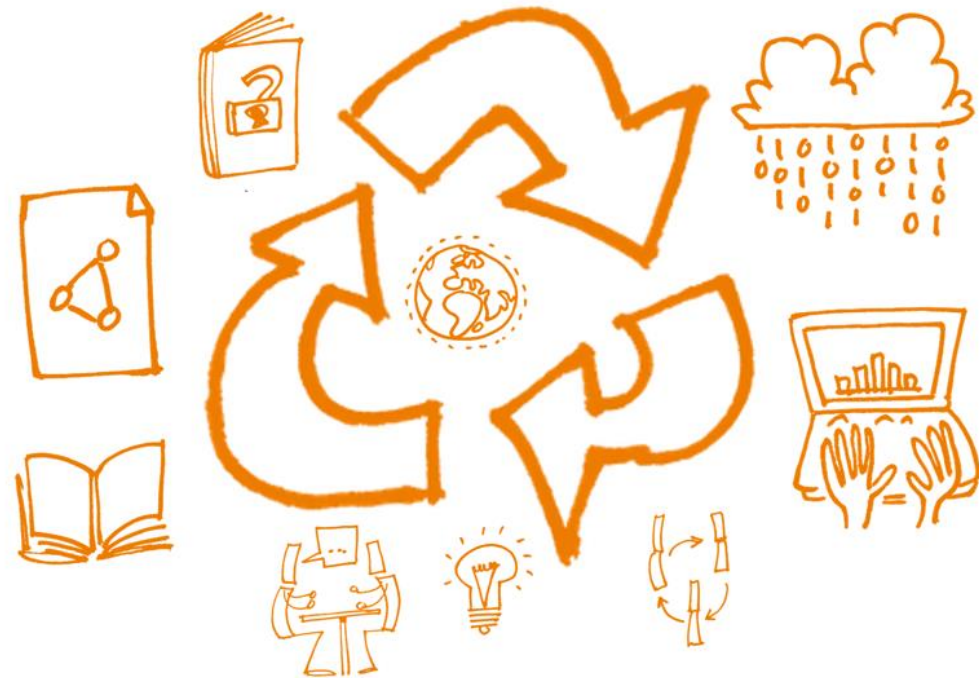# Research Data Management

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Geesthacht
29/09/2021

Topics

- **What is Data Management?**

- **What are the benefits of Data Management**

- **Aspects of Data Management**

- **FAIR Data**

- **The Data Management Plan**

- **Elements of a Data Management Plan**

- **The Data Life Cycle**

What is Data Management?

Data management involves the organisation and control of the work processes involved in generating and managing data as efficiently as possible. This begins at the initial planning stage, through to data creation, archiving, reuse or deletion of data.

Open-Science-Training-Handbook, CC0

What are the benefits of Data Management?

Increase the visibility and impact of your research

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- Good documentation makes your work reusable

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What are the benefits of Data Management?

- Increase the visibility and impact of your research

- Saves time in the long run

- Good documentation makes your work reusable

- Increases the efficiency of research

- Preserves your work for the long term and prevents data loss

- May also be a requirement of the funding agency

Aspects of Data Management

Data Management Plan

Aspects of Data Management

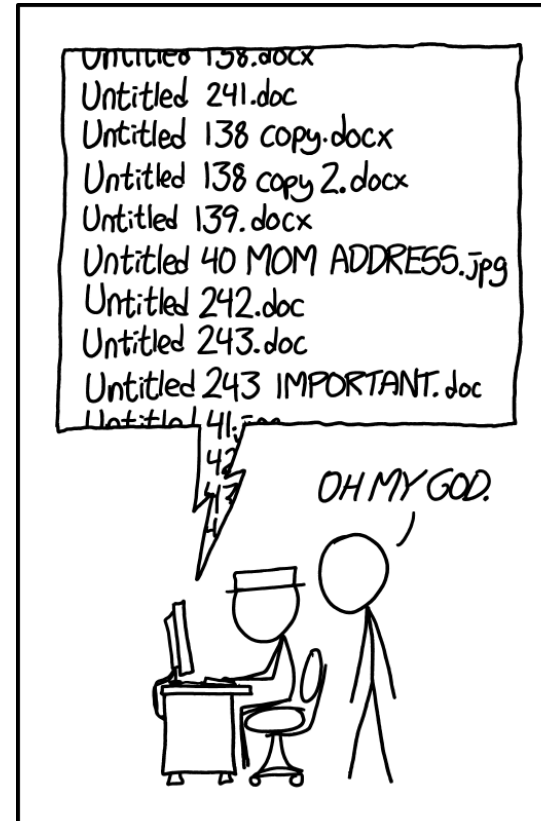Data Management Plan

Storage, back up and archiving

Aspects of Data Management

- Data Management Plan

- Storage, back up and archiving

- Oraganisation of files

PROTIP: NEVER LOOK IN SOMEONE ELSE'S DOCUMENTS FOLDER.

Randall Munroe, 2014, CC BY-NC 2.5

Aspects of Data Management

- Data Management Plan
- Storage, back up and archiving
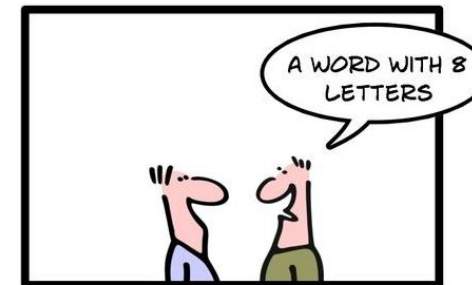- Oraganisation of files
- Metadata and documentation

Metadata

Metadata is data that provides information about other data

Why do we need metadata?

