

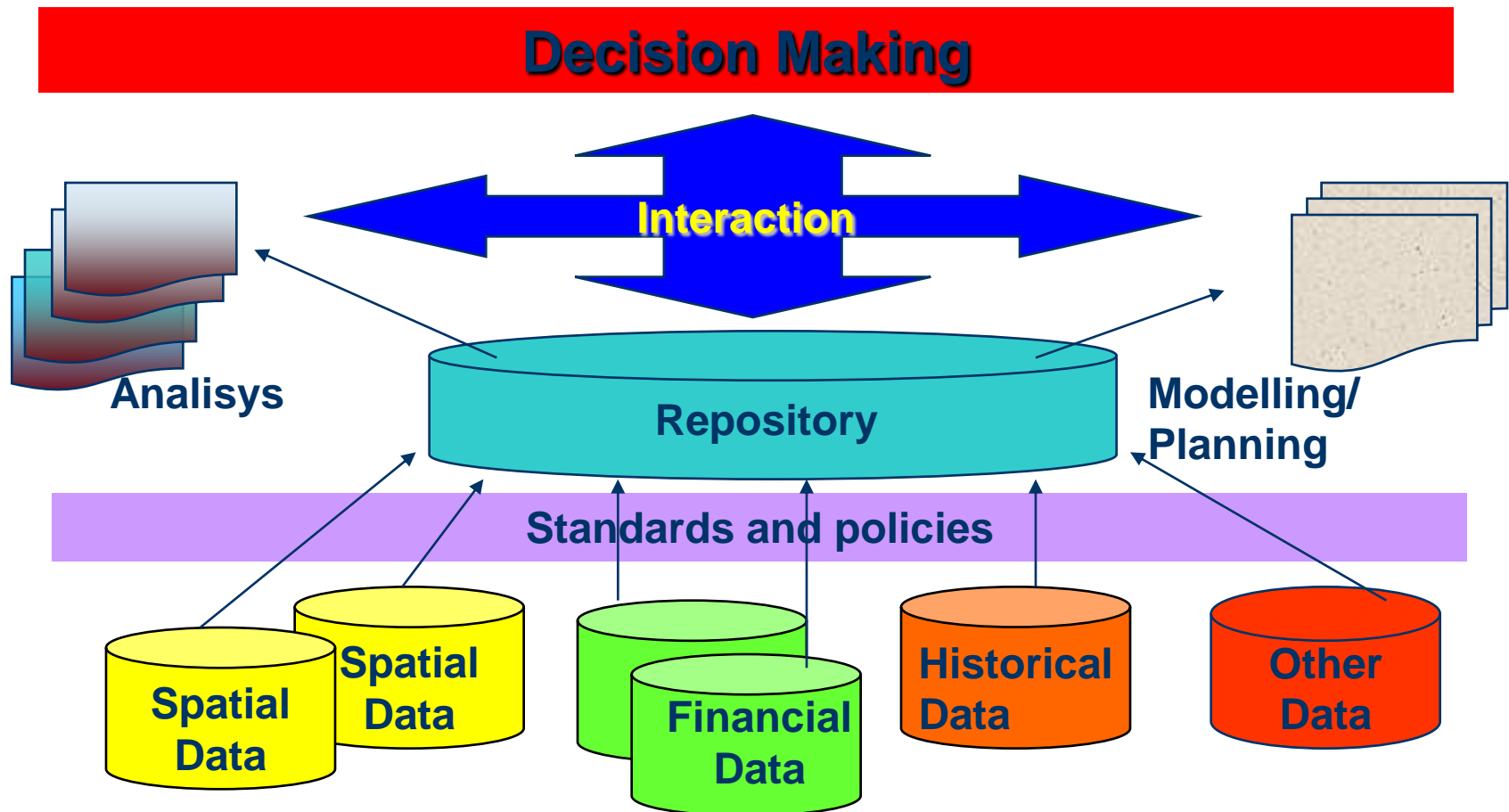
Role of Data Quality in GIS Decision Support Tools

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Decision Support Systems

A spatially based computer application and data that assists a researchers and/or manager in making decisions .

Decision Support System - structure



Role of GIS in Decision Support Systems

- GIS became a basic platform from which a DSS may be developed;
- The system integration provides an effective functional coupling of spatial data, spatial simulation and optimization models;
- It supports various analysis techniques for solving spatial conflicts of different objectives, and for spatial decision making.

