Progress in research data services: An international survey of university libraries

Andrew M. Cox, Mary Anne Kennan, Liz Lyon, Stephen Pinfield and Laura Sbaffi

Research: Past and Present

- Previous research:
  - Previous research: On the role of academic libraries and RDM, in the UK, Ireland, Australia and New Zealand, e.g.
    - Kennan, Corrall, & Afzal (2014)
    - Cox & Pinfield (2014)
  - Project 1: International RDM and libraries survey (Australia, Canada, Germany, Ireland, Netherlands, New Zealand, UK): Sept-Dec 2014
    - Cox, et al (2017)
  - Project 2: Second survey, extended to USA: Jan-Mar 2018
    - Cox, et al (Forthcoming). Maturing research data services and the transformation of academic libraries. *Under review*

The University Of Sheffield.

Progress?

- Recent survey:
  - How, if at all, have the types and levels of RDS being offered changed?
    - Has there been any change in the types of service that are perceived to be a future priority?
    - What have been the main drivers and barriers to developing RDS and policy?
    - What has been the influence of the FAIR principles to date?
- This presentation:
  - Highlights from the 2018 data
  - Comparison with 2014 findings
  - Insights into developing maturity of RDM/RDS

The University Of Sheffield.

Responses

	Australia	Canada	Germany	Ireland	Netherlands	NZ	UK	USA	Total
Invited institutions 2018	39	74	279	12	16	8	169	86	404
Number of responses 2018	34	24	23	11	6	8	80	23	209
% response rate 2018	87	32	10	92	38	100	47	27	
Invited institutions 2014	39	74	48	8	16	7	169	N/A	361
Number of responses 2014	34	17	8	7	12	7	85	N/A	170
% response rate 2014	87	23	17	88	74	100	50	N/A	

The University Of Sheffield.