- To find data

- To use data

- To reuse data
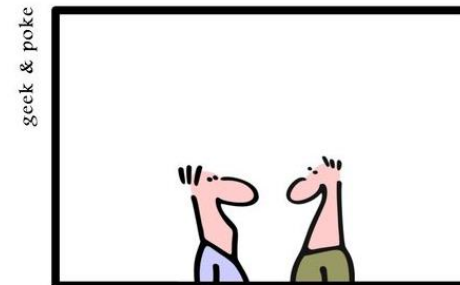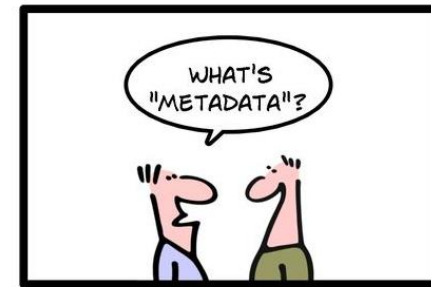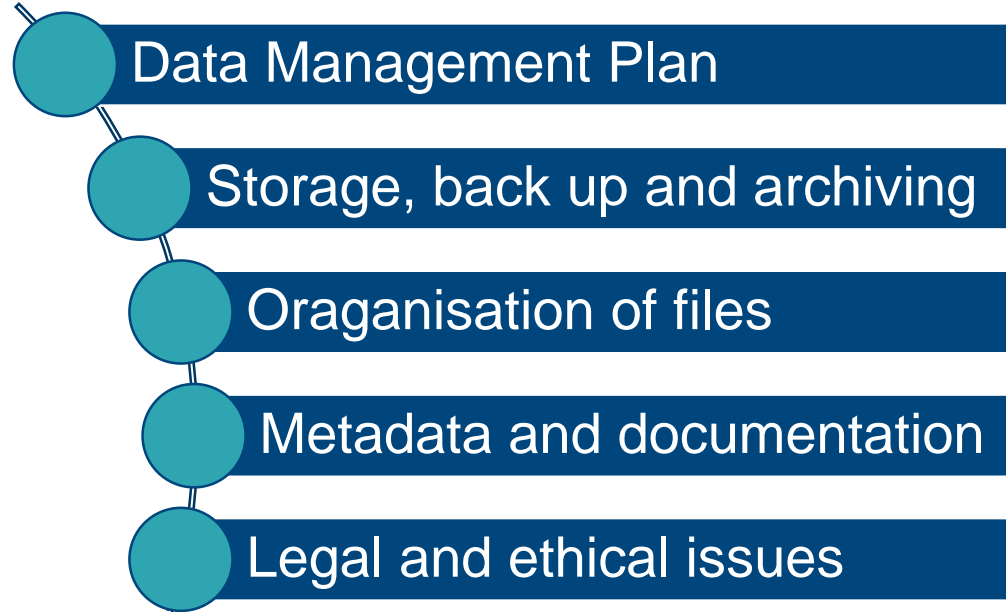
Geek &poke, 2010, CC BY 3.0

Aspects of Data Management

- Data Management Plan
- Storage, back up and archiving
- Oraganisation of files
- Metadata and documentation
- Legal and ethical issues

Aspects of Data Management

- Data Management Plan
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- Sharing and reusing data

Auke Herrema, Het Bouwteam,2004 CC-BY

Aspects of Data Management

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Auke Herrema, Het Bouwteam,2014 CC-BY

FAIR Data
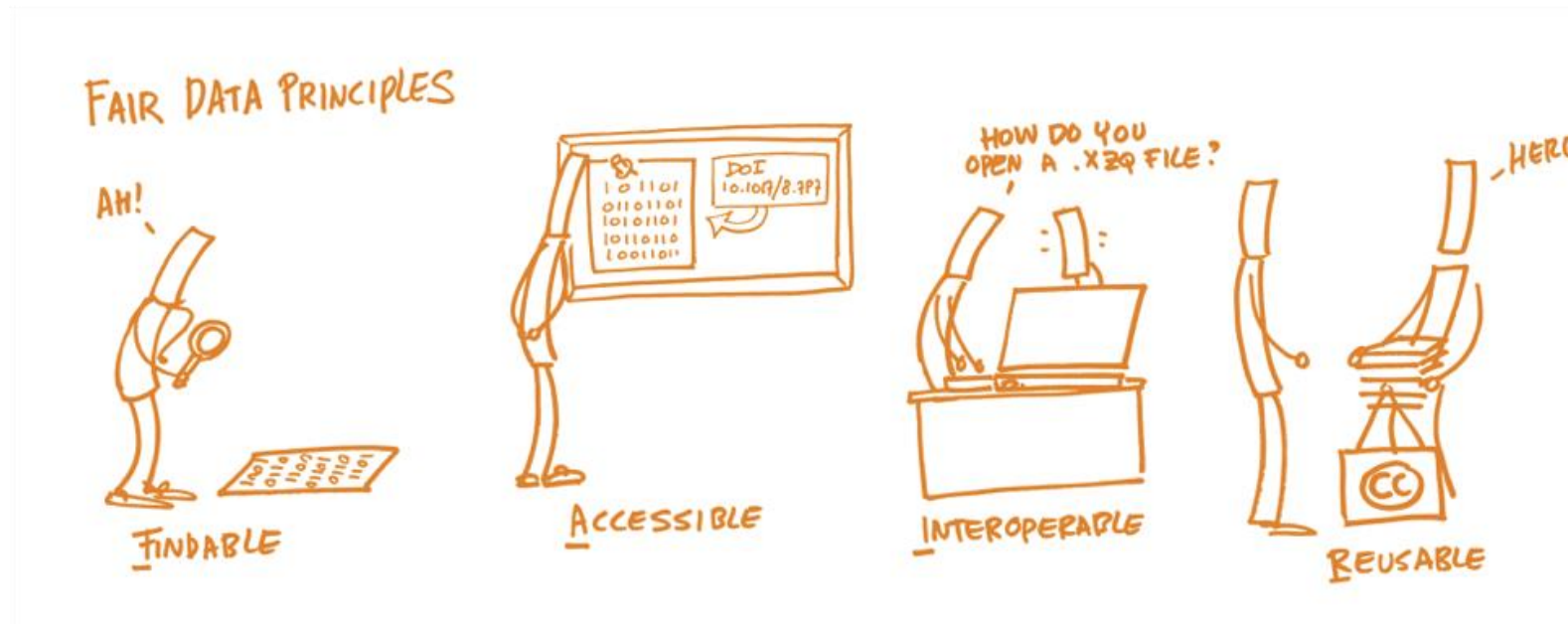
Open-Science-Training-Handbook, CC0

