ensure an organization remains compliant

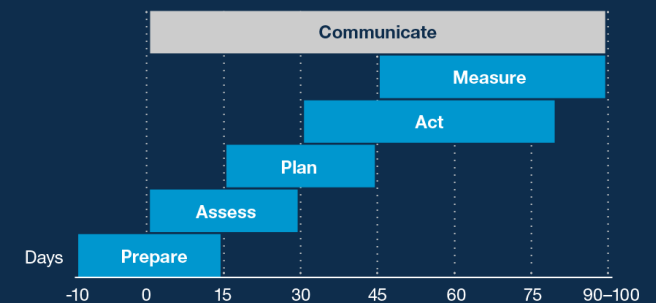


Chief Data Officer



- ✿ Not all (or indeed many!) organisations have a CDO but industry analysis suggests increasing interest in the role especially in regulated sectors
- ✿ Research shows a range of functions for CDO
 - ✿ Establishing an organizational data strategy
 - ✿ Aligning data-centric requirements with available IT and business resources
 - ✿ Establishing data governance standards, policies and procedures
 - ✿ Providing advice (and perhaps services) to the business for data-dependent initiatives, such as business analytics, Big Data, data quality, and data technologies
 - ✿ Evangelizing the importance of good information management principles to internal and external business stakeholders
 - ✿ Oversight of data usage in analytics and Business Intelligence
- ✿ In effect, CDO (and their division) provides an interlocutor role between the data infrastructure functions (typically IT) and data consumers (typically business users)

Roadmap of a CDO's First 100 Days



gartner.com/SmarterWithGartner

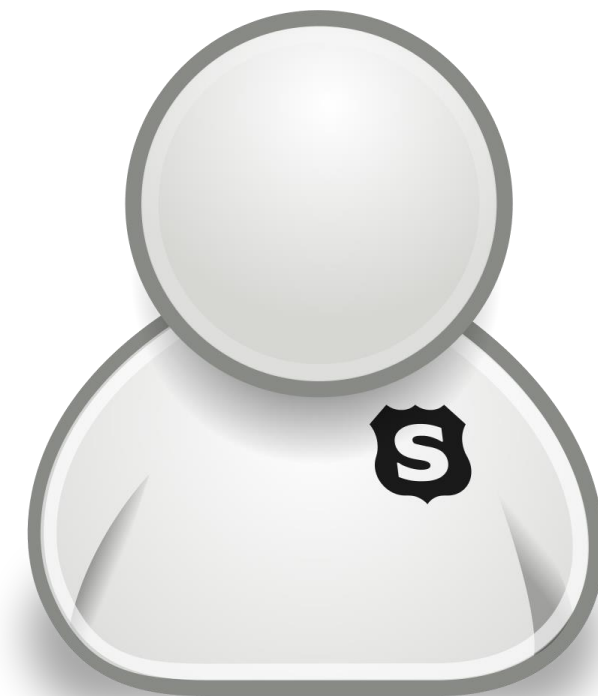
Source: Gartner (January 2018)
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Gartner.

Source: DATAVERSITY Launches Research Paper, “Status of the Chief Data Officer: An Update on the CDO Role in Organizations Today” - DATAVERSITY

Data Stewardship

- ✿ *A steward is some who manages property on behalf of others.*
- ✿ Data Stewards therefore represent the interests of all stakeholders to ensure enterprise data is of high quality and can be used effectively.
- ✿ Effective Data Stewards are accountable and responsible for data governance activities and have a portion of their time dedicated to these activities.
- ✿ Data steward roles activities will change depending on organisational circumstances but may include:
 - ✿ **Creating and managing core metadata** such as business terminology, data dictionary.
 - ✿ **Documenting rules and standards** in order to have organisational consensus and consistent use.
 - ✿ **Managing data quality issues** such as their identification, analysis and resolution
 - ✿ **Executing operational data governance activities** such as participating in data management projects, data governance monitoring



Text Source: DMBOK (2017)

Maturity levels of Data Governance



Reactive Governance Model (driven by issues arising)

-  Tactical effort to respond to a problem arising such as a data leak or disaster

Preemptive Governance Model (driven by upcoming planned event)

-  Organisation facing major change (merger, legislative change)

-  Approach tries to blunt issues

Proactive governance (driven by organisational capability and structure)

-  Driven by an information management strategy

-  Continual Focus on improving capabilities (processes, technologies) to address and resolve anticipated risks and issues

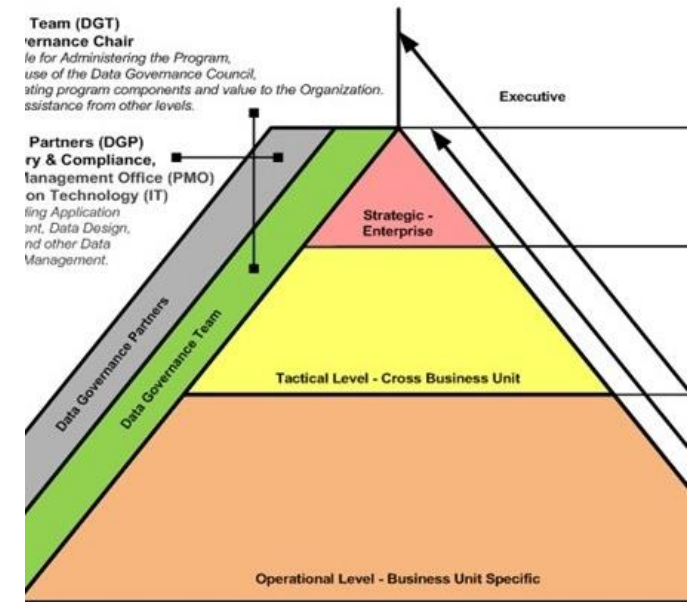
-  Alignment of governance and management process formalising a culture of issue and risk awareness