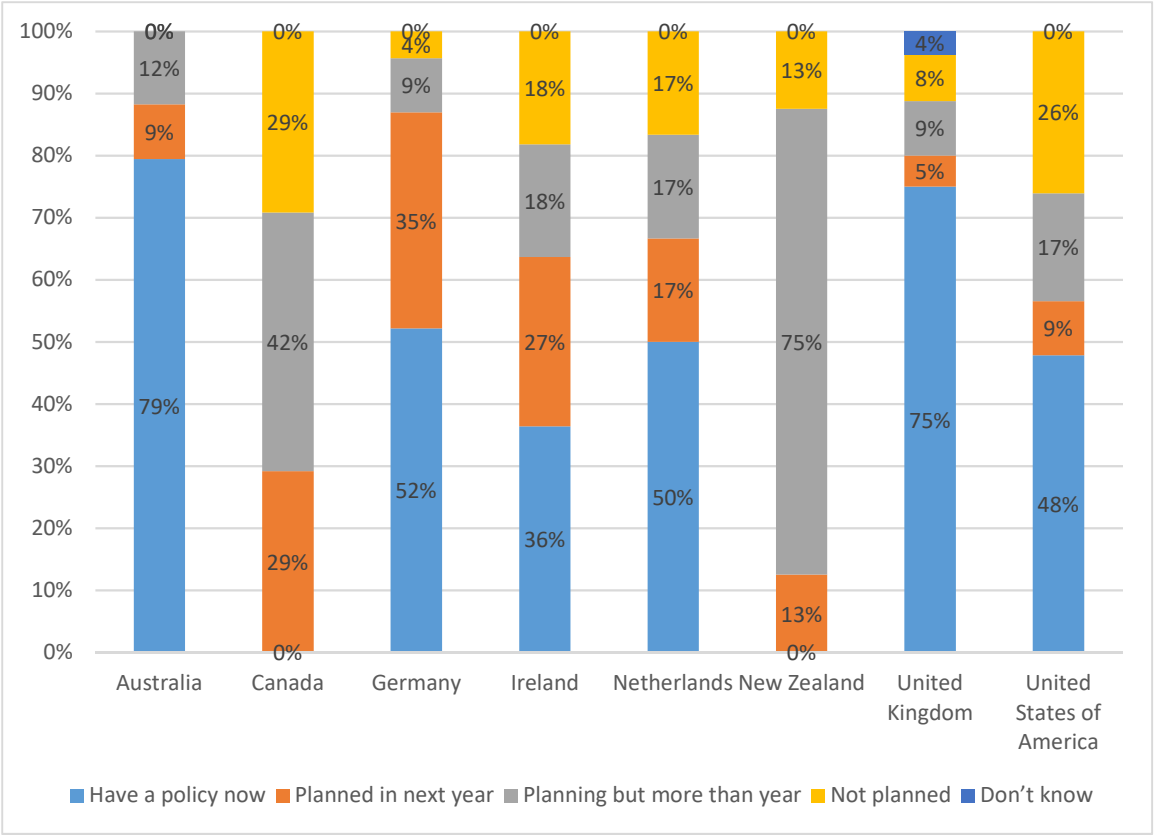
Summary of Findings

1. The sector has moved forward in developing policy and offering services
2. Advisory services are the main type of service
3. The perception of the agenda has not greatly shifted, with future priorities correlating strongly to 2014 priorities
4. Libraries have played a key role in leading the development of RDS
5. Yet there is still perceived to be a significant skills gap
6. The key driver remains funder mandates, but this still lacks teeth
7. Hence lack of resources and lack of academic staff engagement remain the main obstacles

The University Of Sheffield.

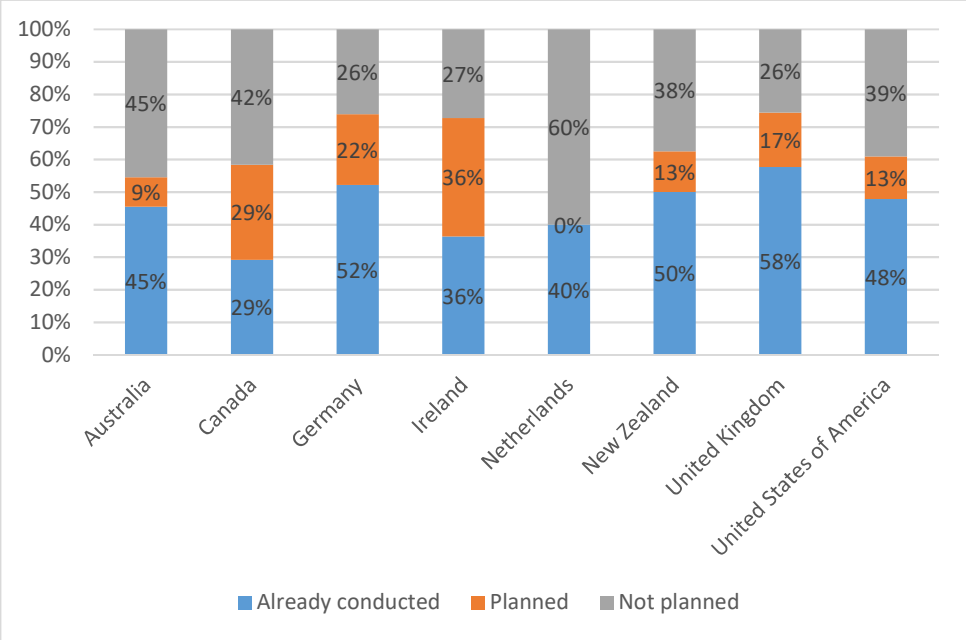
Formal RDM Policy

- 56% have a policy (38% in 2014)
- 14% are planning a policy (46%)
- Canada and NZ no policies cf Australia and UK



- Policy making often early stage in the institutional RDM programme – but some HEIs have services without policy