FAIR Data

Findable

F
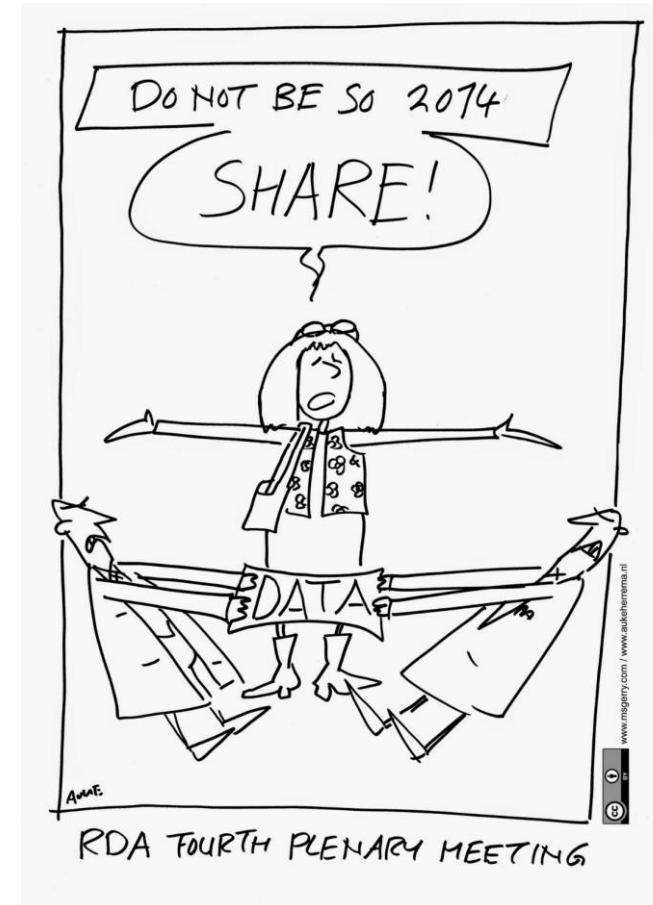
- **F1. (Meta)data are assigned a globally unique and persistent identifier**

- **F2. Data are described with rich metadata**

- **F3. Metadata clearly and explicitly include the identifier of the data they describe**

- **F4. (Meta)data are registered or indexed in a searchable resource**

What is a DOI?

- **A digital object identifier (DOI) is a unique alphanumeric string used to identify objects, mainly journal articles, research reports and data sets but can be assigned to any object.**

- **Even if the location or metadata of the object changes, the DOI remains the same.**

- **This means that an object with a DOI can be easily found even if the object location changes.**

You may find DOIs formatted in various ways:

- ✔ doi:10.1080/02626667.2018.1560449
- ✔ https://doi.org/10.1111/hex.12487
- ✔ https://dx.doi.org/10.1080/02626667.2018.1560449
- ✔ https://doi.org/10.1016/j.jpsychires.2017.11.014

FAIR Data

Accessible

- **A1. (Meta)data are retrievable by their identifier using a standardised communications protocol (e.g. http or ftp)**

- **A2. Metadata are accessible, even when the data is no longer available**

FAIR Data

Interoperable

- **I1. (Meta)data use a formal, accessible, shared and broadly applicable language for knowledge representation**

- **I2. (Meta)data use vocabularies that follow FAIR principles**

- **I3. (Meta)data include qualified references to other (Meta)data**

FAIR Data

Reusable

R

- **R1. (Meta)data are richly described with a plurality of accurate and relevant attributes**

The Data Management Plan

A Data Management Plan
- Useful tool to think ahead
- Allows for easy project management
- Clarifies needed budget
- Makes data FAIRer
- Shows accountability

CESSDA ERIC, CC BY-SA 4.0

Elements of a Data Management Plan

Data Description

- **A description of the data that will be gathered**

- **The type and scale of data that will be created or collected**

Research Data Management

Elements of a Data Management Plan

Data that will be created

- **Formats in which the data will be created, maintained and made available**

- **Estimated data volume**

- **Information on how the data will be generated**

- **What is the purpose of the data collection?**

- **For whom is the data useful?**

- **When and where will the data be generated?**

Elements of a Data Management Plan

Existing Data

- **A description of existing data that can be used for the project**

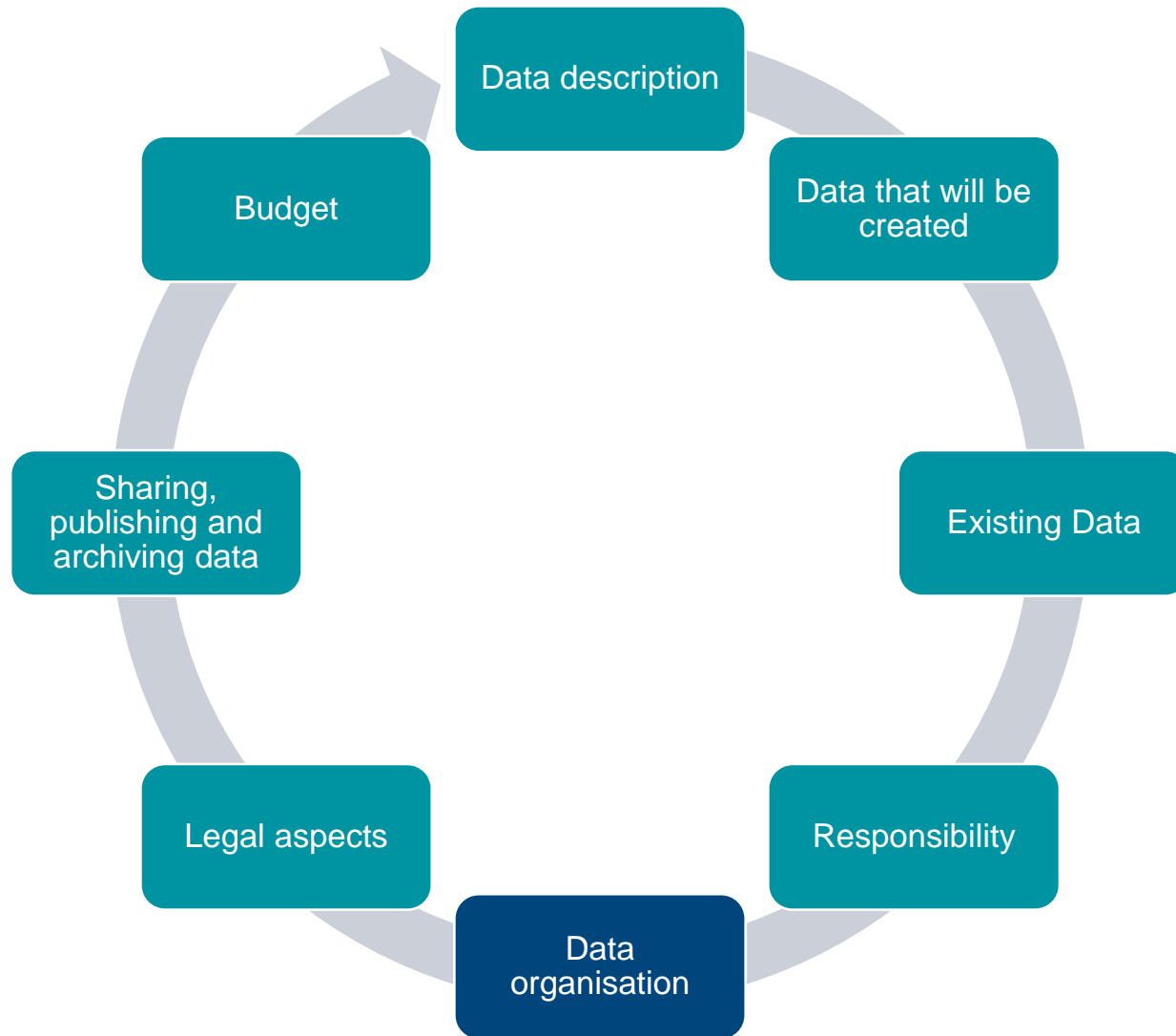- **A discussion on whether and how this data can be integrated**

