The Database Framework

Victoria E Holt

The database framework is a system to look holistically at the database from the design structure of databases in particular consideration of their fallibility & reliability and the retrievability of data from multiple sources. Figure 1 highlights my perception of the database process in the real world.

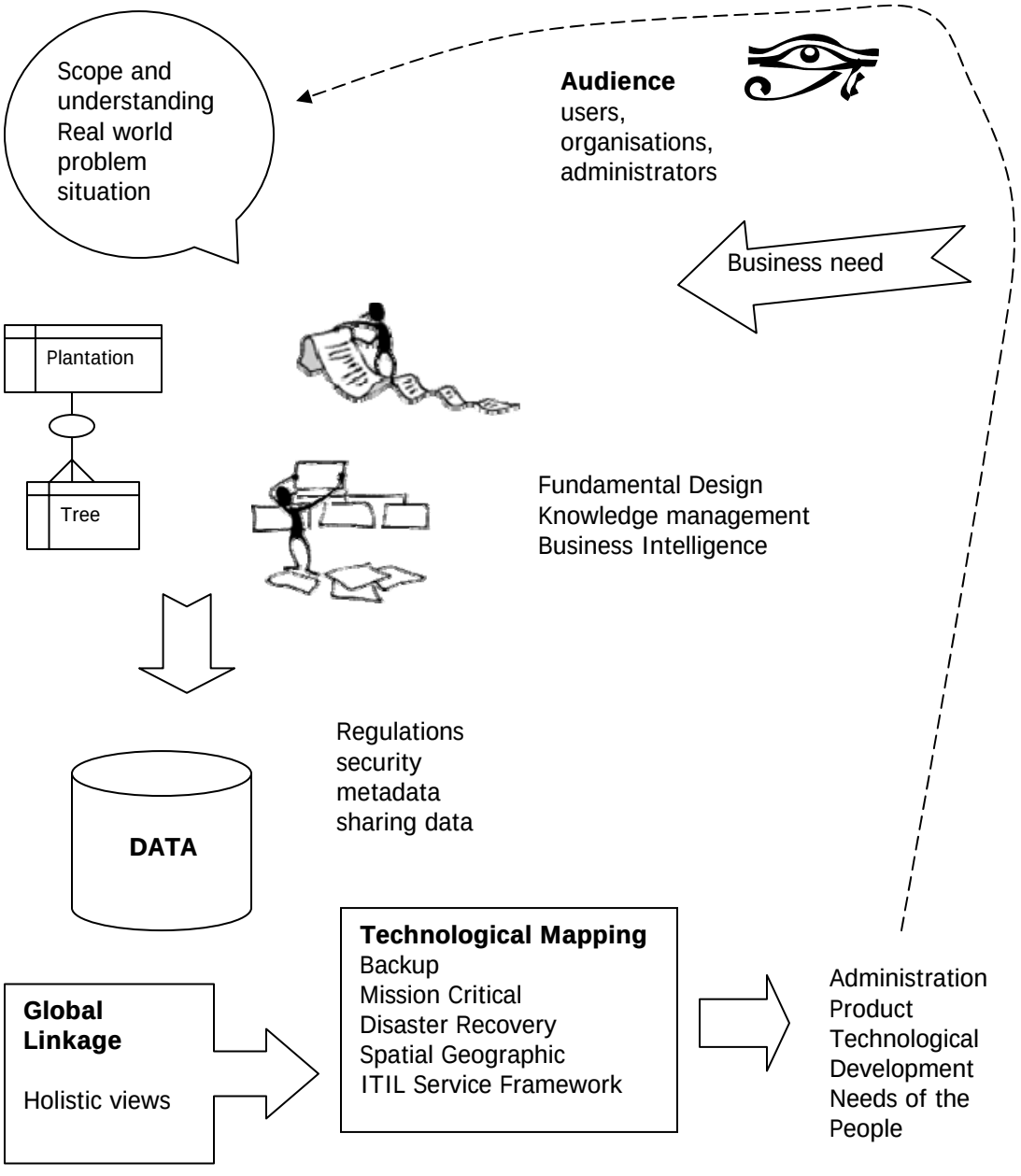

Figure 1 The database process

The aim is to produce a database systems methodology which will have examined current methods and practice, after reflecting and iteration, and drawing from that a conclusion on how best to deliver effective database systems. Figure 2 details the key elements within this bounded system showing their interconnectedness.

