Quelle évolution de l'IST et des métiers ?

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Journée d'étude Bap F de l'InSHS, 21 nov 2014

Approche de la question

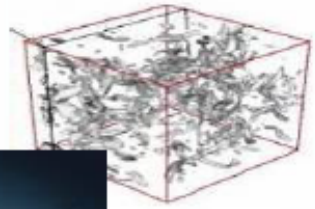
Quelle évolution de l'IST et des métiers…

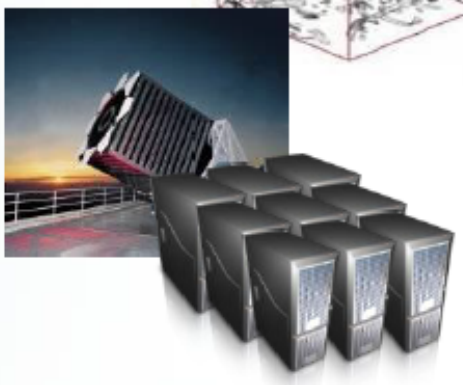
- *Quelles évolutions de la science et des besoins des chercheurs*
- Comment cela se traduit-il dans les activités de soutien à la recherche et donc pour les professionnels de l'IST
- Orientations futures

Emergence of a Fourth Research Paradigm

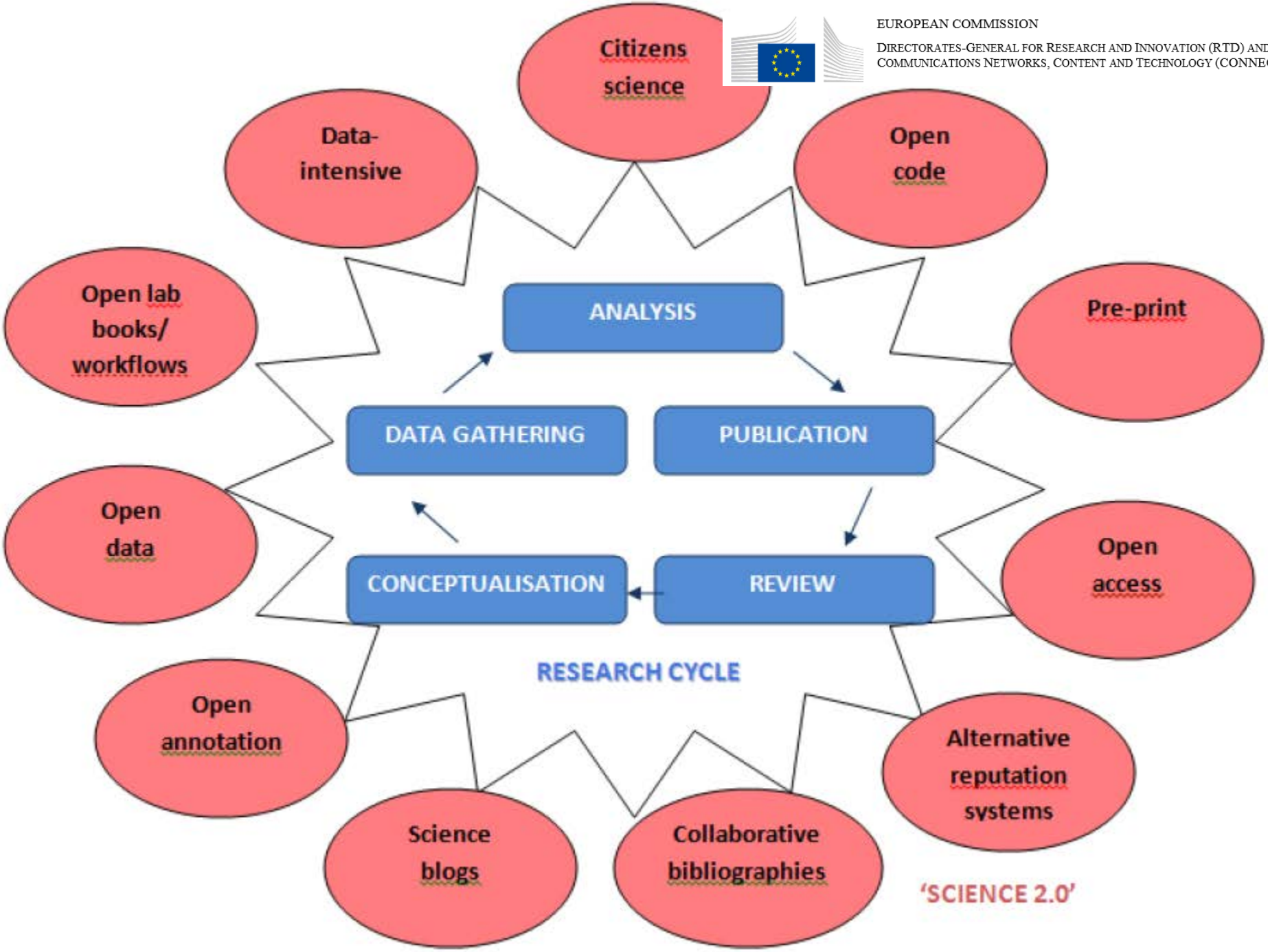
1. Thousand years ago – **Experimental Science**
   - Description of natural phenomena
2. Last few hundred years – **Theoretical Science**
   - Newton's Laws, Maxwell's Equations…
3. Last few decades – **Computational Science**
   - Simulation of complex phenomena
4. Today – **Data-Intensive Science**
   - Scientists overwhelmed with data sets from many different sources
     - Data captured by instruments
     - Data generated by simulations
     - Data generated by sensor networks
   - ➢ eScience is the set of tools and technologies to support data federation and collaboration
     - For analysis and data mining
     - For data visualization and exploration
     - For scholarly communication and dissemination