Elements of a Data Management Plan

Responsibility

- **List of people responsible for the data management in the research project**

Elements of a Data Management Plan

Data organisation

- **Creation of metadata**

- **Data naming and folder structure**

- **Documentation**

- **Storage and backup**

Elements of a Data Management Plan

Legal Aspects

- **Copyright constraints**

- **Access rights**

- **Data protection – for sensitive data**

Elements of a Data Management Plan

Sharing, publishing and archiving data

- **A description of how data will be shared**

- **Access options (free, restricted…)**

- **How data will be selected for archiving and how long it will be held**

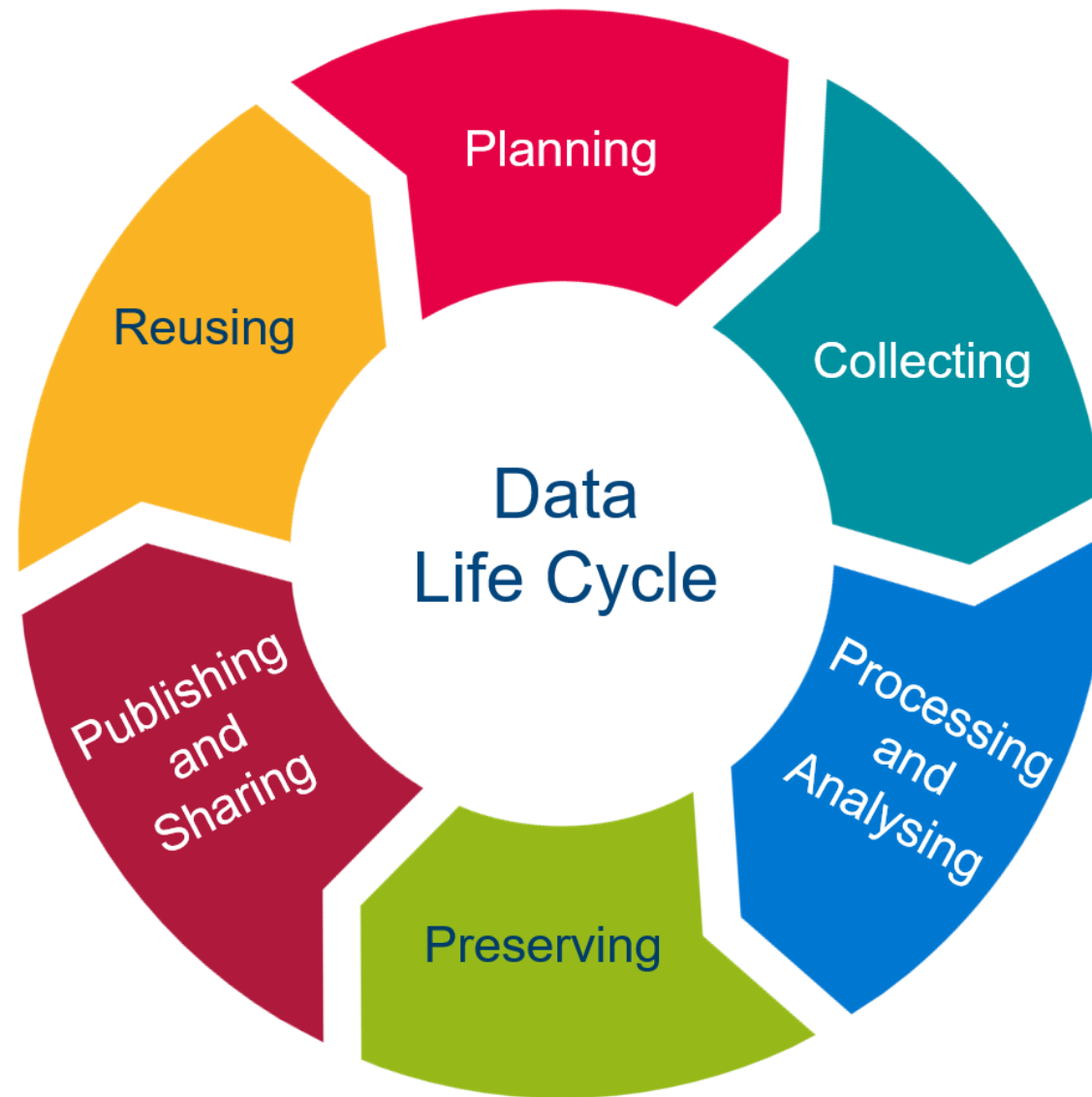- **Do you plan to request DOIs for your data?**
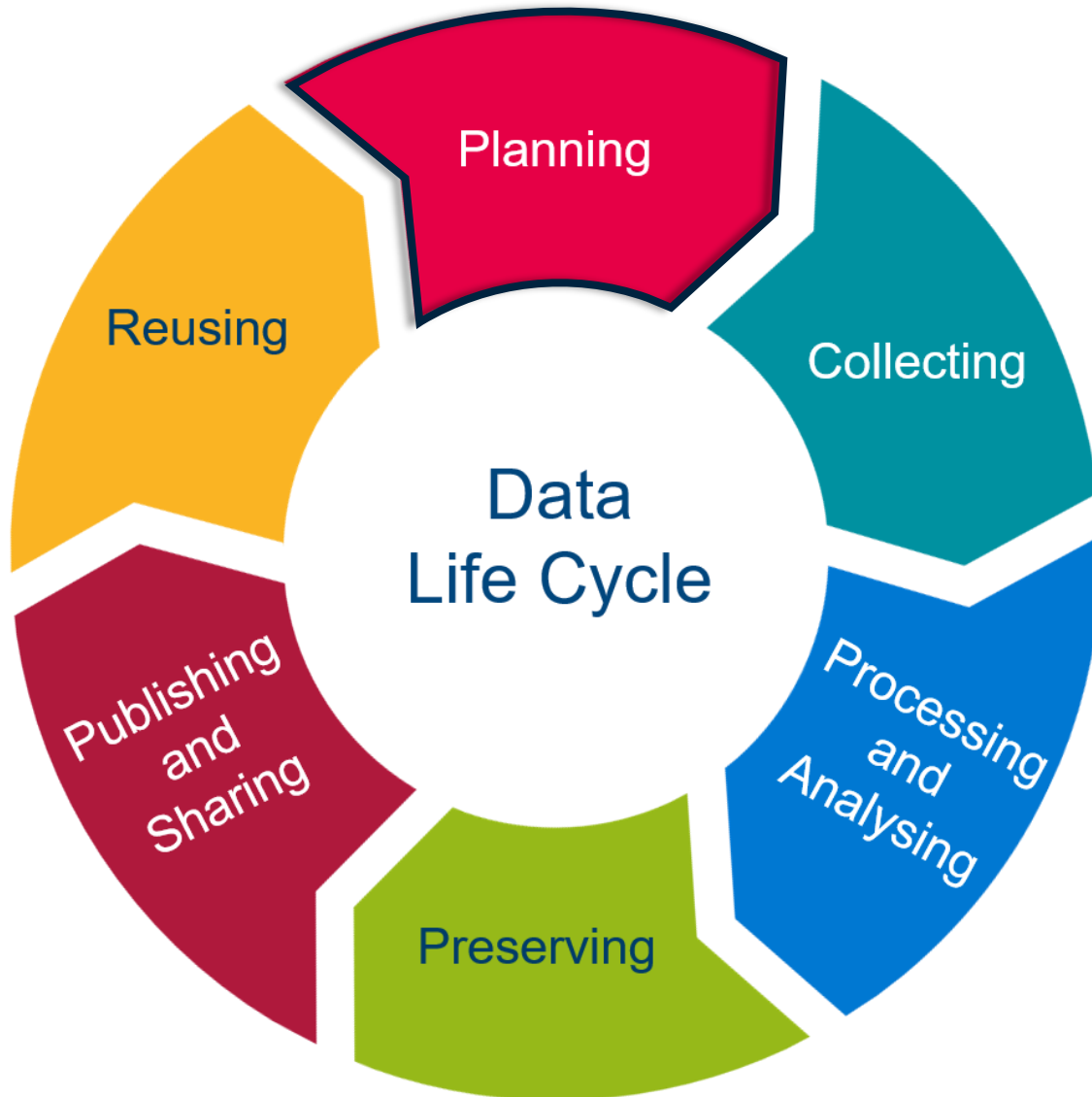
Elements of a Data Management Plan

Budget

- **The cost of preparing data for archiving and how these costs will be paid**

- **Requests for funding can be included**
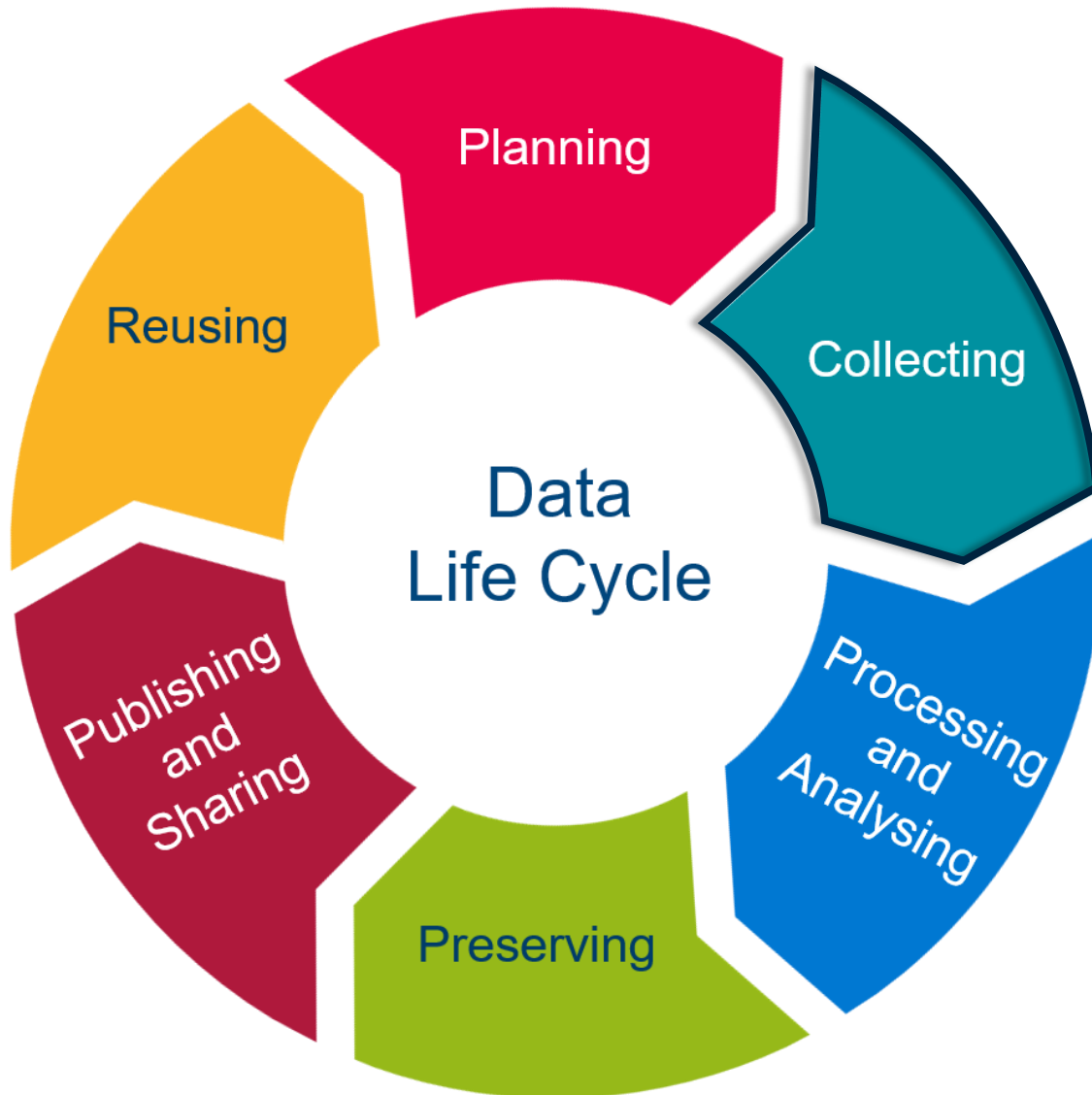
The Data Life Cycle