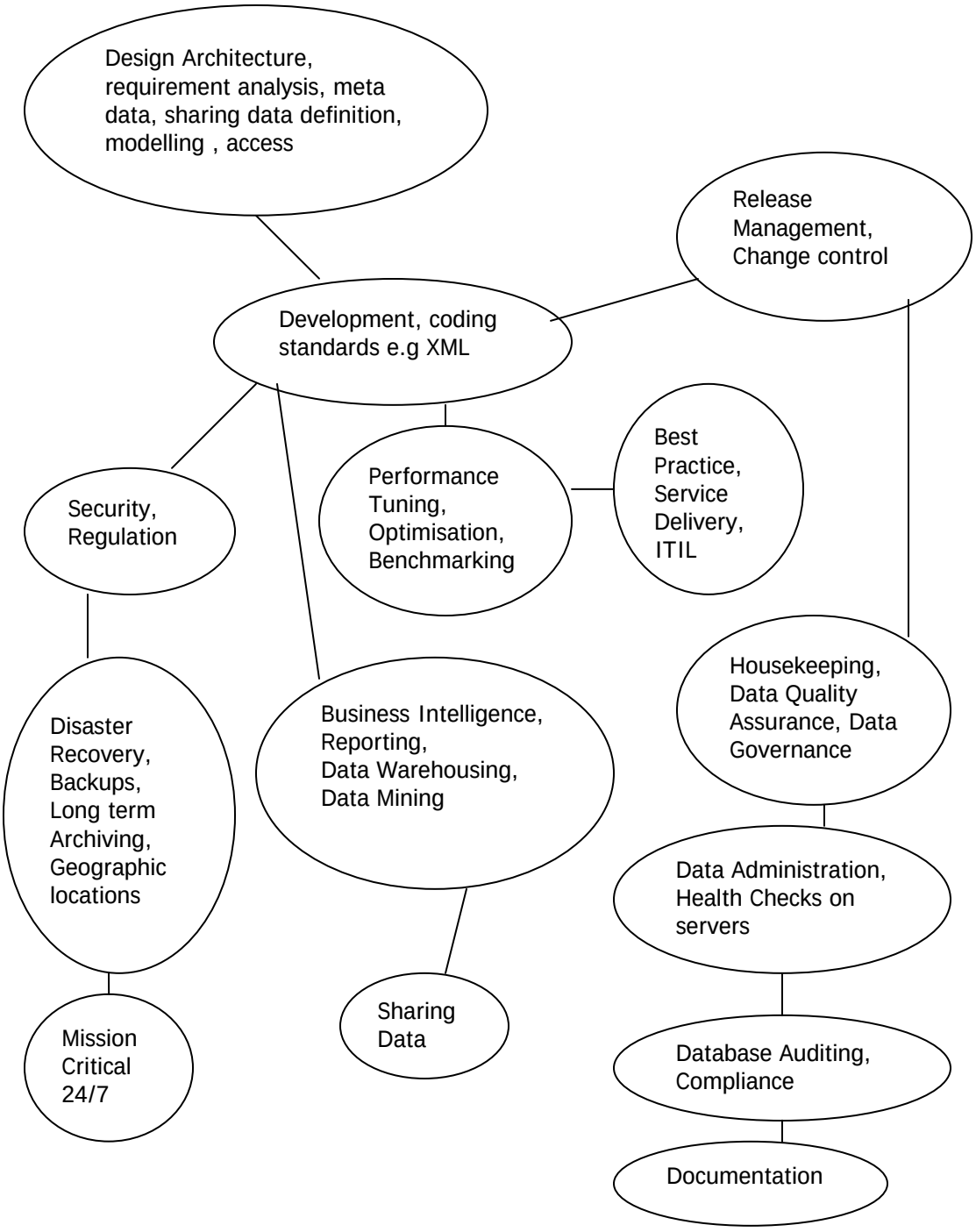

Figure 2 The key element within the system of interest

As we see today a large number of data systems fail due to things such a poor design knowledge management and specification, storing of ill thought out metadata, not considering the need for business intelligence, integration of systems data, mission criticality, high availability, not applying the ITIL framework with things such as change management, retention policy for backups, archiving of digital data and of course human error. The speed of change within the database industry provides endless more possibilities for the usage of the database. A framework, methodology, needs to provide an overview so that database systems work efficiently, effectively with little need for administration, the self managing system.

A lightweight framework on how to do something rather than specifics of the tasks technically needs to be identified. It should contain a model for interaction with modules which are flexible, extendable and reusable. It needs to be easy to configure and apply with specific goals.