$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - \mathrm{K}\frac{c^2}{a^2}$$





(With thanks to Jim Gray)


Citizens science
Data-intensive
Open code
Open lab books/ workflows
Pre-print
ANALYSIS
DATA GATHERING
PUBLICATION
Open data
Open access
CONCEPTUALISATION
REVIEW
RESEARCH CYCLE
Open annotation
Alternative reputation systems
Science blogs
Collaborative bibliographies
'SCIENCE 2.0'

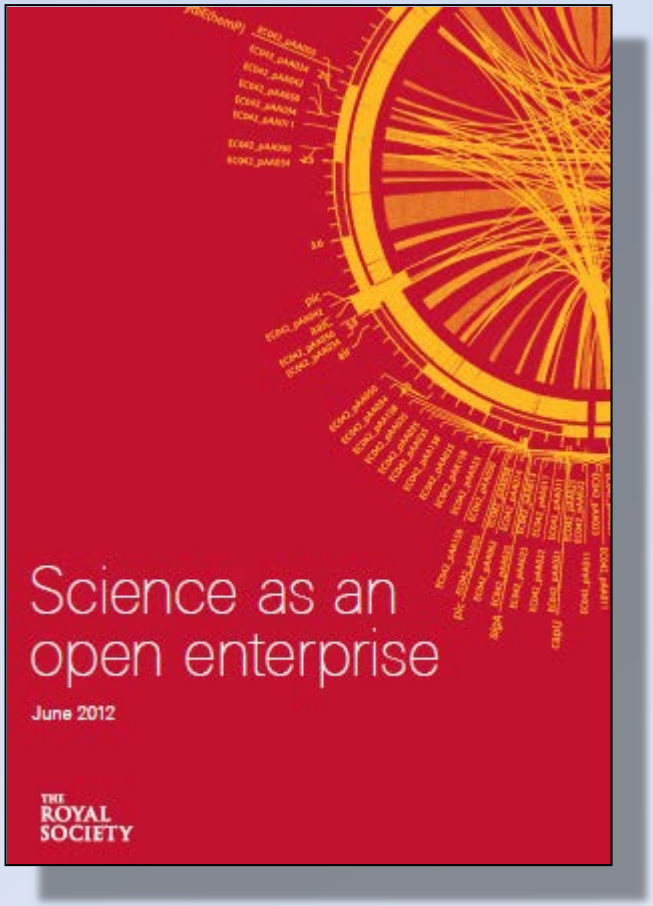
Vers un nouveau paradigme en IST:

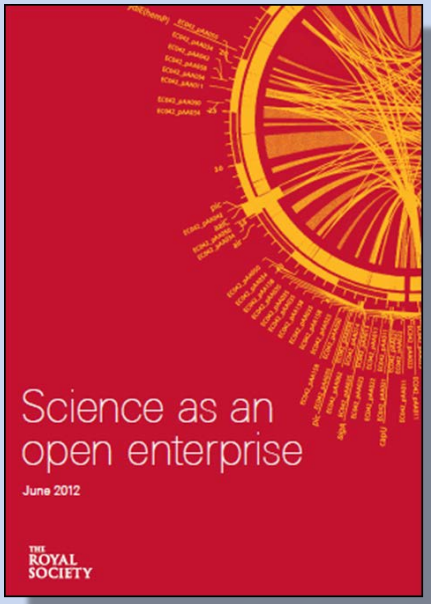
nouveaux acteurs dominants, nouveaux modèles économiques, nouvelles technologies

18
- Papier, sociétés savantes, abonnements, catalogues

20+
- Bases de données, édition numérique, discovery tools, concentration des éditeurs, big deals

21
- Mouvement Open Access,Modèles OA en concurrence, data deluge, Web 2 .0 - Open science,





"A particular dilemma for universities is to determine the role of their science libraries in a digital age. ……
The traditional role of the library has been as a repository of data, information and knowledge and a source of expertise in helping scholars access them.
That role remains, but in a digital age, the processes and the skills that are required to fulfil the same function are fundamentally different. "

Science as an Open Enterprise Report, Royal Society, UK

Views of young scientists

- The generation gap: younger researchers typically produce more data; recognise data sharing as maximising value; have most potential to develop data sharing tools; and they are the future. We should listen to them!

1. a shift away from a research culture where data is viewed as a private preserve
2. the data evidence for a published argument MUST be intelligently open at the time of publication
3. data management should be embedded in the community producing and using the data
4. science data should be as easy to "remix" as music is to a DJ
5. replication is by far the best guarantee of preservation (e.g. LOCKSS)
6. give credit for useful data communication and novel ways of collaborating
7. common standards for communicating data (correct?)
8. the cost of intelligent openness is an integral part of the cost of doing science
9. Training and support

EXCELLENCE IN SCIENCE

THE ROYAL SOCIETY

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Essential enabling tools & processes:

key issues for research & implementation

- data integration
- supporting dynamic data
- providing provenance
- annotation
- metadata generation
- citation
- access to data scientists
- changing the library

EXCELLENCE IN SCIENCE

THE ROYAL SOCIETY

Research Library UK : Re-skilling for Research 2012

les compétences « essentielles»

Nine skills and knowledge areas were identified as being essential now and of continuing or growing importance over the next 2 – 5 years, by the majority of respondents.

- Excellent knowledge of **bibliographic and other finding tools** in the discipline/subject
- Excellent skills to **design information literacy training** (both face to face and online) to meet the identified needs of **different types of researchers**
- Outstanding skills in **information discovery**, literature searching etc.
- Knowledge to advise on **citing and referencing, and the use of bibliographic management software**
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- Awareness of current and **changing local research interests**
- Ability to gain an appreciation of **individual researcher/project needs**, including effective listening skills

RLUK Research Libraries UK

Research Library UK : Re-skilling for Research 2012

Les compétences à développer ….

- Ability to advise on **preserving research outputs** (49% essential in 2-5 years; 10% now)
- Knowledge to advise on **data management and curation**, including ingest, discovery, access, dissemination, preservation, and portability (48% essential in 2-5 years; 16% now)
- Knowledge to support researchers in **complying with the various mandates of funders** including open access requirements (40% essential in 2-5 years; 16% now)
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- Skills to develop **metadata schema, and advise on discipline/subject standards and practices**, for individual research projects (16% essential in 2-5 years; 2% now)

RLUK Research Libraries UK

CORE SKILLS FOR DATA MANAGEMENT

A follow-up from the second DCC Research Data Management Forum (November 2008)

DATA MANAGER

- Risk / Disaster Management, Contingency
- Data Legislation (rights, IPR, DP, etc)
- Data Security, Access, Authentication
- Conditions of Use

DATA CREATOR

- Documentation (research, environmental, temporal) Context

DATA LIBRARIAN

- Negotiation Skills
- Complaints and Expectation Management
- Coordination of Practice across Institution
- Data Appraisal and Retention
- Advocacy, Promotion, Marketing, Raising Awareness