User Requirement Gathering

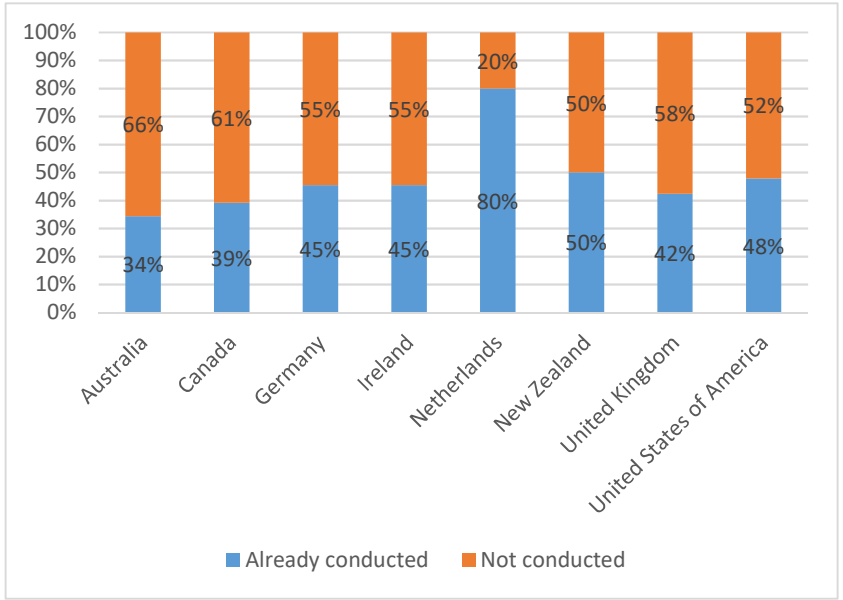


RDM Data Audit

- 49% of responding institutions had undertaken a data study
- 62% of institutions had undertaken at least one of these types of study and 29% done both (sometimes in the form of a single survey covering both topics)

RDM User Survey

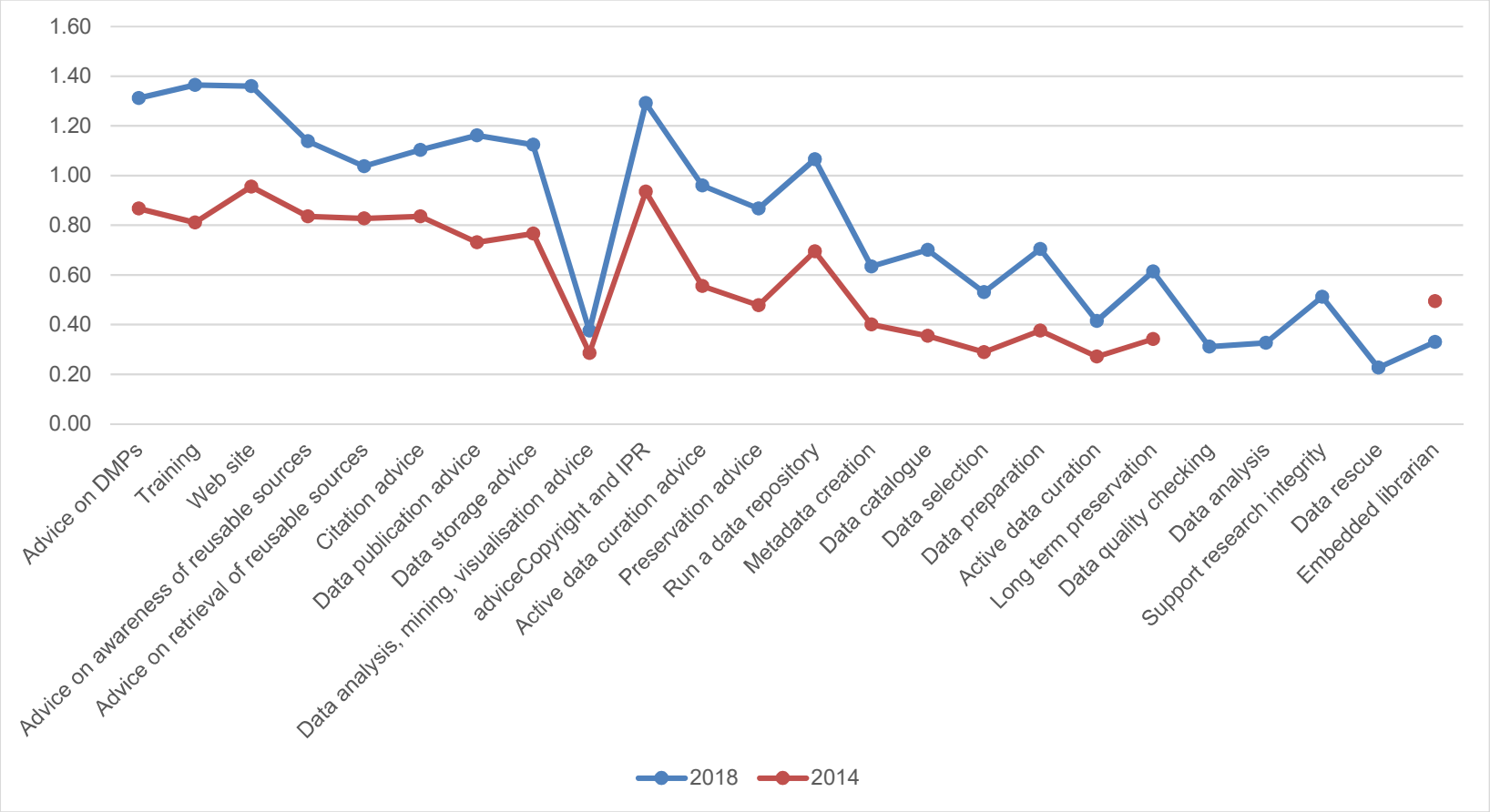
- 43% had undertaken a user study



The University Of Sheffield.