The core problem situation that is identified in the relevant system shows the transformation process within the perceived system. A root definition of this relevant system which has emerged as the primary task system.

Root Definition

A system to store, share, manipulate and analyze raw data to provide meaningful data for today and the future , which is accessible to the public for the benefit of an organization subject to budgetary, government and technological constraints.

The formulation of this root definition contains the six CATWOE elements which help to highlight the transformation process within the system and the weltanschauung or worldview.

CATWOE

Customers:	the public
Actors:	the public, database administrators, organizations administrators
Transformation	the process of storing raw data to either return it in its original form, to share or to aid in prediction analysis
Weltanschauung:	to contain a repository of data that is accessible by the relevant groups of users
Owner:	organizations, government

Environmental: budgetary constraints, technological constraints, government legal policies

Using the root definition and CATWOE the system can be modelled. This human activity system displays the minimum necessary activities to carry out the transformation process.

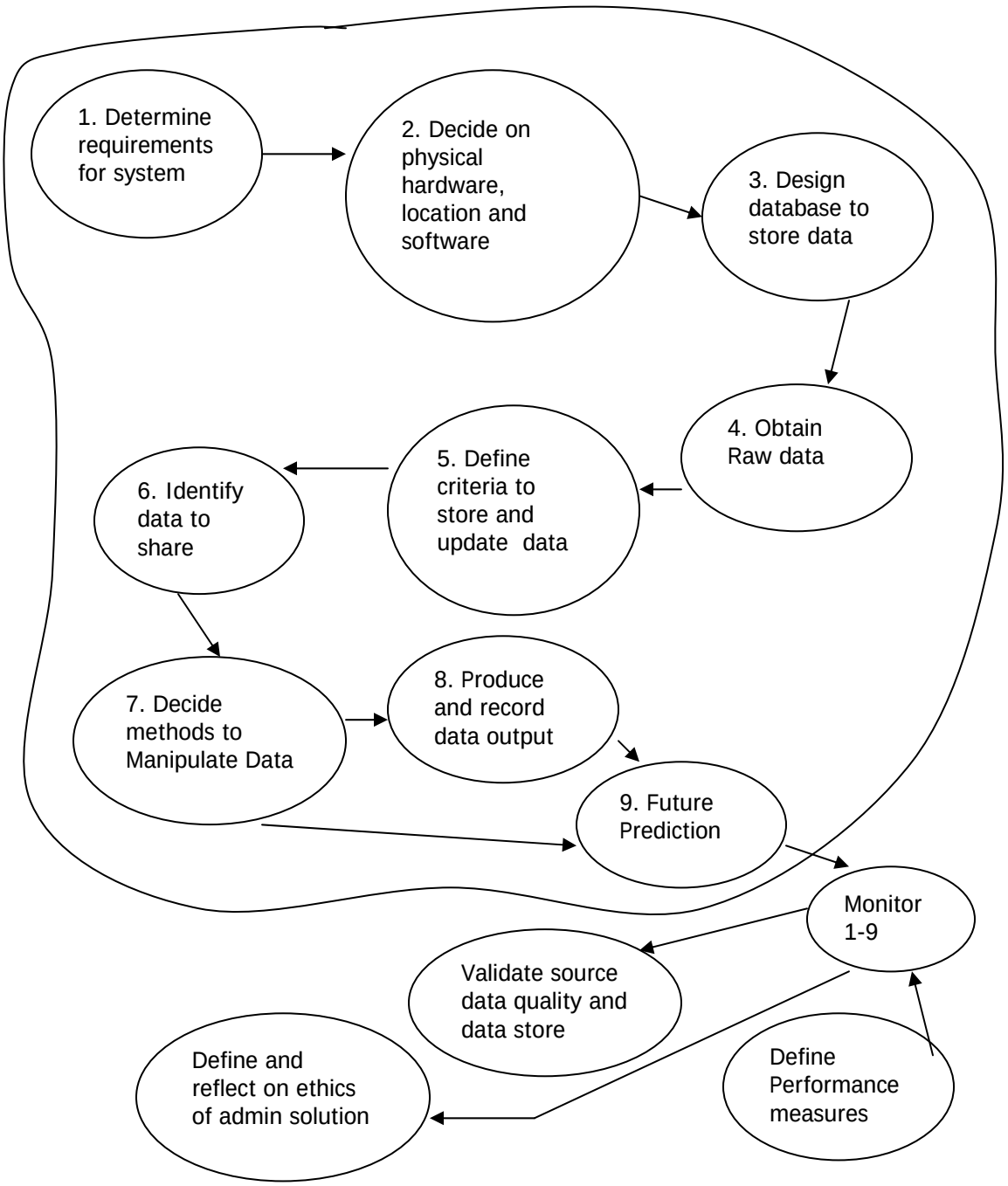

Figure 3 A conceptual model of the database framework

To ensure the system of interest is achieving the desired real goal it is necessary to monitor its performance and determine metrics to measure the operational systems. The criteria for performance using the 5 E's are