Source: Adler

Decision making processes



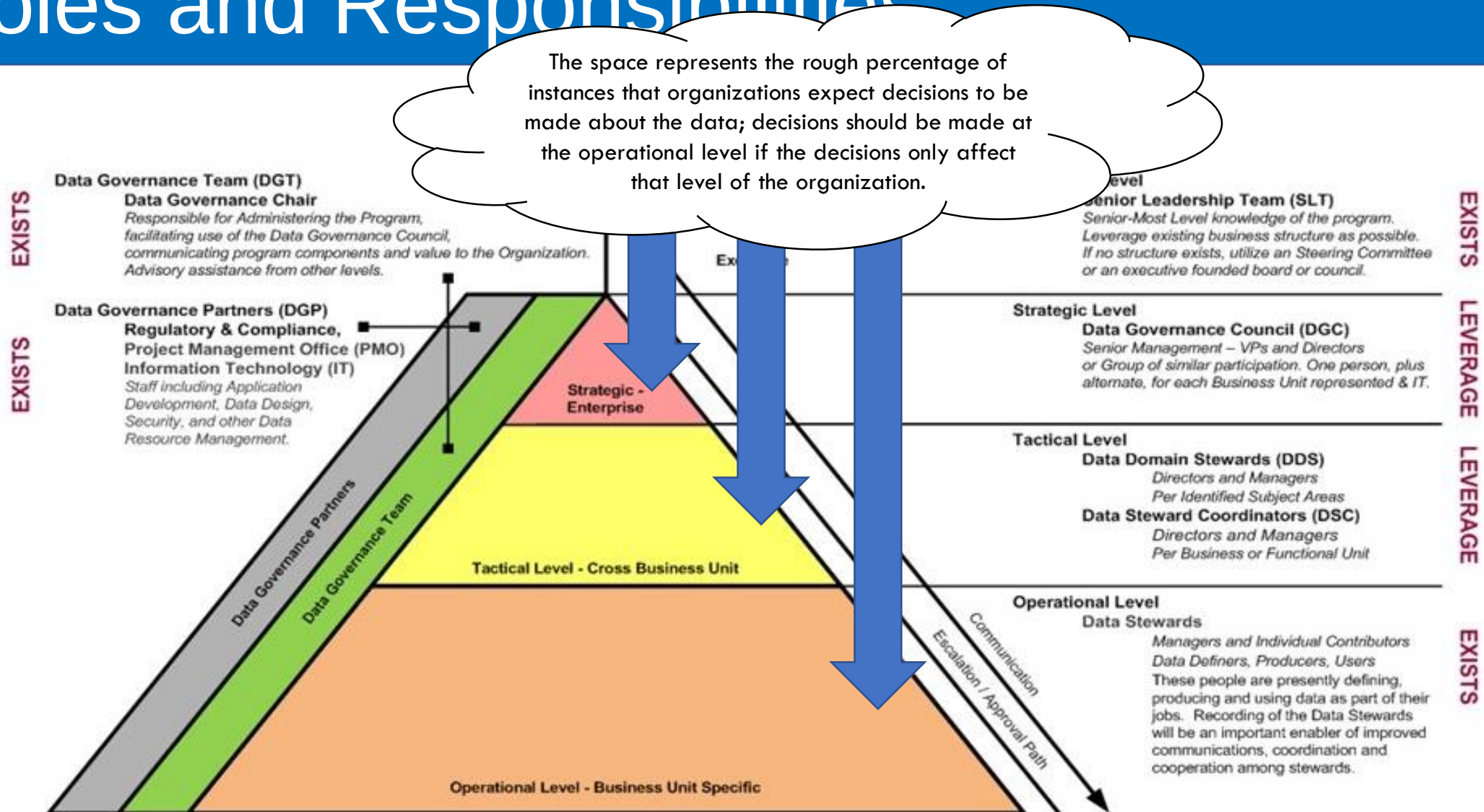
- ❁ Recall that the operating model is defined by the roles and responsibilities and the processes that determine decisions
- ❁ We will go into this in more detail in the lab using the operating model shown but for now it's enough to say that processes are related to
 - ❁ Nature of decisions required (strategic, tactical or operational level)
 - ❁ Decentralised to business areas or centralized to the Data Governance Team
 - ❁ Business or technical in nature