Service Development

- Provision of all services has risen 2014-18



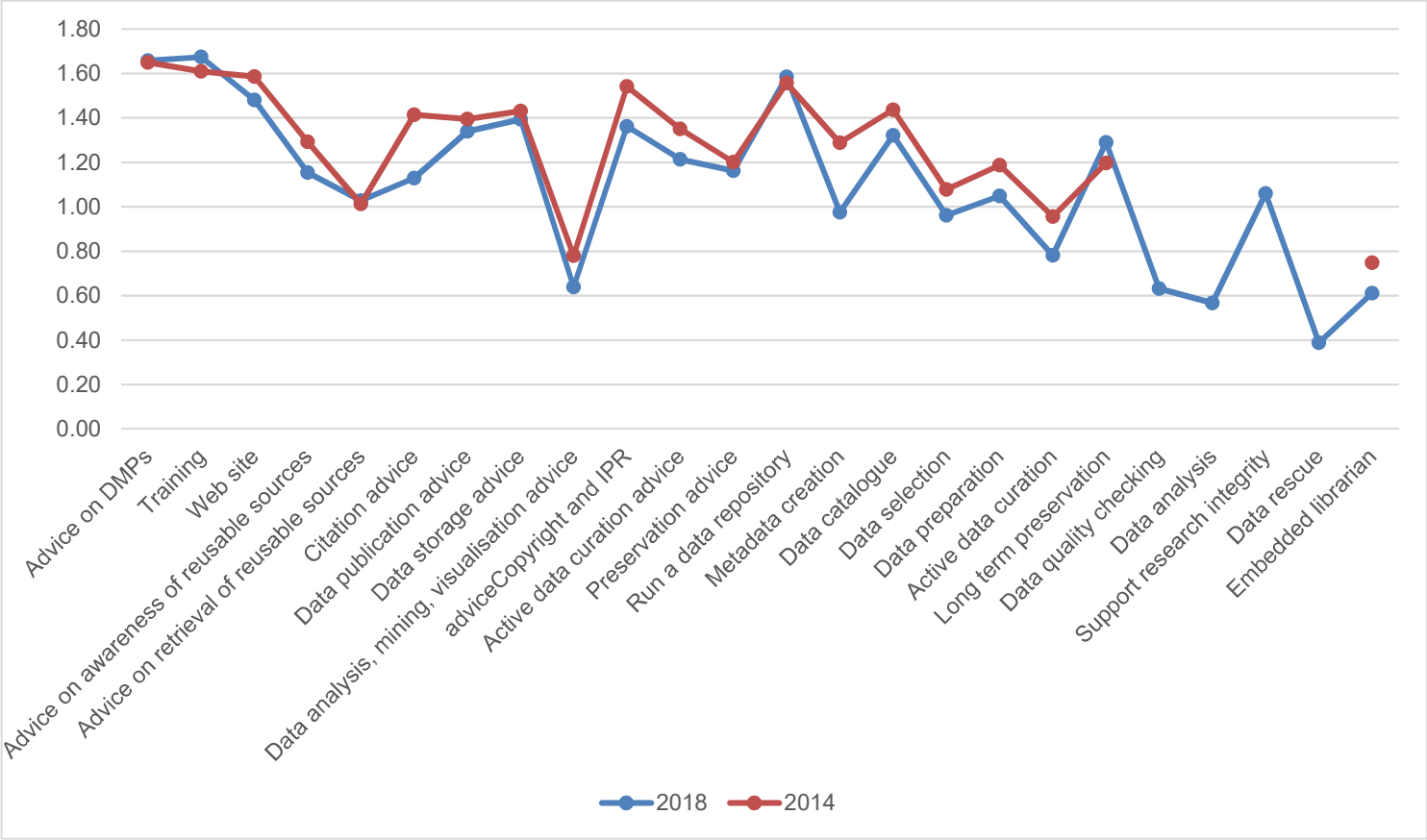
0=no service; 1=basic service; 2=well developed 3=extensive service

