State of the Art of Costs & Benefit Models for Digital Curation

Cost Concept Model and Gateway Specification

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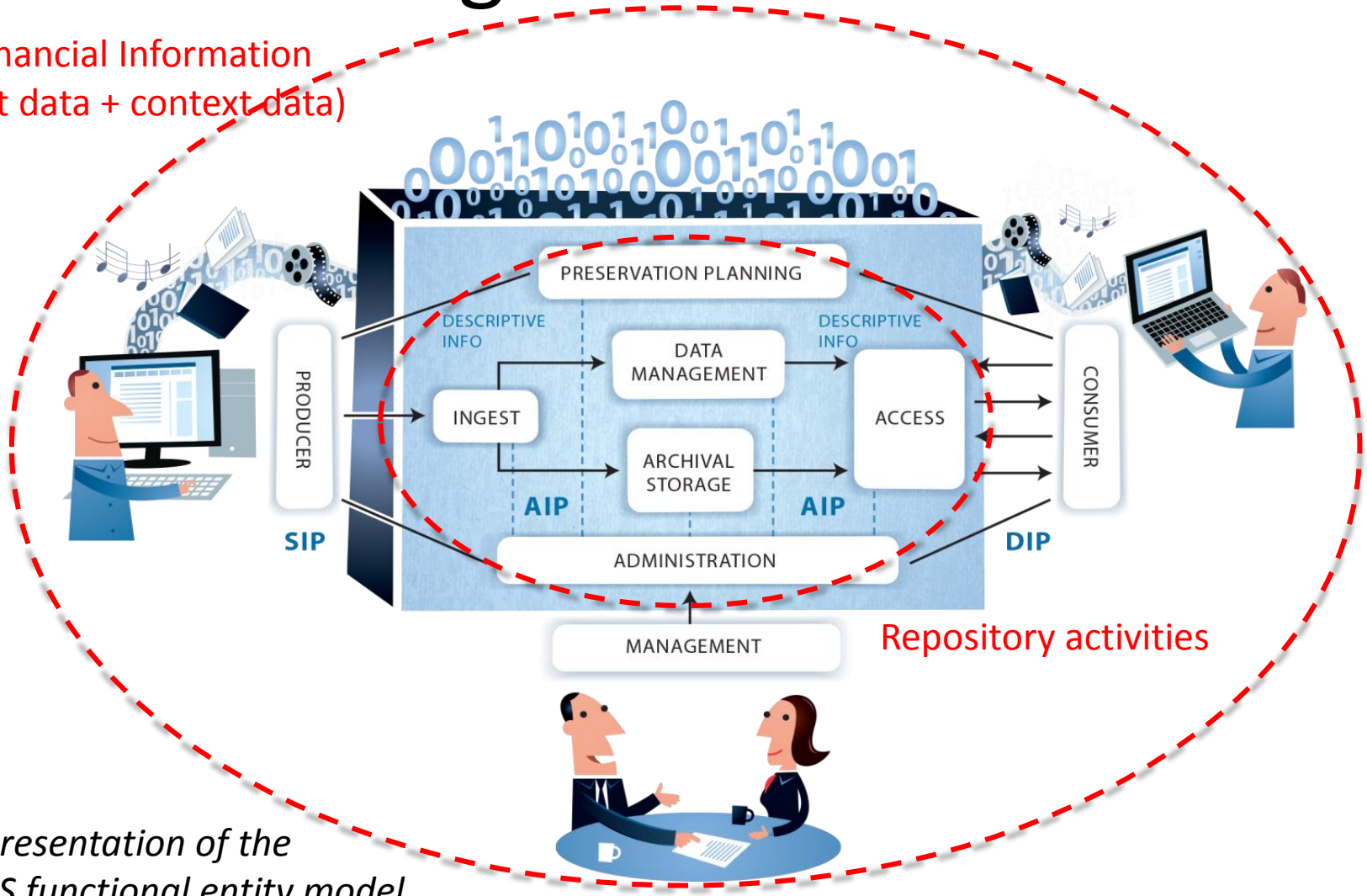
Digital Curation