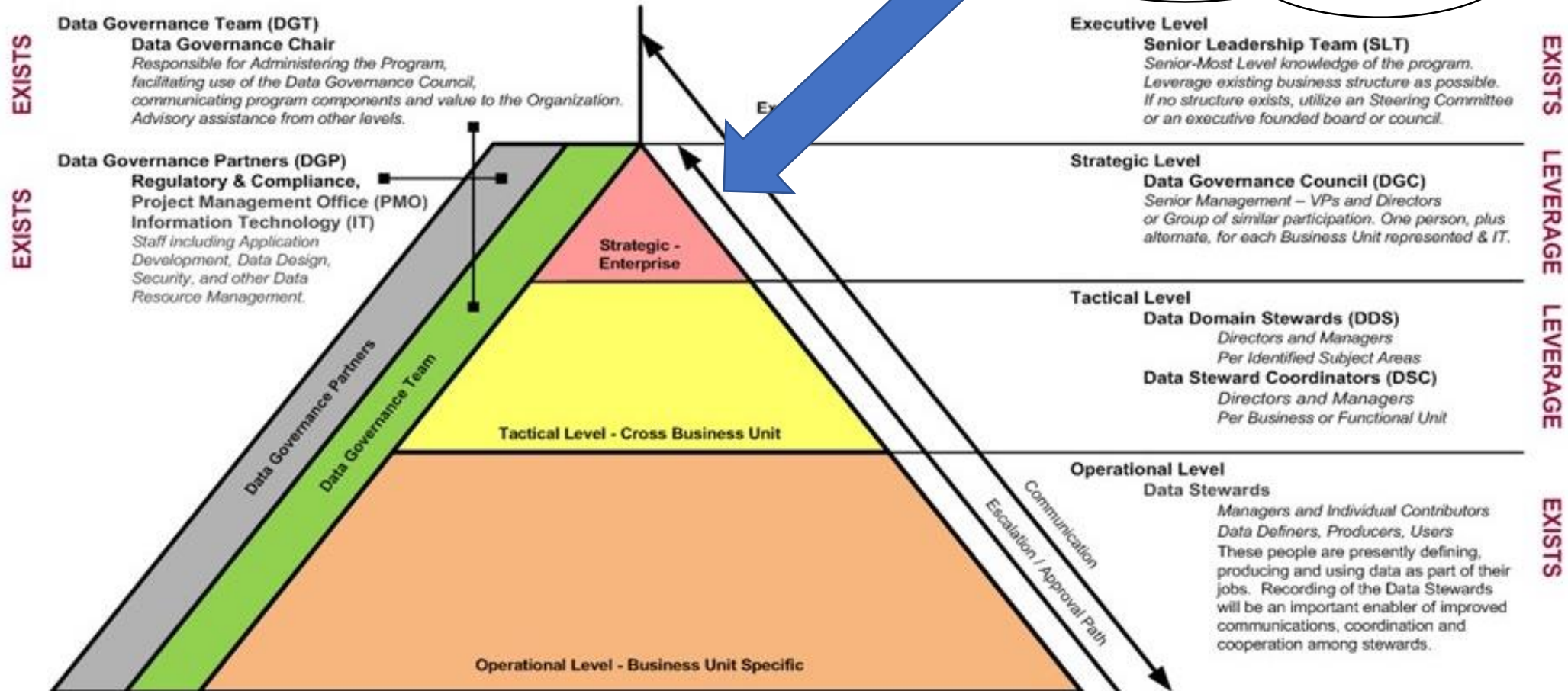
Consulting – Last Updated 09/04/2013

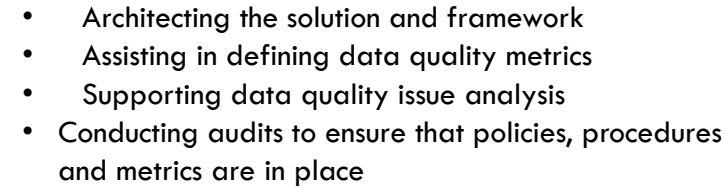


Data Governance Operating Model of Roles and Responsibilities

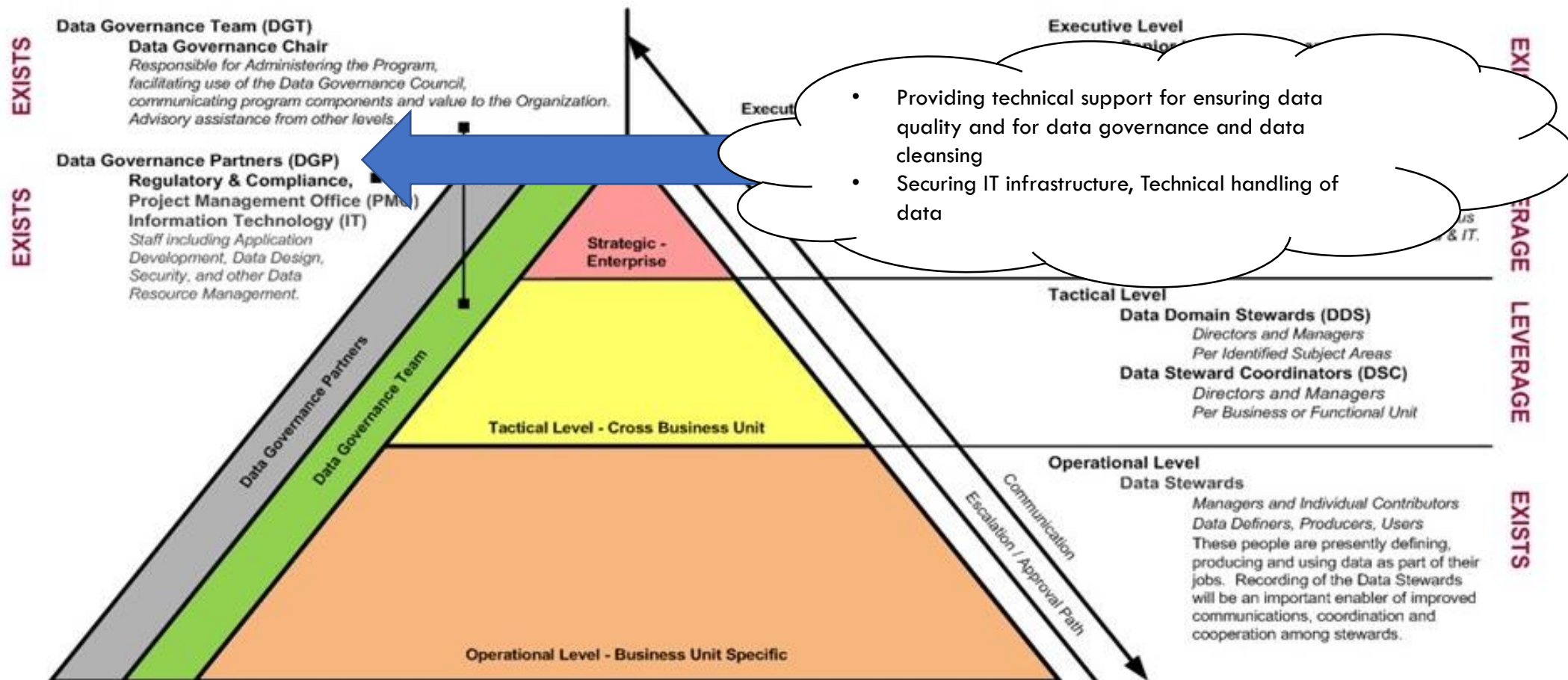


The escalation path does not extend into the executive level because data issues are not typically escalated to the senior-most management of an organization.