DATA SCIENTIST

- From Information Management to Knowledge Management
- Data Analysis and Manipulation
- Extracting Information from Data Models (and People)
- Merging, Mash-ups, Integration

Monitoring Processes

Metadata

Value of Data, Economic Issues

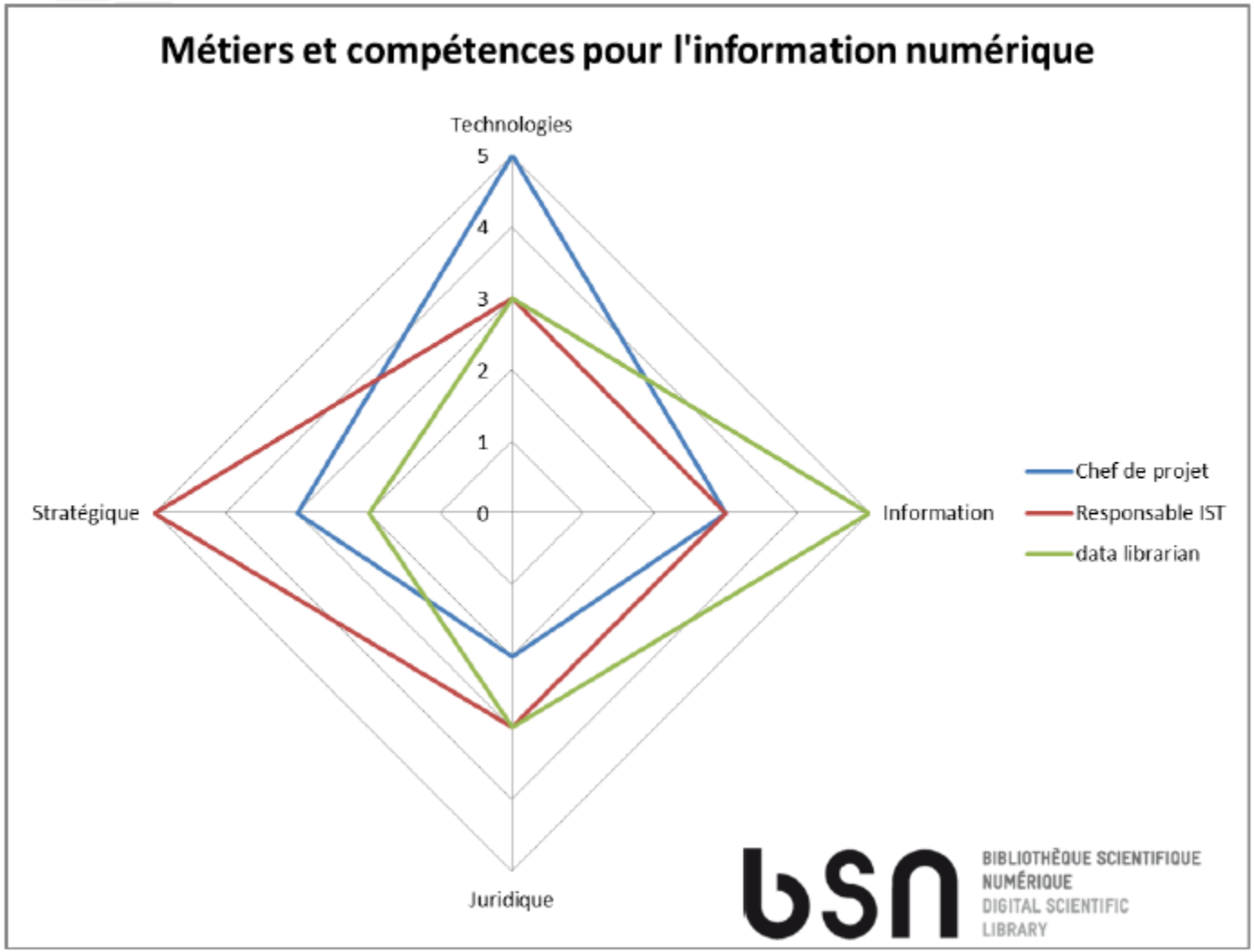
Data Preservation

Facilitation / Communication

Data Modelling

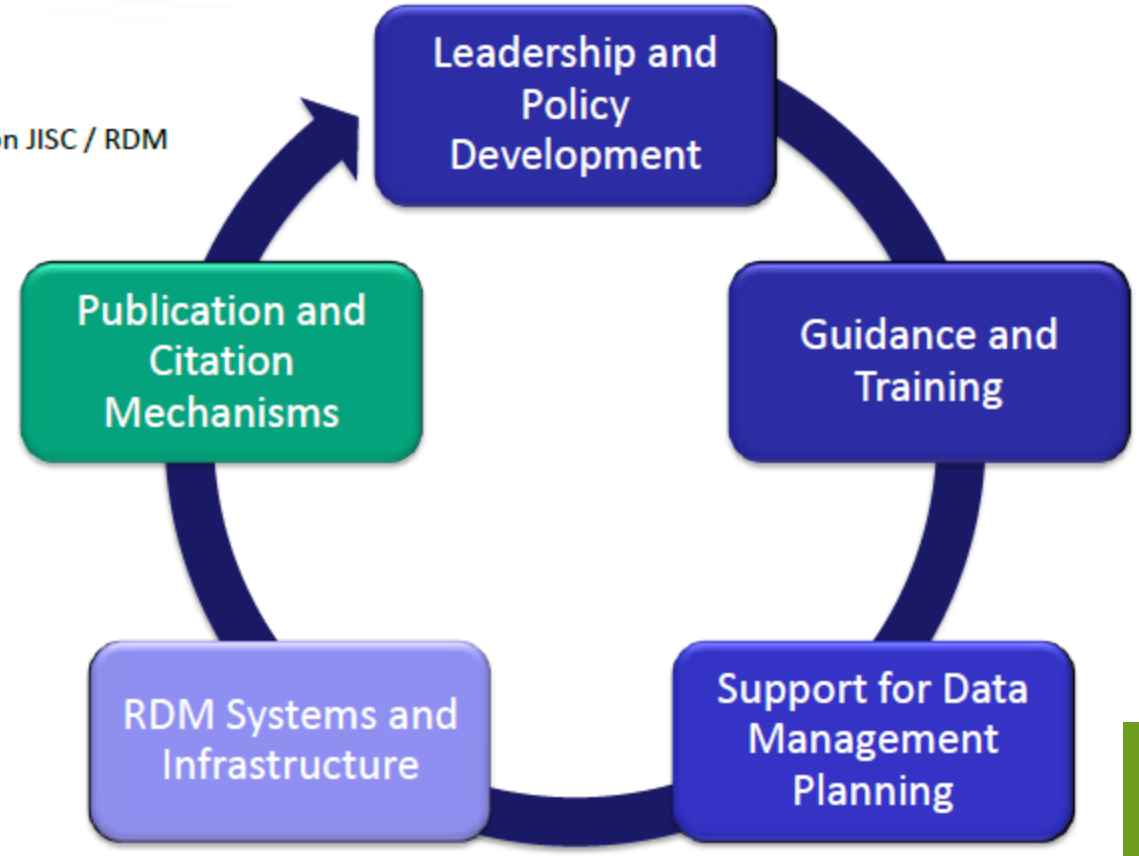
Standards Development

Travaux dans le cadre de BSN9



Contribution possible de l'IST

Source : S. Hodson JISC / RDM



INRA SCIENCE & IMPACT

Compétences/connaissances à avoir

- Traditionnelles :
  - ✓ compréhension des Data journals
  - ✓ connaissance des entrepôts externes
  - ✓ Mécanismes de citation et d'évaluation
  - ✓ Connaissances juridiques (CC, PI, BdD)
  - ✓ Elaboration et Maintenance de référentiels termino, vocabulaires …
- Technologiques
  - ✓ Identifiants (DOI, URI …)
  - ✓ Modèles de données et de métadonnées (DC et +)
  - ✓ Interopérabilité (OAI-PMH et autres)
  - ✓ Linked data, Ontologies et standards associés

INRA SCIENCE & IMPACT

- Le cœur technique de compétences ne change pas, mais :
  - ✓ il faut consolider la dimension techno (gestion d'objets numériques)
  - ✓ Intérêt des doubles compétences : techno/IST ou IST/ Scientifique

- Articulation des niveaux et compétences intra BAP F (manager, chef de projet, gestionnaire d'info)