Efficacy	Is the data stored and providing the required data, secure and valid.
Efficiency	set up performance monitor is to see if minimum resources are used.
Effectiveness	is the data which is collected and transformed helping the longer term goals related to the organisation.Is the company purpose, financial gain or future prediction of market trends providing information, ease of use.
Ethicality	is this the moral thing to do
Elegance	is the data provided in the required, easy to use format.

These criteria determine performance of this system and that it is monitored to ensure the system is providing the data within a timely fashion. The data provided should be verified to ensure nothing is deleted, that it is correct and secure. The effectiveness of the transformation of raw data into useable data is measured by how well the organisation performs, what innovation it has or by the increase in speed of regular task.

The ethics for the management of the database systems is important, should we be doing this and should we be storing this information and how should we be doing this.

Databases are now being used across multiple industries and environments and there is the need to look not only at the ethics of the data contained within the databases but at the group of people who administer and are the guardians of the database. There is ethical concern over the information contained within the database how it is stored, accessed, secured and gathered however regardless of this the administrators need to ensure that they follow some ethical principals or guidelines. The guidelines below cover not only the overarching ethics but the core aspects which need to be covered whilst administering the database. All database administrators (DBAs) have a mutual engagement with the shared issues and have ethical aspirations. This ethicality statement covers the intentions, actions, problematic issues, confidentiality and data used. The ethicality statement must also ensure that sufficient stakeholders perspectives have been considered and that there contributions included within the final statements. Ethics covers the areas shown in figure 4

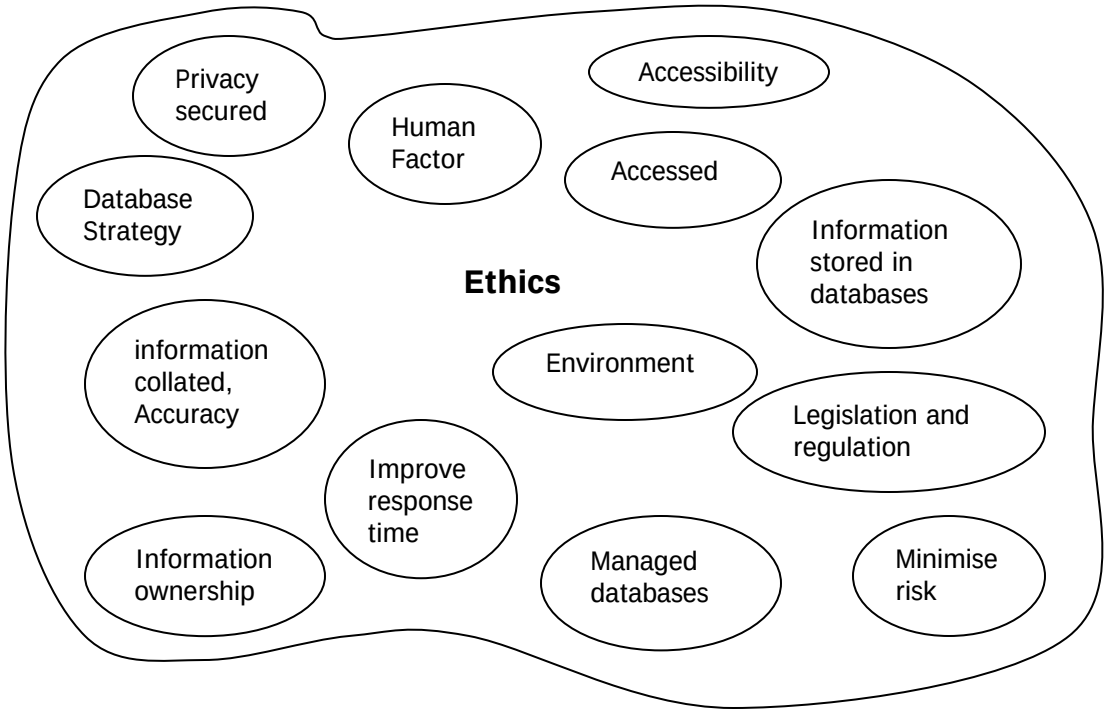

Figure 4 Ethics and the database systems map

The ethicality statement for the DBA (Database Administrator) is:-

Canon 1 - The DBA role consists of

- Being an enforcer of the database
- Numerous stated and unstated responsibilities
- Explaining the DBA role and recommendations to the public
- One who avoids any problems rather than firefighting incidents

Canon 2 - The Company's data is the most precious asset it has. A DBA must protect it.