Research Data Management

The Data Life Cycle

Planning

- Plan how data will be managed throughout the life cycle

- Create a Data Management Plan

The Data Life Cycle
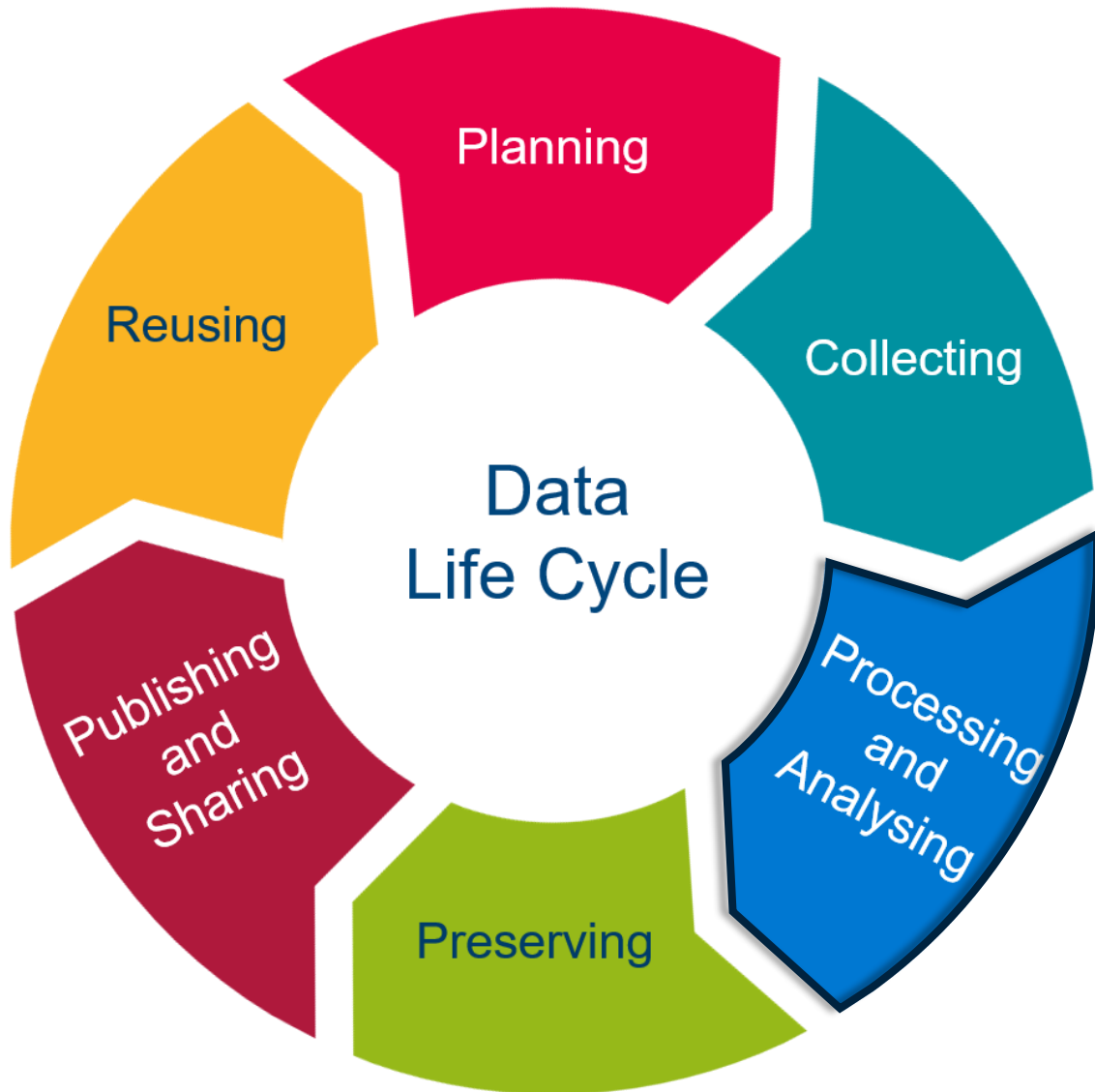

Collecting

- Collect or generate new data

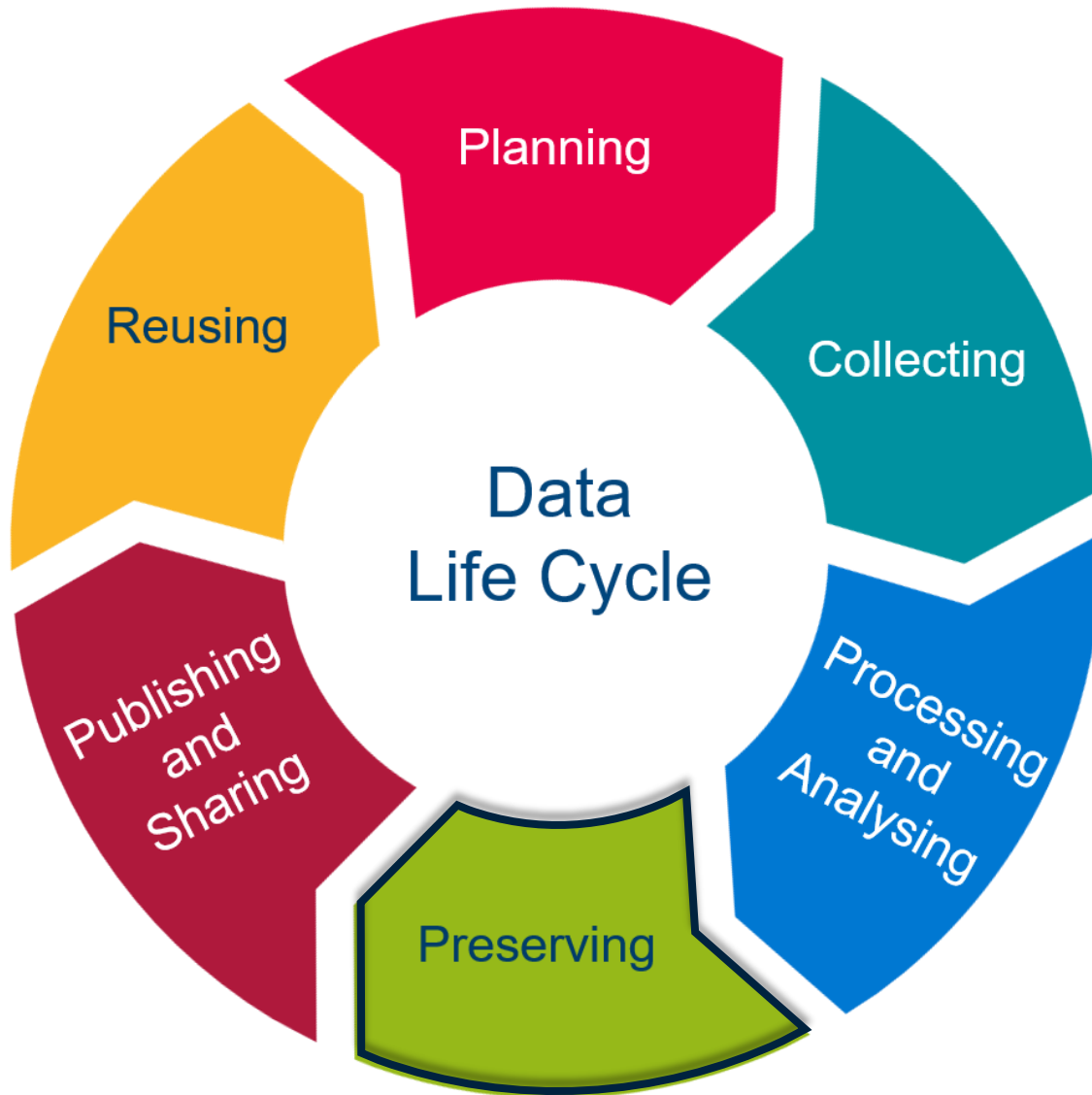- Obtain existing data