- Changement de posture, s'insérer dans la science en train de se faire

- Il est possible d'avancer, même en l'absence de politique sur les données

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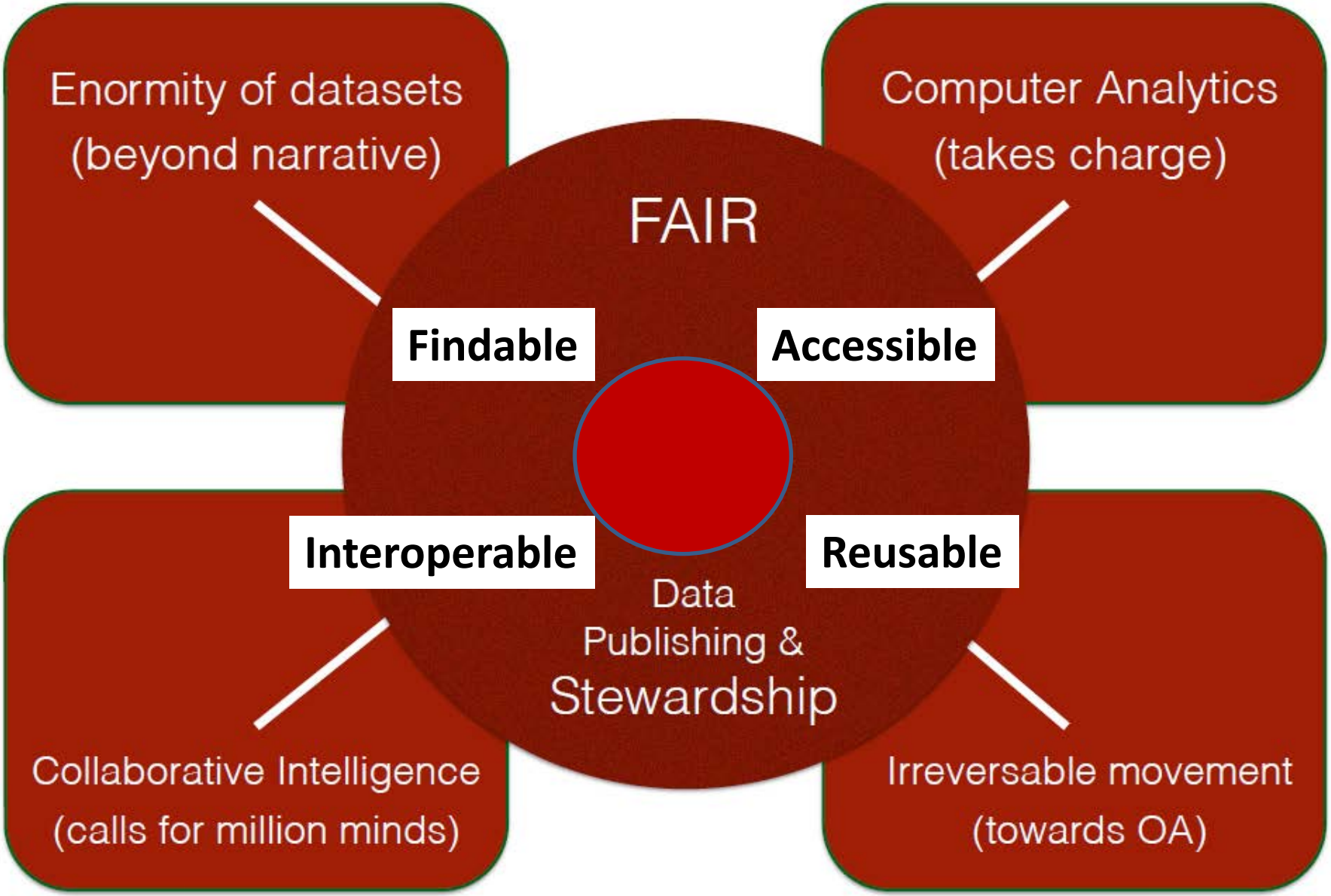
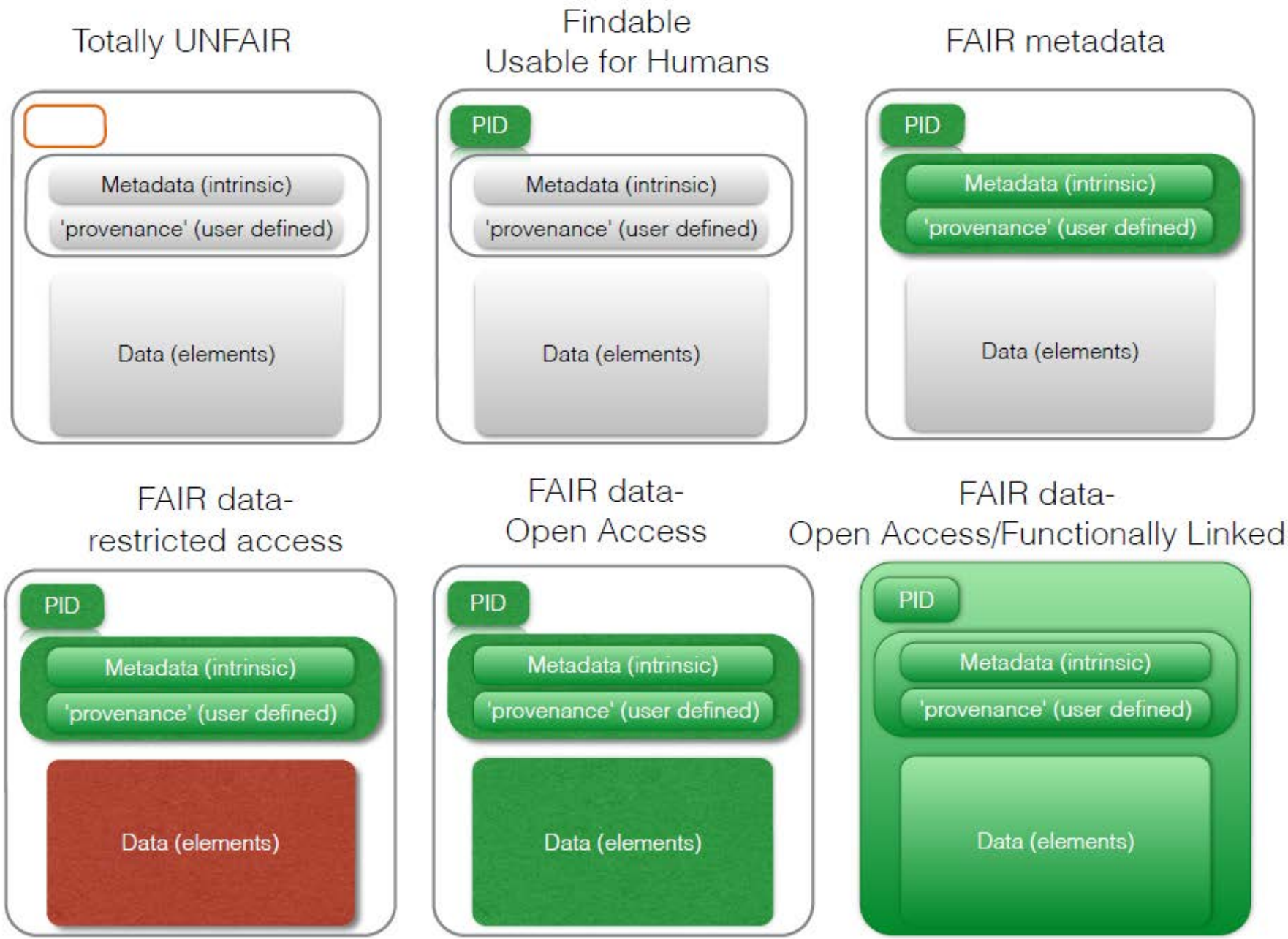
- *Orientations futures*