Service Provision and Priorities

	Current services			Future priorities	
	2018	2014		2018	2014
Advice on DMPs	1.31	0.87		1.66	1.65
Training	1.36	0.81		1.67	1.61
Web site	1.36	0.96		1.48	1.59
Advice on awareness of reusable sources	1.14	0.84		1.15	1.29
Advice on retrieval of reusable sources	1.04	0.83		1.03	1.01
Citation advice	1.10	0.84		1.13	1.41
Data publication advice	1.16	0.73		1.34	1.40
Data storage advice	1.12	0.77		1.39	1.43
Data analysis, mining, visualisation advice	0.38	0.29		0.64	0.78
Advice on Copyright and IPR	1.29	0.94		1.36	1.54
Active data curation advice	0.96	0.55		1.21	1.35
Preservation advice	0.87	0.48		1.16	1.20
Run a data repository	1.07	0.69		1.58	1.56
Metadata creation	0.63	0.40		0.98	1.29
Data catalogue	0.70	0.35		1.32	1.44
Data selection	0.53	0.29		0.96	1.08
Data preparation	0.70	0.38		1.05	1.19
Active data curation	0.41	0.27		0.78	0.96
Long term preservation	0.61	0.34		1.29	1.20
Data quality checking	0.31			0.63	
Data analysis	0.33			0.57	
Support research integrity	0.51			1.06	
Data rescue	0.23			0.39	
Embedded librarian	0.33	0.49		0.61	0.75

Priorities for the Future

- Priorities very similar 2018 cf 2014
- If anything, technical priorities slightly lower



0=no service; 1=basic service; 2=well developed 3=extensive service

The University Of Sheffield.

Collaborations

	2018			2014		
	Yes	No (planned)	No (not planned)	Yes	No (planned)	No (not planned)
Australia	50%	16%	34%	76%	9%	15%
Canada	50%	13%	38%	67%	0%	33%
Germany	43%	35%	22%	60%	20%	20%
Ireland	18%	27%	55%	14%	14%	71%
Netherlands	60%	20%	20%	82%	18%	0%
New Zealand	38%	25%	38%	14%	14%	71%
United Kingdom	47%	23%	30%	22%	29%	49%
United States of America	52%	9%	39%	n/c	n/c	n/c
Overall mean value	46%	21%	33%	42%	20%	38%

- Nearly 50% of respondents said that their library was cooperating with an external organisation; another 20% planned to do so
- Australian institutions collaboration declined; UK collaborations had increased

The University Of Sheffield.

Organisational Structure

	A single individual is responsible	A team with a specific focus on research data is responsible	A team with a general remit for research support is responsible	It is spread across multiple teams
Australia	18%	18%	31%	26%
Canada	11%	29%	11%	14%
Germany	15%	42%	15%	12%
Ireland	40%	13%	20%	13%
Netherlands	20%	80%	0%	0%
New Zealand	20%	10%	20%	10%
United Kingdom	25%	17%	22%	10%
United States of America	31%	26%	11%	26%
Overall mean value	23%	23%	19%	15%

- Diversity of organisational approaches

The University Of Sheffield.

Organisational Structure and Service Level

	A single individual is responsible	A team with a specific focus on research data is responsible	A team with a general remit for research support is responsible	It is spread across multiple teams
No service	549 (41%)	334 (25%)	277 (40%)	207 (41%)
Basic service	502 (38%)	490 (37%)	273 (40%)	202 (40%)
Well developed service	272 (21%)	487 (37%)	139 (20%)	94 (19%)
Total	1323	1311	689	503

- The total number for each type of organisational structure was compared with the 26 services the number of times no service, basic service or more than basic service was selected
- suggests that institutions with a specific team dedicated to RDM typically had stronger services.
- 37% of institutions with a RDM team had well developed services, compared to around only 20% for each of the other forms of organisation

The University Of Sheffield.