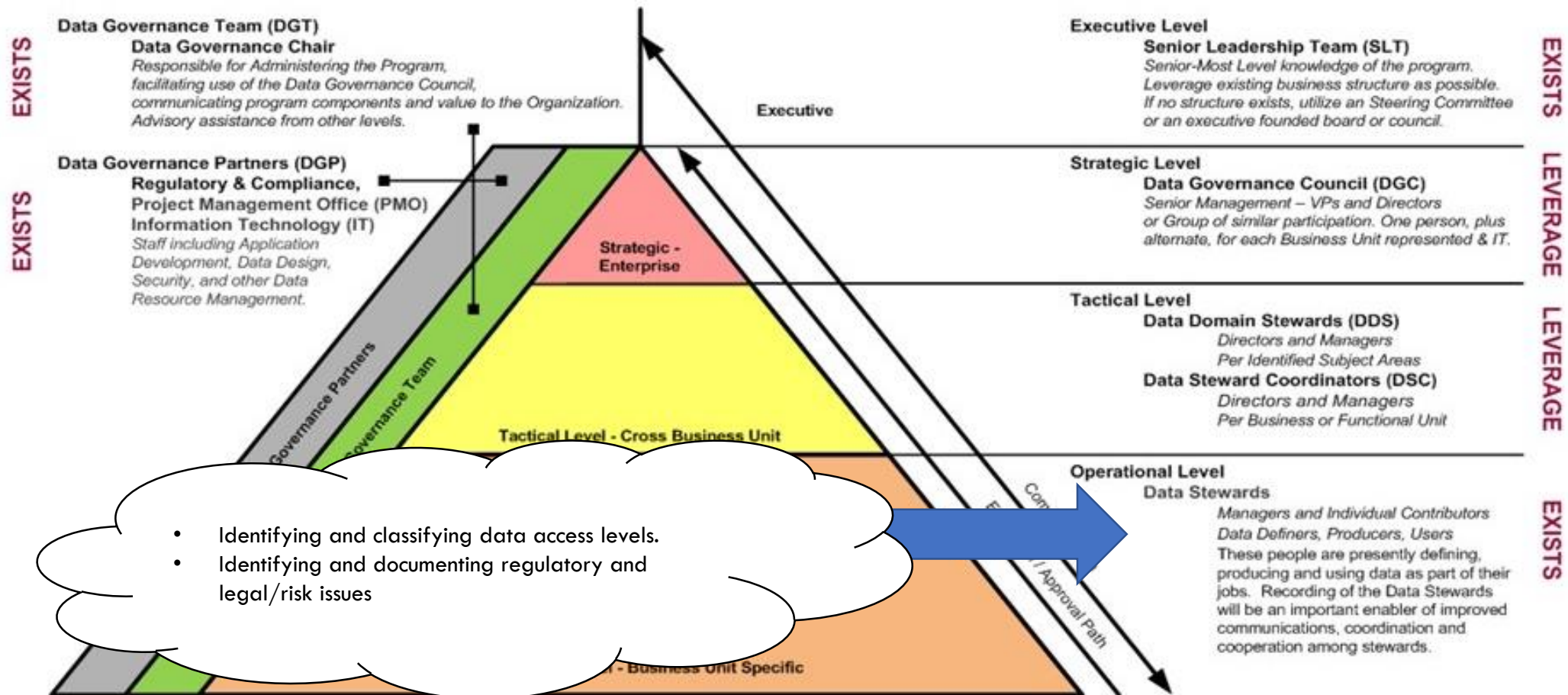




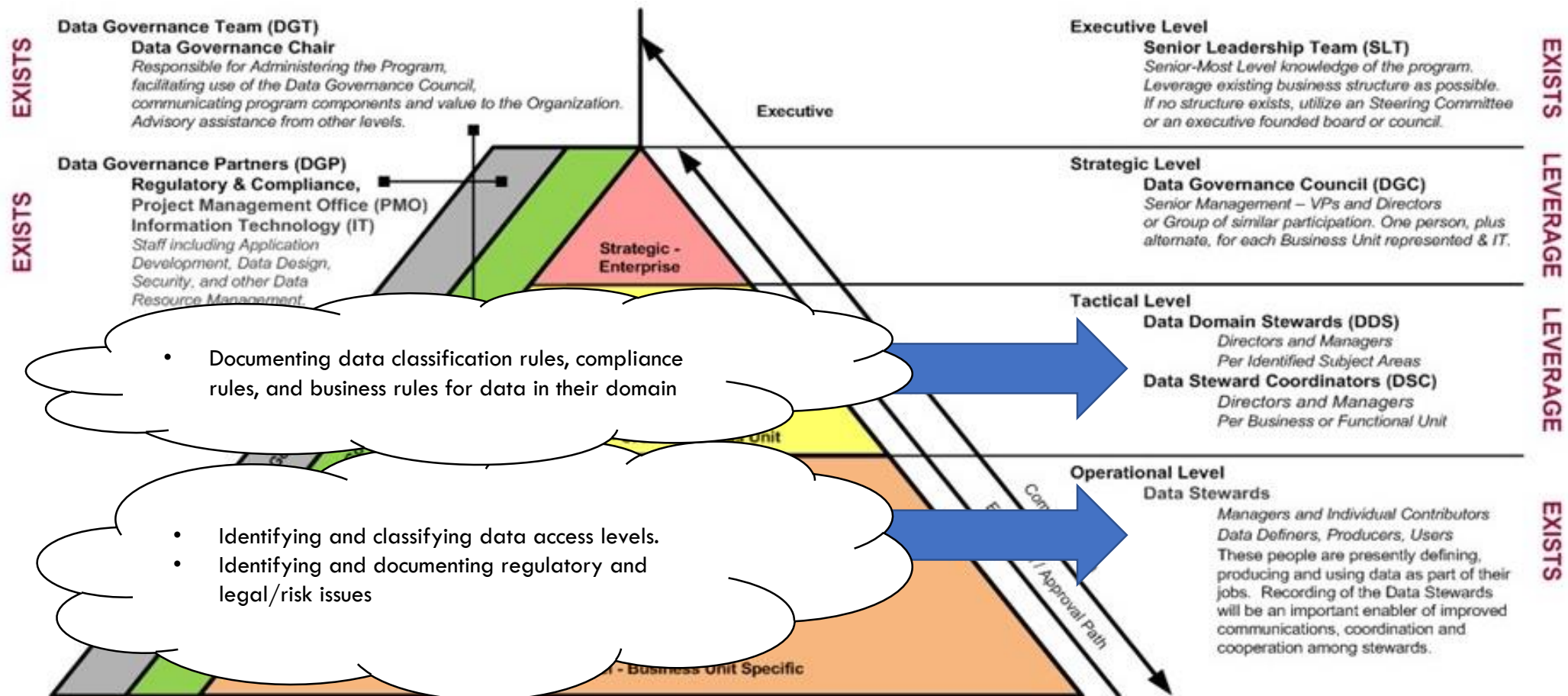
Data Governance Operating Model of Roles and Responsibilities