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The Data Life Cycle

Processing and Analysing

- Processing data e.g. transforming or summarising data

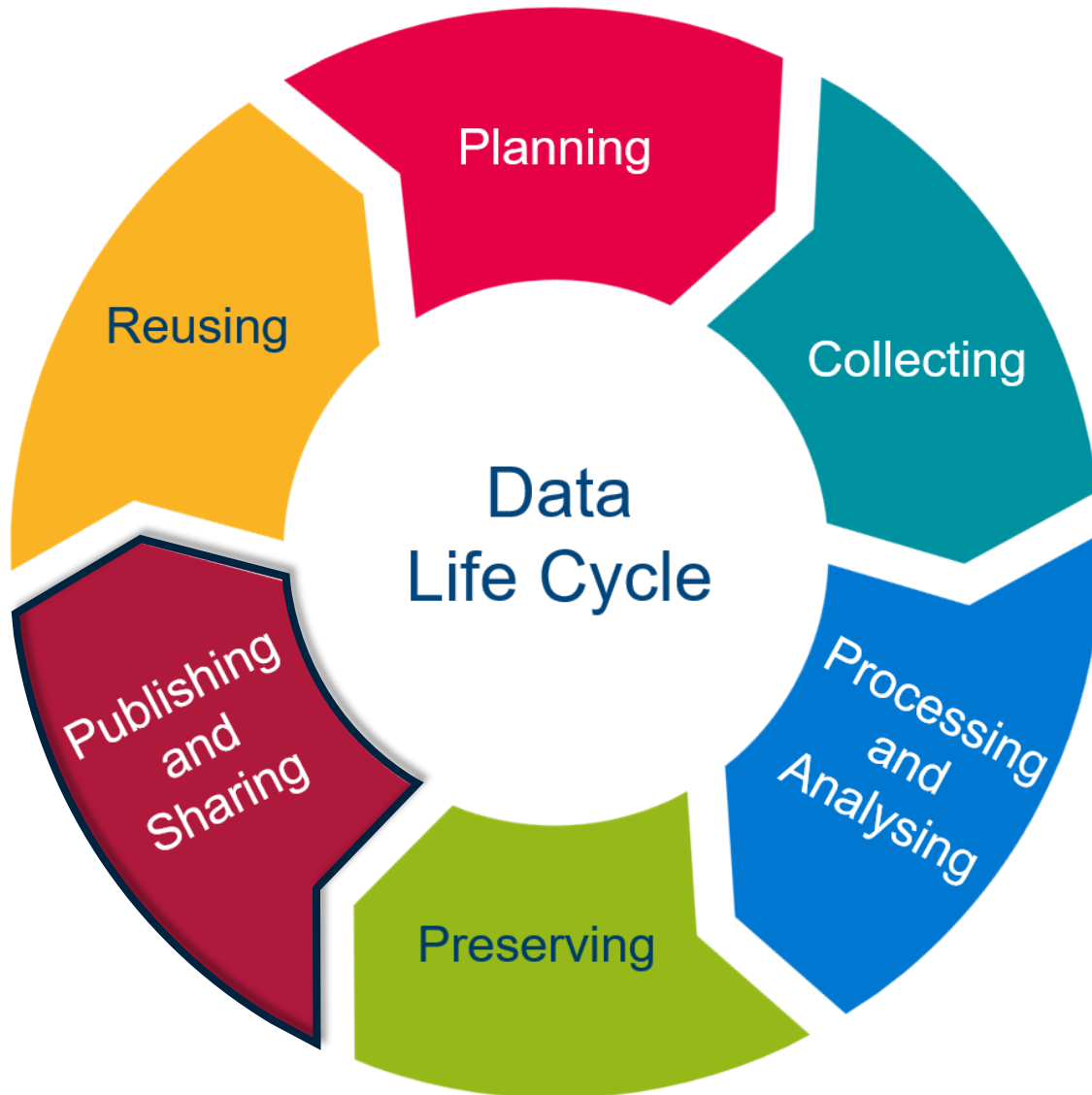- Analysing data e.g. statistical analysis, modeling, visualisation