Impact of Spatial Data Quality on Decision-Making

- **Domain** of company – the complexity of spatial data and of the spatial relationships,
- **The role** of the geographic information system (GIS) inside the company,
- **Usability of GIS**: requirements for data quality are different depending on whether GIS is used at operational, management or executive level

The Quality of Spatial Data

- *Dependability characteristics* – time related aspects: **availability, temporal correctness**
- *Integrity characteristics* – applicability of information: **completeness, consistency, correctness**
- *Accuracy characteristics* – **positional accuracy** and **attribute accuracy**

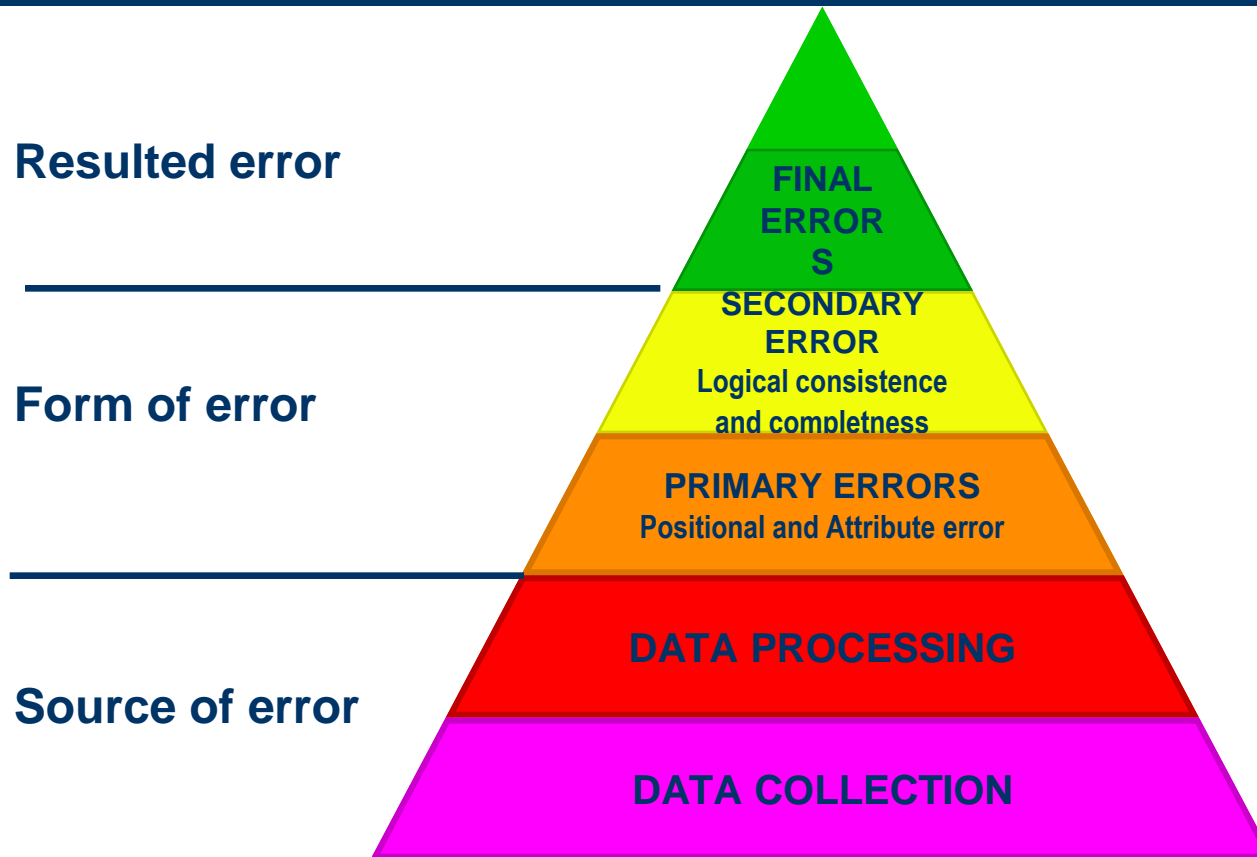
Uncertainty of Spatial Data

- **Error** is the difference between the value of the property of an object, measured with unknown error, and the true value of the same property of the same object measured without error.
- **Vagueness** arises due to poor definitions. Vagueness can be caused by poor documentation. It can be quantified in the case of fuzzy objects;
- **Ambiguity** arises due to disagreement on the definition of objects in a spatial data set. Such disagreement can arise because the definition was not specific,