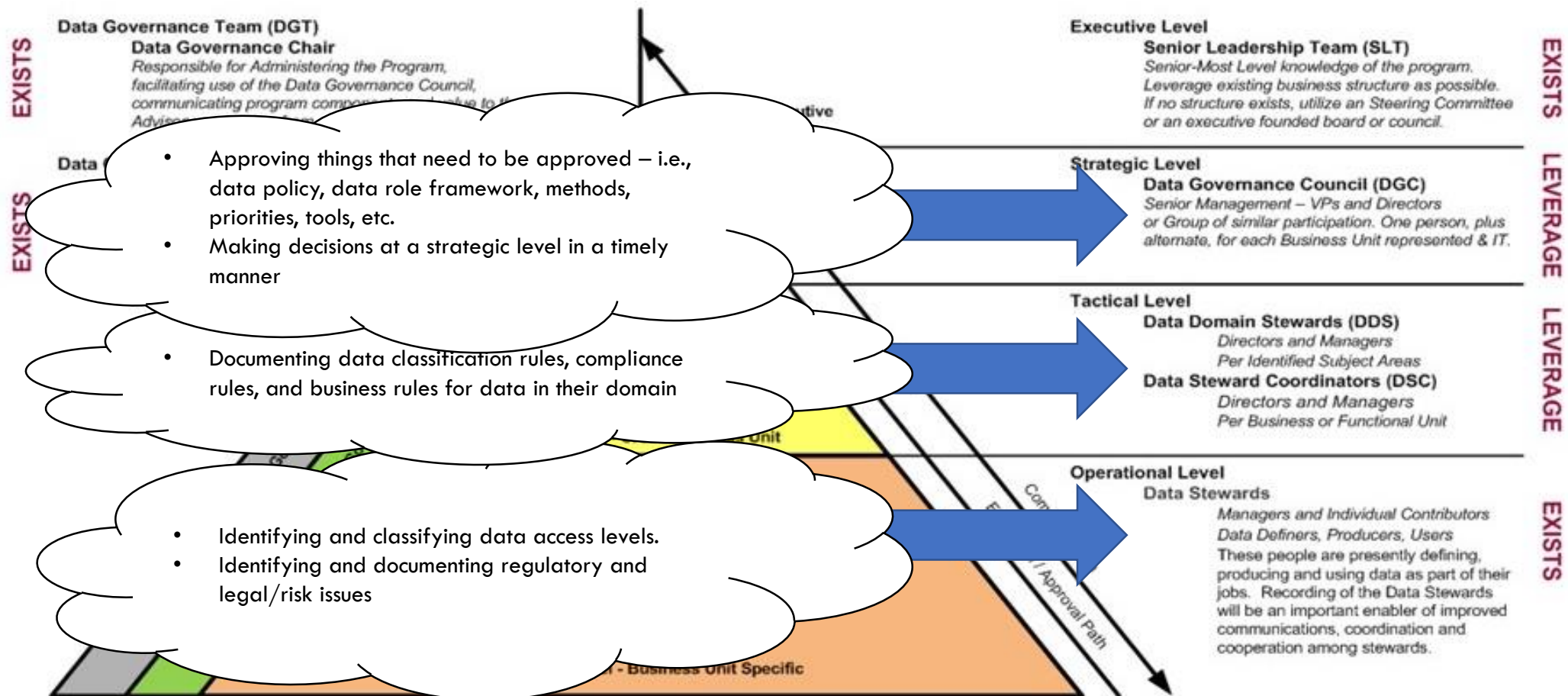
Data Governance Operating Model of Roles and Responsibilities



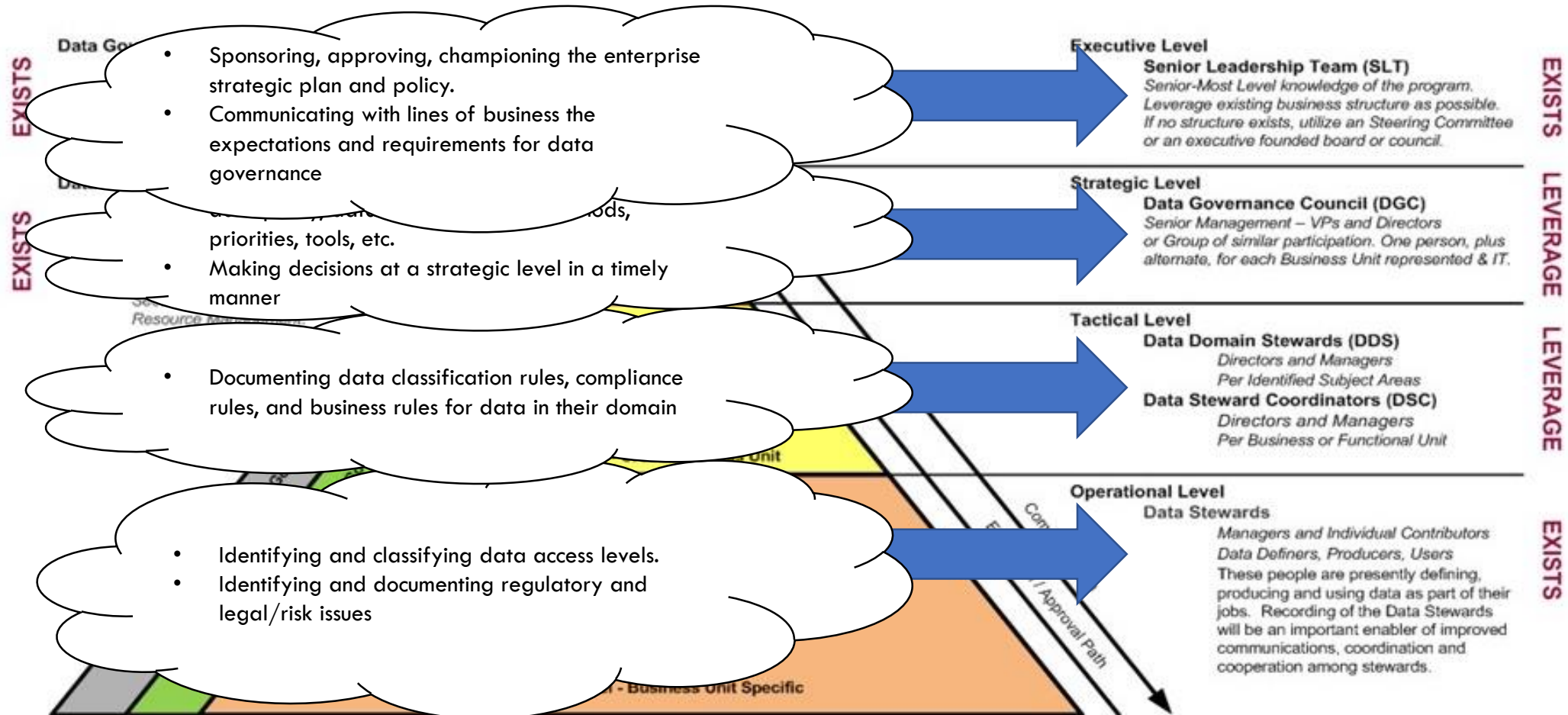
Data Governance Operating Model of Roles and Responsibilities