The Data Life Cycle

Preserving

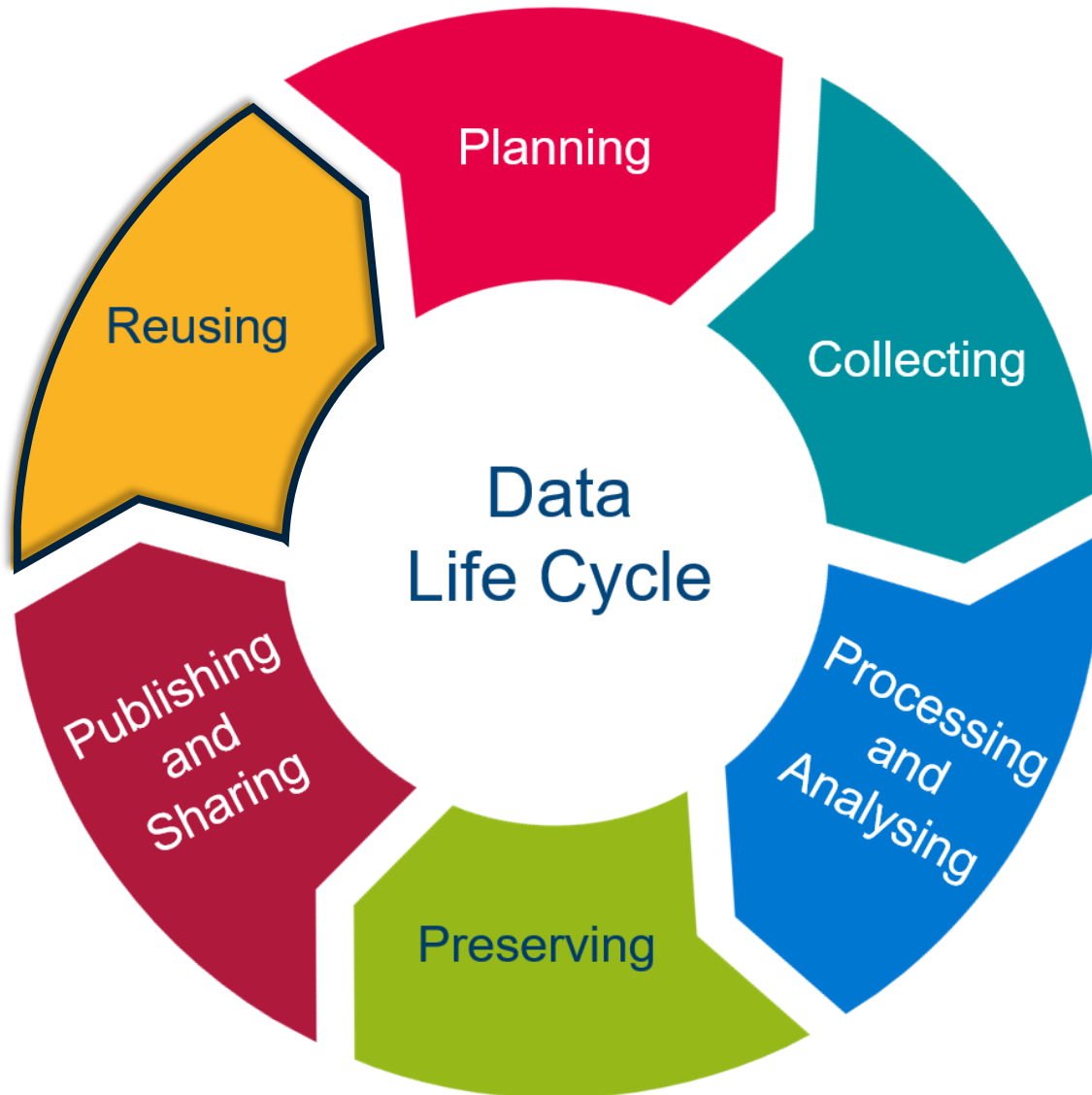- Data are submitted to a long term archive

The Data Life Cycle

Publishing and Sharing

- Data should be stored in a data repository where it can be easily accessed

- Include good metadata

- Data can be made public or restricted

Research Data Management

The Data Life Cycle

Reusing

- Data can now be reused by other researchers

References

- **https://www.go-fair.org/fair-principles/**

- **https://www.scribbr.com/citing-sources/what-is-a-doi/**

- **https://www.icpsr.umich.edu/web/pages/datamanagement/dmp/elements.html**

- **https://www.usgs.gov/products/data-and-tools/data-management/data-lifecycle**

- **https://guides.lib.unc.edu/metadata/importance**

Vielen Dank

www.hereon.de

Helmholtz-Zentrum
hereon

Titel der Präsentation, Z1, Arial Regular 9 pt

The Data Life Cycle

Titel der Präsentation, Z1, Arial Regular 9 pt