Canon 3 - A DBA is responsible for making data available to authorized users and keeping data inaccessible to the unauthorized. Also there is need to know how sensitive the data is, how it is set up and manage the security

Canon 4 – A DBA should have a patching philosophy for when

- Security issues arise
- When a software bug arises

Canon 5 – A DBA should monitor the system to ensure it is always available when it is needed

Canon 6 – A DBA should ensure backups are made and checked to be valid

Canon 7 – A DBA should monitor changes to the system

- Following ITIL best practice
- Having 3 environments - development/staging/production
- Take a backup
- Ensure developers provide scripts to change production
- Always have a back out plan
- Understand the consequences of this change

Canon 8 – A DBA should ensure appropriate documentation is written or obtained

- A summary of essential information
- Keeping it up-to-date is the crucial aspect.
- Aim to create Self-documenting systems where possible

Canon 9 – A DBA should ensure good Data Modeling is applied so the data is useable across systems

Canon 10 – A DBA should ensure there are database Audits which

- Periodically audit each database
- Have a Checklist for problems
- Have a sheet describing the purpose of each check

Canon 11 – A DBA should design and follow best practice for design, development and administration

Canon 12 - When you're wrong, admit it, quickly

- Any man worth his salt will stick up for what he believes right, but it takes a slightly better man to acknowledge instantly and without reservation that he is in error - Andrew Jackson

Design ethical matters need to be addressed separately due to the vast complex arena of holistic representations. These ethical matters must be holistic and reflexive and be able to be iterative not only by the organizational needs but by that of the users. Analysis, reporting and custom driven architectures lead the way to future developments but they do not question the ethics of the situations.

The data content ethical issue considers how the information is obtained that is collected and stored in the database and who is allowed access to this data. The ethical dilemma is who owns the data, is it secure, will it become out of date, does it represent a real picture of the situation or will it lead to misinterpretations. Figure 5 displays the questions which need addressing.

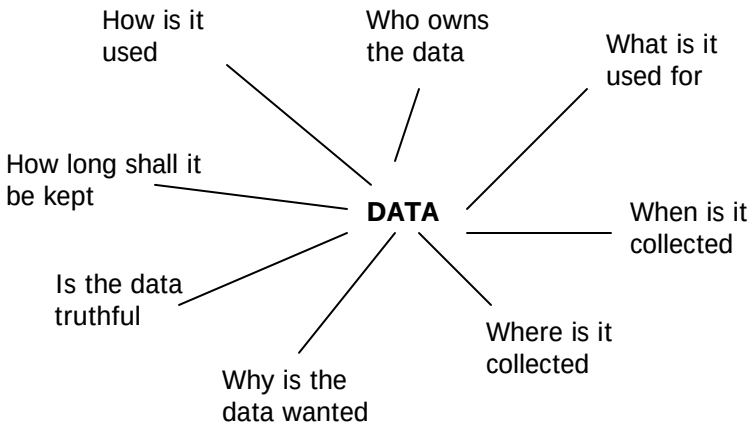

Figure 5 Ethical design

There are 2 core parts to ethics covered here

- Ethical Design
- Ethical Management

With ethics asking questions about the data this leads to reflection and all parts of the database changing continually as in figure 6.

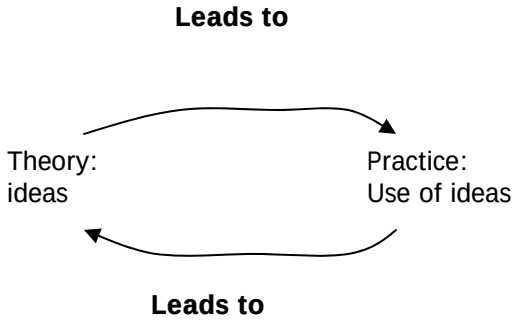

Figure 6 Learning cycle in which theory and practice create each other

The changes can be systematically desirable to produce the desired results or culturally feasible. With this epistemological awareness of the situation a database framework is required to deal with the emergent properties. This complex system requires some kind of governing body to simplify the lifecycle design, development and manageability securely. I propose a framework with various tracks as data architecture, data quality,

data availability and data administration (AQAA). Figure 7 outlines the AQAA framework.