Data Governance Operating Model of Roles and Responsibilities



Data Governance Operating Model of Roles and Responsibilities



DGM Scope and Implementation

Part V

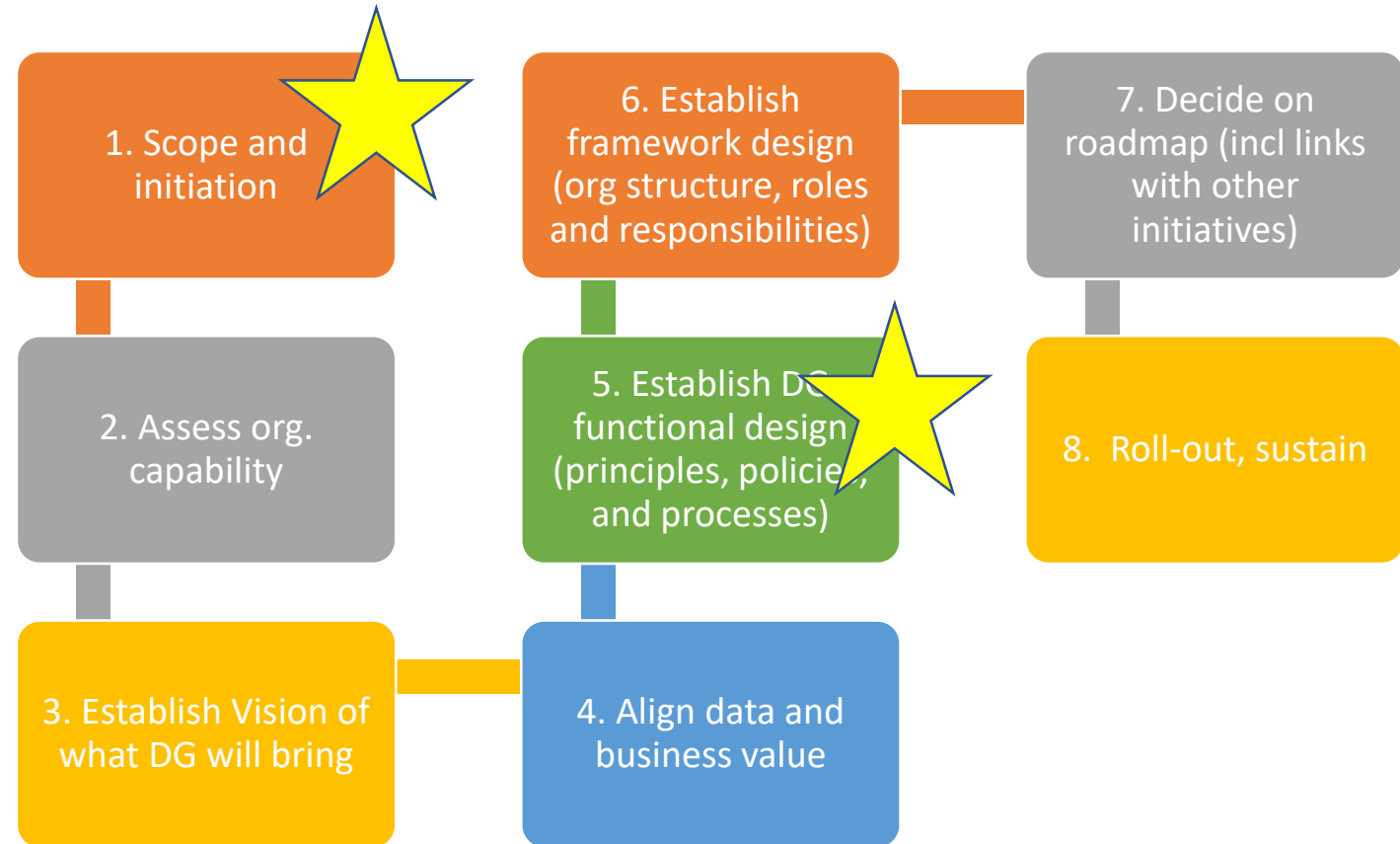


Scope of Typical DG programme

Strategy	Defining, communicating, and driving execution of Data Strategy and Data Governance Strategy
Policy	Setting and enforcing policies related to data and Metadata management, access, usage, security, and quality
Standards and quality	Setting and enforcing Data Quality and Data Architecture standards
Oversight	Providing hands-on observation, audit, and correction in key areas of quality, policy, and data management (often referred to as stewardship)
Compliance	Ensuring the organization can meet data-related regulatory compliance requirements
Issue management	Identifying, defining, escalating, and resolving issues related to data security, data access, data quality, regulatory compliance, data ownership, policy, standards, terminology, or data governance procedures
Data management projects	Sponsoring efforts to improve data management practices
Data asset valuation	Setting standards and processes to consistently define the business value of data assets

DG implementation 8-phase process

- 🌐 Your organisation thinks that it has a data problem (e.g. poor data quality, risk of data breaches)
- 🌐 Yet, in DG, we've said that "It's not one size fits all"
- 🌐 So how do you "do Data Governance" for your organisation?
- 🌐 Where do you start and how do you know when its done?



DG implementation 8-phase process (Derived from Ladley (2012) Chapter 5)

1. Scope and initiation



- Understand options/Decide on Span and Depth
- Is there a full understanding in organisation of nature and scope of DG
- What business areas are to be covered in the programme?
 - DG is ultimately an organisation-wide process but may need to take into account a realistic assessment of effort required, timing, market conditions, government regulations
- How deep into the organisation does the programme need to go?
- Set- up temporary, organisational steering group important to ensure “not seen just as IT project”, right balance of skills and politics is available, at senior enough level to ensure taken seriously (led by executive DG sponsor)
- Is there a process to approve scope, acknowledge and address constraints?