The trends in e-Science



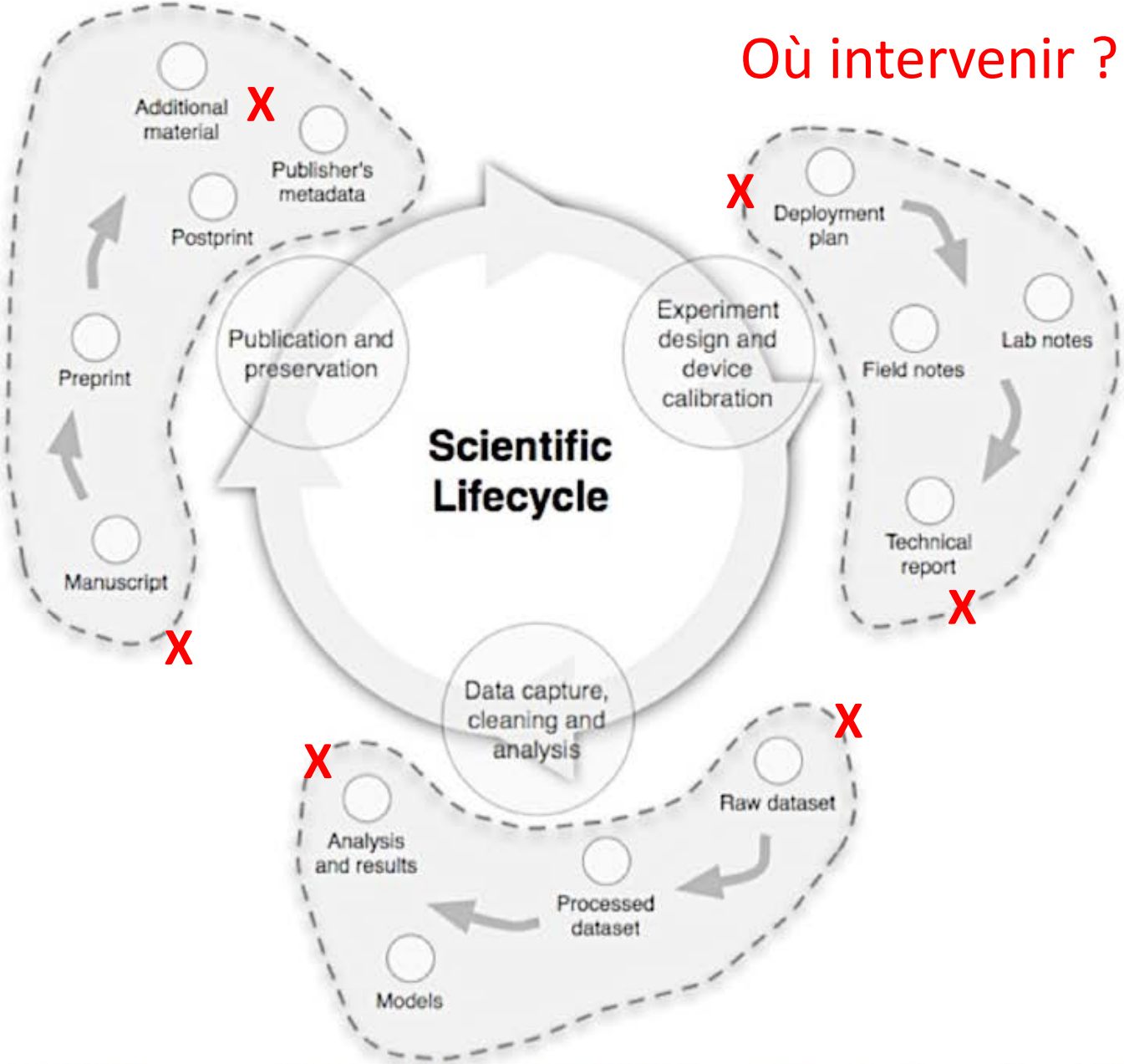
Data as increasingly FAIR Digital Objects



Attitudes…

- Se rapprocher des projets de recherche
- Développer des compétences IT au service du continuum publications/données
- Passer de la gestion des contenants (métadonnées) à la gestion des contenus (TDM)
- Assurer la pérennité du patrimoine scientifique
- Agir pour la valorisation des productions scientifiques par des actions de curation facilitant la réutilisation des publications ET des données
- Coopérer avec les autres personnels de soutien à la recherche

Où intervenir ?



Pepe, A., Mayernik, M. S., Borgman, C. L. & Van de Sompel, H. (2010). From Artifacts to Aggregations: Modeling Scientific Life Cycles on the Semantic Web. Journal of the American Society for Information Science and Technology, 61(3): 567–582.

Pas d'angélisme !

Passer de l'un à l'autre nécessitera :

Research Library UK : Re-skilling for Research 2012

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- **Implication**
- **Soutien**
- **Moyens…**

Questions ?

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