Financial Information
(cost data + context data)



Repository activities

Representation of the OAIS functional entity model

List of evaluated models

ID	Name and acronym	Owner	Type
1	Cost Model for Digital Preservation	National Archives of the Netherlands	Cost
2	The NASA Cost Estimation Tool (CET)	National Aeronautics & Space Administration	Cost
3	LIFE^3 Costing Model	University College London; British Library	Cost
4	Keeping Research Data Safe (KRDS)	Charles Beagrie Limited	Cost, Benefit
5	Cost Model for Digital Archiving	Data Archiving and Networked Services (DANS)	Cost, Benefit
6	Cost Model for Digital Preservation (CMDP)	Danish National Archive; Royal Library, DK	Cost
7	DP4lib Cost Model	German National Library	Cost
8	PrestoPRIME Cost Model for Digital Storage	PrestoPRIME project	Cost
9	Total Cost of Preservation (TPC)	Digital Library of California	Cost
10	Economic Model of Long-Term Storage	Rosenthal, D	Cost

Example of model summary

Property	Description
ID	9
Name	Total Cost of Preservation (CDL-TCP)
Creator and funding	The model was (and is being) developed by the California Digital Library (CDL), UC Curation Center (UC3) under a Creative Commons Attribution-Sharealike 3.0 license
Status	The latest version of the TCP pricing model tool and whitepaper is rev 2.1 from 2013-08-05
Purpose	Modelling the full economic costs of preservation, the "total cost of preservation" (TCP) over time in order to sustain long-term preservation efforts—effective and affordable curation management. UC3 itself needs a TCP model in order to move many of its core service offerings to a cost recovery operational basis.
Information assets	Any kind of digital asset—the model uses a generic, abstract level
Activities	Ingest, Data Management, Archival Storage, Preservation Planning, Access, Administration, Management
Resources	Total cost; in the tool total cost is refined into subsidiary costs such as capital cost, labour cost; operational cost; one-time, term or annual costs (called scope), fixed cost or marginal cost (proportional cost). Term costs are annualized over their lifespan and adjusted for inflation.
Time	Present, future—10 year scope
Variables	More than 100. For example, for "Migration" there are unit costs for: refreshment, replication, repackaging, transformation. For "Staff" there are 12 kinds of roles with salaries, FTE day rates.
Type of tool	Analysis tool, implemented as a MS Excel spreadsheet
Availability of tools	The tool is available for download at: https://wiki.ucop.edu/display/Curation/Cost+Modeling
References	California Digital Library, Total Cost of Preservation (TCP), Whitepaper, 2013,: https://wiki.ucop.edu/download/attachments/163610649/TCP-cost-price-modeling-for-sustainable-services-v2_1.pdf?version=4&modificationDate=1375721821000

Stakeholder consultation

- Nature of organisation and information assets
  - Various use cases (organisations, assets, activities, retention time)
- Current practices
  - Accounting and budgeting
  - Various staff (account managers, department directors, repository managers)
  - 2 out of 3 organisations do not breakdown costs
- Experience with models/tools
  - Limited use (1 out of 5 have experience)
  - Limited success (lack of usability)

Users' needs for cost models

- Easy to use
  - Well documented
  - Supported by easy to use tools
- Fit for purpose – flexible and scalable
  - Various types/amounts of assets
  - Accounting and budgeting
  - Assessment of benefits
- Accurate and validated
  - Sound definition and breakdown of activities
  - Sound definition and breakdown of resources (well defined accounting principles and practices)