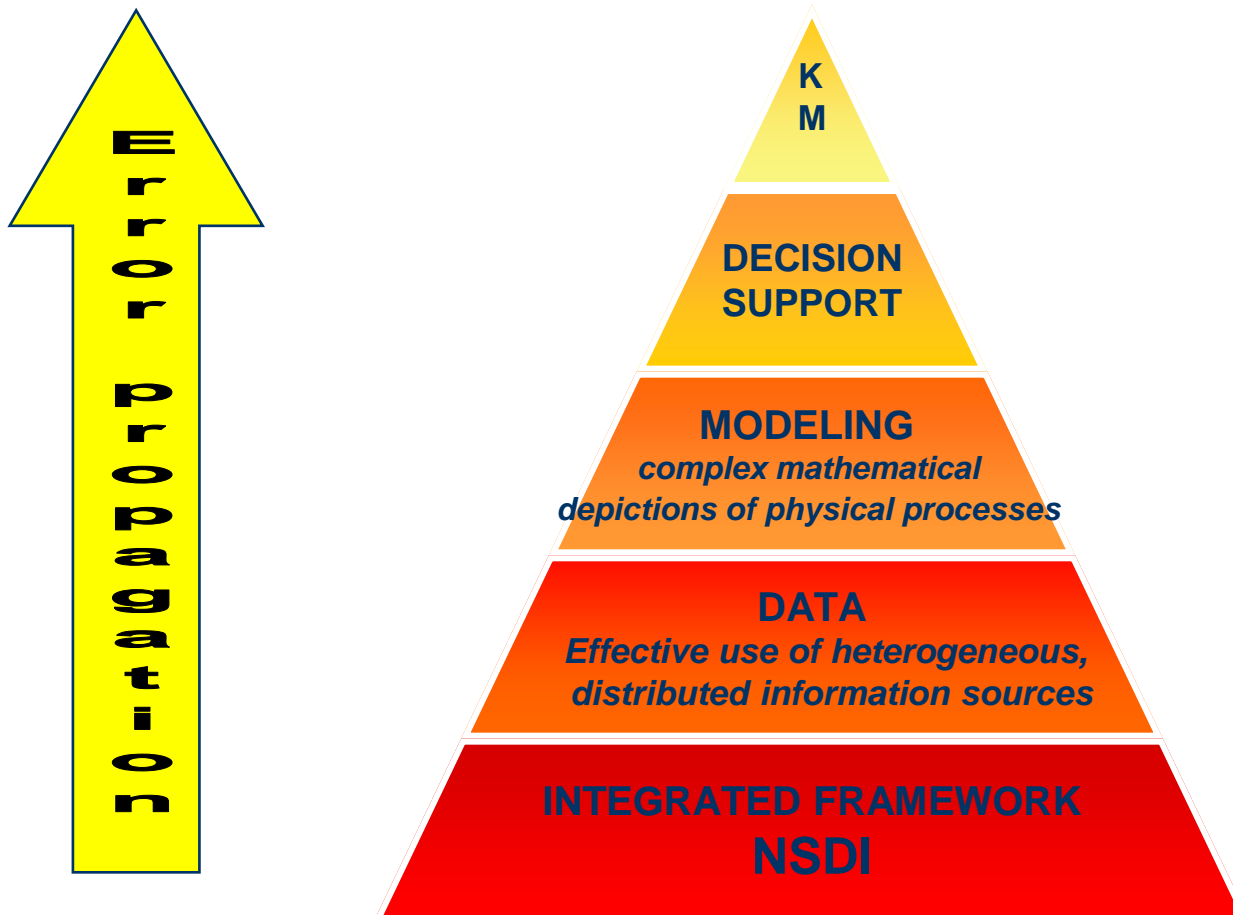
Error propagation

- **Error propagation** occurs because every process in GIS is a function of the input geospatial data sets, which have inherent source errors that automatically affect the computed results

Error Classification and Propagation



Impact of Spatial Data Quality on Decision-Making



Improvement of Spatial Data Quality

- Evaluation of the quality is necessary to be done at least at the end of each process,
- Evaluation of quality is dependent by the type of the process,
- Uncertainty of spatial data can be evaluated by using two methods:
 - by direct observation, with visual comparisons of the resulted models
 - by using statistical parameters.

Evaluation of Spatial Data Quality