Ladley (2012) Chapter 6

5. Establish DG functional design (principles, policies, and processes)

- ✿ Addresses the what and how questions of DG – moving from concept to operational (“logical model design”)
- ✿ Established principles that provide the foundation of effective policies and therefore processes, protocols and standards.
- ✿ Identify functions for plan, design, management and operation (e.g., plan assessment info maturity, design data standards, manage data architecture, operate data controls)
- ✿ Seek buy-in from organisation/DG business leadership



Ladley (2012) Chapter 10

Some examples of GAIP (Generally Accepted Information Principles)



- Data and content of all types are assets with all the characteristics of any other asset.
- They should be managed, secured and accounted for as other materials or financial assets.

Data content as assets



- There is value in all data and content, based on its contribution to an organization's business/operational objectives,
- And to its intrinsic marketability, and/or its contribution to the organization's goodwill (balance sheet) valuation.

Data assets as having Real Value



- There is risk associated with data and content.
- This risk must be formally recognized, either as a liability or through incurring costs to manage and reduce the inherent risk.

Data as presenting risk



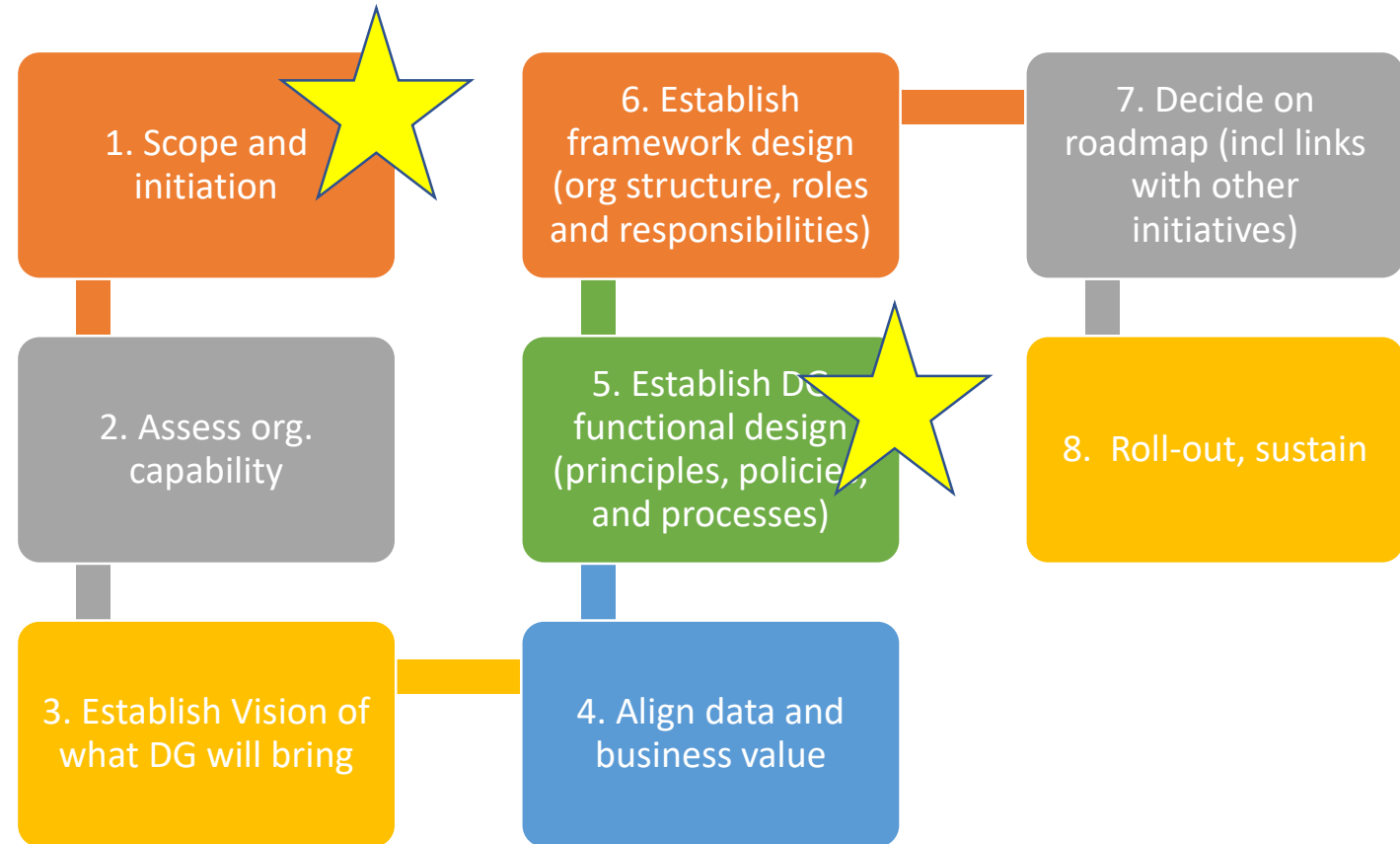
- The relevance, meaning, accuracy and lifecycle of data and content can affect the financial status of an organization.

Asset value as determined by Data Quality



DG implementation 8-phase process

- 🌐 Your organisation thinks that it has a data problem (e.g. poor data quality, risk of data breaches)
- 🌐 Yet, in DG, we've said that "It's not one size fits all"
- 🌐 So how do you "do Data Governance" for your organisation?
- 🌐 Where do you start and how do you know when its done?



DG implementation 8-phase process (Derived from Ladley (2012) Chapter 5)

DGM in a research organisational context

Part VI



Is research different?

❖ What aspects of DGM can be applied in a research context?

❖ Concepts, rationale, principles, standards etc?

❖ Building blocks

❖ Defined roles and responsibilities?

❖ Individual researcher (and their supervisors)

❖ Research partnership team

❖ Faculty or institutional based team

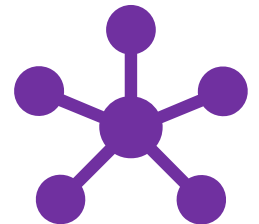
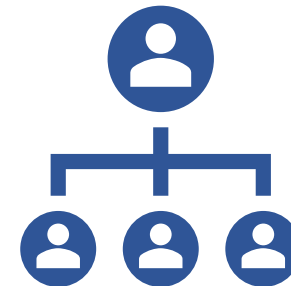
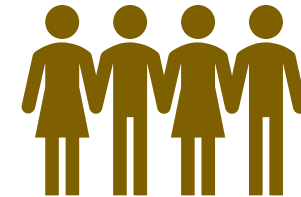
❖ Cross-institutional team (national, international)

❖ Clear decision making processes?