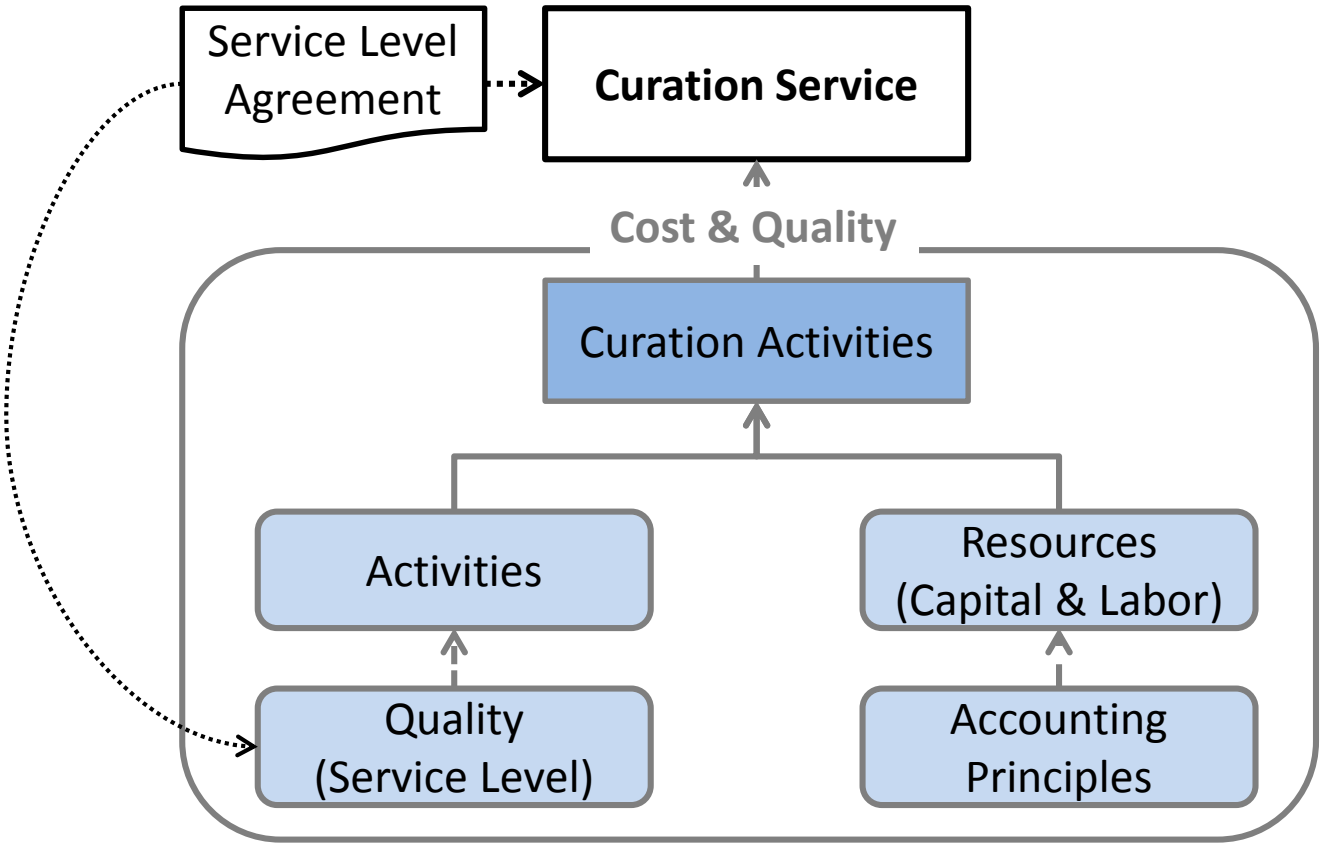
Gap analysis

	Model									
Cost variables	T-CMDP	NASA-CET	LIFE3	KRDS	CMDA	CMDP	DP4lib	PP-CMDS	CDL-TCP	EMLTS
Quantity of assets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Min/max amount of assets	✓	✘	✘	✓	✓	✘	✓	✓	✘	✓
Different types of assets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Quality of activities	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Upload/download capacity	✘	✓	✓	✓	✘	✘	✘	✓	✘	✘
Quality of repository	✘	✘	✘	✘	✓	✘	✘	✘	✘	✘