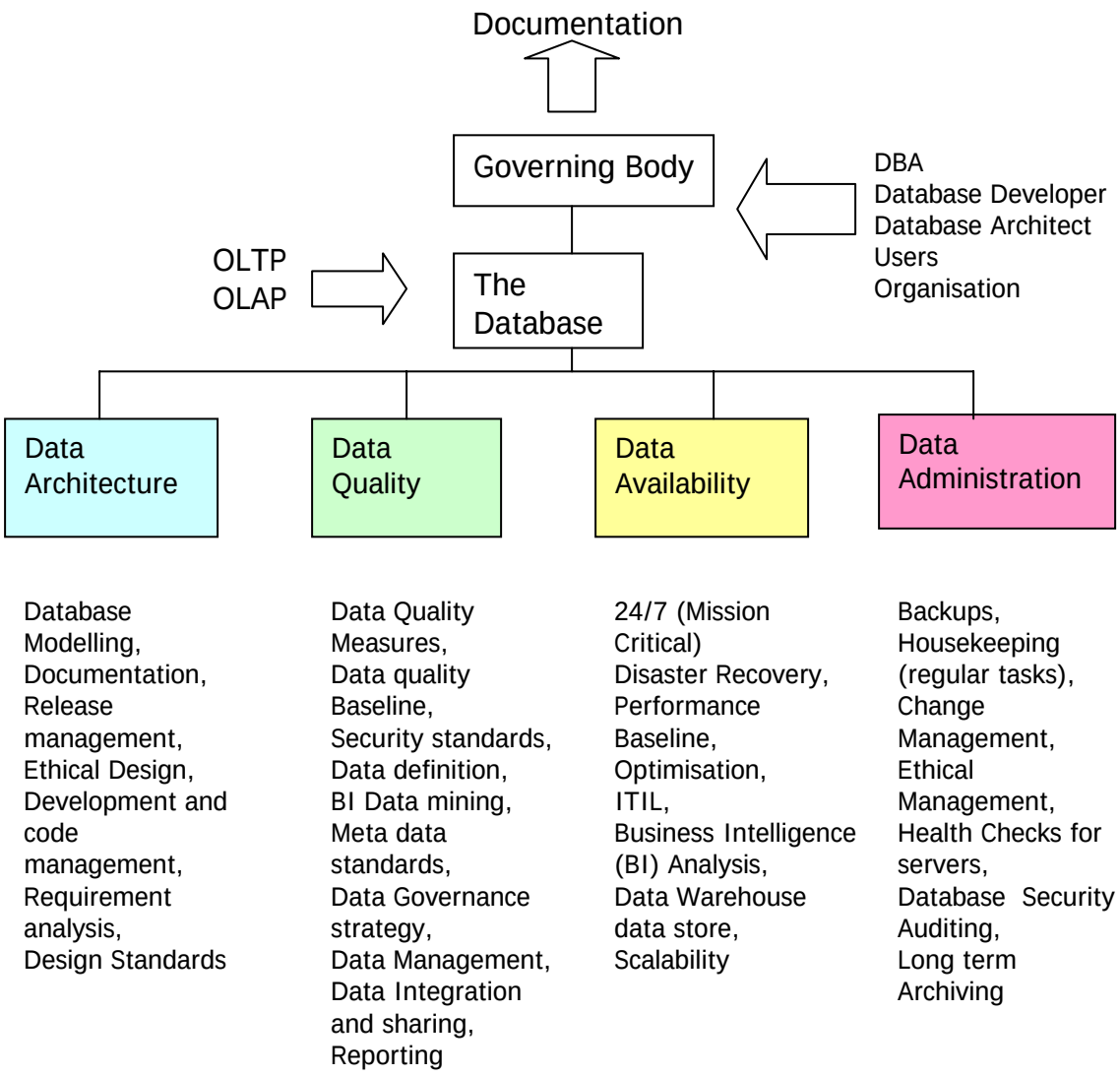

Figure 7 AQAA framework

The framework requires order and identifies the action required, is extendable and reusable with the aim to automate.

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