❖ Organisational structure more complex than organisational decentralised model?

❖ Decision making structures

❖ Who “does governance” as opposed to manage?



Some lessons from a genomics research study



Planning

Communications

Informatics

Analytics

HGG Advances

ARTICLE

Lessons learned and recommendations for data coordination in collaborative research:
The CSER consortium experience

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Source: Muenzen, K. D. *et al.* (2022) 'Lessons learned and recommendations for data coordination in collaborative research: The CSER consortium experience', *Human Genetics and Genomics Advances*, 3(3), pp. 1–15.

doi: 10.1016/j.xhgg.2022.100120.

Available at: <https://pubmed.ncbi.nlm.nih.gov/35707062/>

Study recommendations

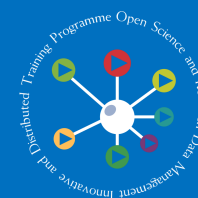


Table 2. Recommendations for consortium data coordination

Category	Needs	Recommendations
Planning	clear expectations for internal and external data sharing	1. Build data sharing expectations into expected scope of work in funding announcements (NIH ^a)
	sufficient financial resources and time for data coordination	2. Budget for data coordination, management, and reporting at individual research sites (NIH ^a)
	integration between DCC and consortium	3. Establish DCC at start of funding period, if not before (NIH ^a and DCC ^a)
Communication	consolidation of communication channels	4. Consolidate lines of communication from DCC to working groups and assign action items appropriately (DCC ^a and sites ^a)
	technical specifications for data sharing	5. Maximize transparency of data coordination expectations and resources (NIH ^a and DCC ^a)
	efficient use of diverse expertise available within the consortium	6. Facilitate translation of critical information between stakeholder groups (DCC ^a)
Informatics	consolidation of informatics platforms for data coordination	7. Deploy a secure, centralized web resource for data coordination (DCC ^a)
	flexibility in response to unforeseen events and changing analysis plans	8. Build flexibility into central databases and data-management software (DCC ^a)
	correct implementation of site-level security and privacy agreements	9. Prioritize data privacy and security during platform design (DCC ^a)
Analytics	high-quality and reliable data from heterogeneous sources	10. Provide clear and detailed documentation of shared data resources (DCC ^a and sites ^a)
	integration of research and clinical practice; enhanced protection of data from vulnerable populations	11. Document approaches to data governance (DCC ^a and sites ^a)

^aEntities which should be responsible for each recommendation.

(Muenzen *et al.*, 2022)

Can lessons be generalised?



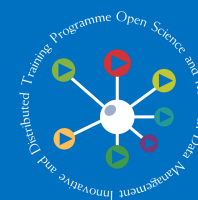
“While there is an understanding among scientific communities worldwide that sharing research data is a necessary component of scientific progress, the mechanisms for protecting against potential harm while maximizing usefulness are not well-defined. These two aims are often in tension and lend themselves to diverse data governance strategies across research projects within and between scientific disciplines.”

“As funding agencies increasingly expect research projects to contribute high-quality, harmonized data to public repositories, funders and researchers alike should recognize these dedicated groups as an essential component of any research program and provide appropriate budget support accordingly”

Source: Muenzen, K. D. *et al.* (2022) ‘Lessons learned and recommendations for data coordination in collaborative research: The CSER consortium experience’, *Human Genetics and Genomics Advances*, 3(3), pp. 1–15.

doi: 10.1016/j.xhgg.2022.100120.

OECD recommendations on research networks



“Recommendation 5

In establishing, developing, operating, and supporting international data networks the following 'organisational' aspects should be taken into account:

- ☐ Networks should have a clearly defined user and data provider community. At the same time potential requirements of new users, e.g. in terms of interoperability, should not be ignored;
- ☐ Networks should have a clear understanding of how they relate to other networks and how they fit into the global research and data sharing landscape;
- ☐ Different governance models can succeed, but there is need to define clearly what is to be governed and to involve the data users and providers;
- ☐ Roles and responsibilities across a network, e.g. for data curation versus service provision, must be clearly defined and, where possible, data champions identified;
- ☐ The necessary level of standardization needs to be clearly defined taking into account user requirements and the need to maintain an appropriate balance of autonomy amongst network nodes and central control;
- ☐ Objective and transparent mechanisms for network assessment should be based on standard quality management frameworks and certification of participating data repositories;
- ☐ Consideration needs to be given to regional differences in capacity - infrastructure and human resources - and in culture, community needs and expectations”

DIRECTORATE FOR SCIENCE, T. A. I. and COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY, OECD. (2017) *Co-ordination and Support of International Research Data Networks*. Available at: [https://one.oecd.org/document/DSTI/STP/GSF\(2017\)5/en/pdf](https://one.oecd.org/document/DSTI/STP/GSF(2017)5/en/pdf)

Getting your class involved with DGM

Part VII



Some suggestions for how to get students involved



Quizzes (MS forms, Kahoot!) particularly suitable definitions, concepts etc



Presentation and discussion of use of case studies from industry, services, public sector etc



Group discussion of issues through review of academic or consultant papers

Sources and resources



DAMA International (2017). *DAMA-DMBOK: Data Management Body of Knowledge* (2nd ed.). Technics Publications. [ISBN:978-1634622349].

Ladley, J. (2019). *Data governance: How to design, deploy, and sustain an effective data governance program*. Academic Press.

Smallwood, R. F. (2019). *Information Governance: Concepts, Strategies and Best Practices*. Wiley. [ISBN: 978-1119491446].

Review of presentation

Part VIII



Aims of presentation

Review

- ✿ Provide overview of DGM section of Data Governance and Ethics module (normally 6 contact hours)
- ✿ Introduce DGM Concepts and Definitions
- ✿ Provide DGM Rationale and Goals
- ✿ Show strategic overview of DGM (who, how, what etc)
- ✿ Illustrate DGM building blocks
 - ✿ Roles and responsibilities
 - ✿ Operating Model
- ✿ Explain implementation method (using Ladley model)
- ✿ Consider DGM in a research organisational context
- ✿ Consider how to get getting your students involved with DGM

Any
Comments
or
Questions?



THANK YOU!



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