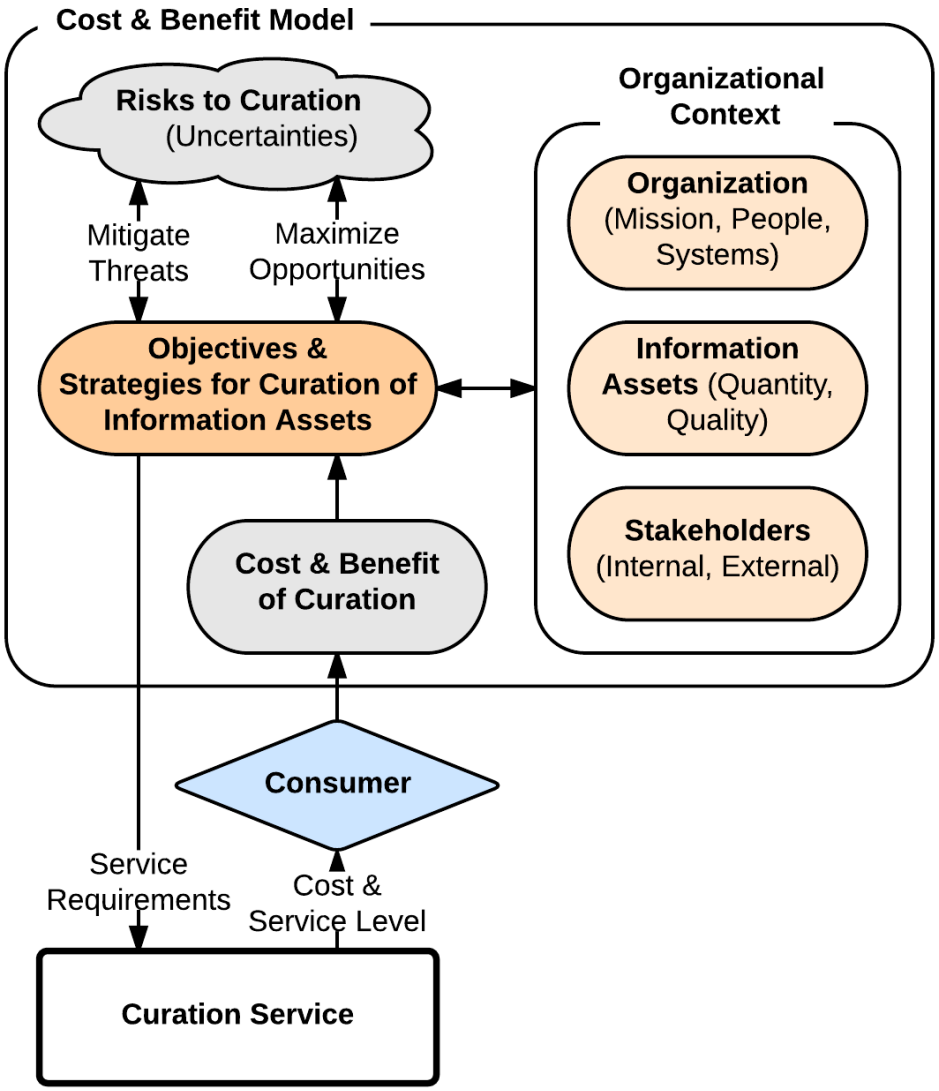
Recommendations

- Enhance usability of current cost models
  - Quick start guide and clear documentation
  - Tools (graphical user interfaces, pre-defined values)
  - Associate with benefit models
- Standardize cost models
  - Terms and concepts
  - Breakdown of costs
- Share cost data

Conceptual Cost Model



Conceptual Cost & Benefit Model



Conceptual Cost & Benefit Model

- A cost model is a representation that
  - defines the curation activities and their quality (service adjustments)
  - assesses resources (capital and labour) needed to perform the activities
  - defines accounting principles and practices (financial adjustments)
  - *specifies the relationship between the quality of curation activities and the costs of the activities (objective)*
- A benefit model is a representation that
  - defines benefits (what, who, when, impact, likelihood)
  - assesses value of benefits to a stakeholder
  - *specifies the relationship between the quality of curation activities, and the benefits that these activities represent to stakeholders (subjective)*