Skills and Skills Gaps

	Total 2014	Rank	Total 2018	Rank
Data curation skills	74%	1	73%	1
Knowledge of a variety of research methods (e.g. data analysis…	65%	4	66%	2
Data description and documentation	72%	2	64%	3
Legal, policy and advisory skills (e.g. intellectual property…	71%	3	61%	4
Technical and ICT skills (e.g. data storage, infrastructure…	60%	5	59%	5
Understanding of research integrity, reproducibility and transparency principles	N/A	N/A	55%	6
Knowledge of the research lifecycle	58%	6	42%	7
Subject and or disciplinary knowledge	36%	7	40%	8

- Most libraries identified a skills gap, in nearly every area identified, but particularly around data curation skills, knowledge of research methods and data description
- This is consistent across different surveys

The University Of Sheffield.

Drivers

Most frequently mentioned drivers were:

- Funder compliance
- The need for the library to stay relevant
- Needs of researchers
- Research integrity
- Open science
- Publishers' requirements

	AUS	CAN	GER	IRE	NETH	NZ	UK	USA	Total	%
Funder compliance	17	14	4	8	1	4	39	8	95	57%
Library role - having the skills/needing to stay relevant	7	6	8	5	5	3	25	9	68	41%
Needs of researchers	7	5	7	3	1	2	9	7	41	25%
Integrity	7	1	1	1	1	0	12	4	27	16%
Open science	6	1	0	1	1	0	12	1	22	13%
Publishers	3	4	1	0	0	1	6	4	19	11%
Impact of research	3	2	1	1	1	1	6	4	19	11%
Institutional policy	7	1	0	1	0	0	4	2	15	9%
REF (or equivalent)	0	0	0	0	0	1	13	0	14	8%
FAIR	4	0	1	0	0	0	1	0	6	4%
Competition from commercial suppliers	1	0	0	0	0	0	0	1	2	1%
Consortia	1	1	0	0	0	0	0	0	2	1%

The University Of Sheffield.

Challenges

Most frequently mentioned challenges were:

- Resources
- Skills
- Academic engagement
- Collaborations with other central services
- Infrastructure

	AUS	CAN	GER	IRE	NETH	NZ	UK	USA	Total	%
Skills	10	9	9	6	0	4	23	6	67	39%
Resourcing – financial	9	6	4	4	1	2	23	6	55	32%
Engagement of academic staff	9	5	3	2	1	5	19	4	48	28%
Collaboration with other support services	5	5	3	4	0	6	10	1	34	20%
Resourcing – staffing	3	4	4	0	0	0	12	3	26	15%
Infrastructure	8	3	2	4	0	0	7	2	26	15%
Senior support – institutional	1	0	1	1	0	2	8	3	16	9%
Understanding disciplinary differences	2	1	5	1	2	0	3	2	16	9%
Acceptance in the institution	2	0	2	2	0	0	6	2	14	8%
Lack mandate/rewards*	0	2	1	1	1	2	6	1	14	8%
Reprioritising in the library	3	0	0	0	0	1	4	2	10	6%
Acceptance of RDM role in the library	3	1	0	0	0	0	2	3	8	5%
Acceptance of data sharing	1	2	2	0	0	0	3	0	8	5%
Legal issues	1	1	1	1	0	0	4	0	8	5%
Data - scale, variety	2	1	0	0	0	0	2	1	6	4%
Rapid technology change	2	0	2	0	0	0	2	0	6	4%
Competition from publishers*	2	2	0	1	1	0	0	1	7	4%
Acceptance of the need for RDM	2	1	1	0	0	0	1	0	5	3%
Collaboration between institutions	1	0	1	2	0	0	1	0	5	3%
Preservation	0	0	0	0	0	0	4	0	4	2%
Senior support – library	0	1	0	0	0	0	0	1	2	1%
Compliance with funder requirements	0	0	0	0	0	0	2	0	2	1%

The University Of Sheffield.

FAIR (findable, accessible, interoperable and reusable) ?

- In question on drivers - FAIR only mentioned in six survey responses
- In question about guiding principles for service delivery (which gave FAIR as an example) answers hinted at alignment.
- However explicit mentions in policy were relatively rare usually in examples of policy creation or refreshing e.g.

  “We are currently reviewing our policy with the aim of integrating FAIR principles into the policy.”

  “No principles are explicitly referenced in the policy but FAIR has informed our approach. We do reference these principles in our training and advocacy activities.”
- FAIR mentions more likely in national level standards, such as in Australia “The code for the responsible conduct of research” or in the UK “RCUK common principles”

The University Of Sheffield.

Theory and Interpretation

Key issues:

- Research data management services maturity
- Determinants of service provision
- Extent to which changes are transformational for libraries

The University Of Sheffield.

‘Maturity’

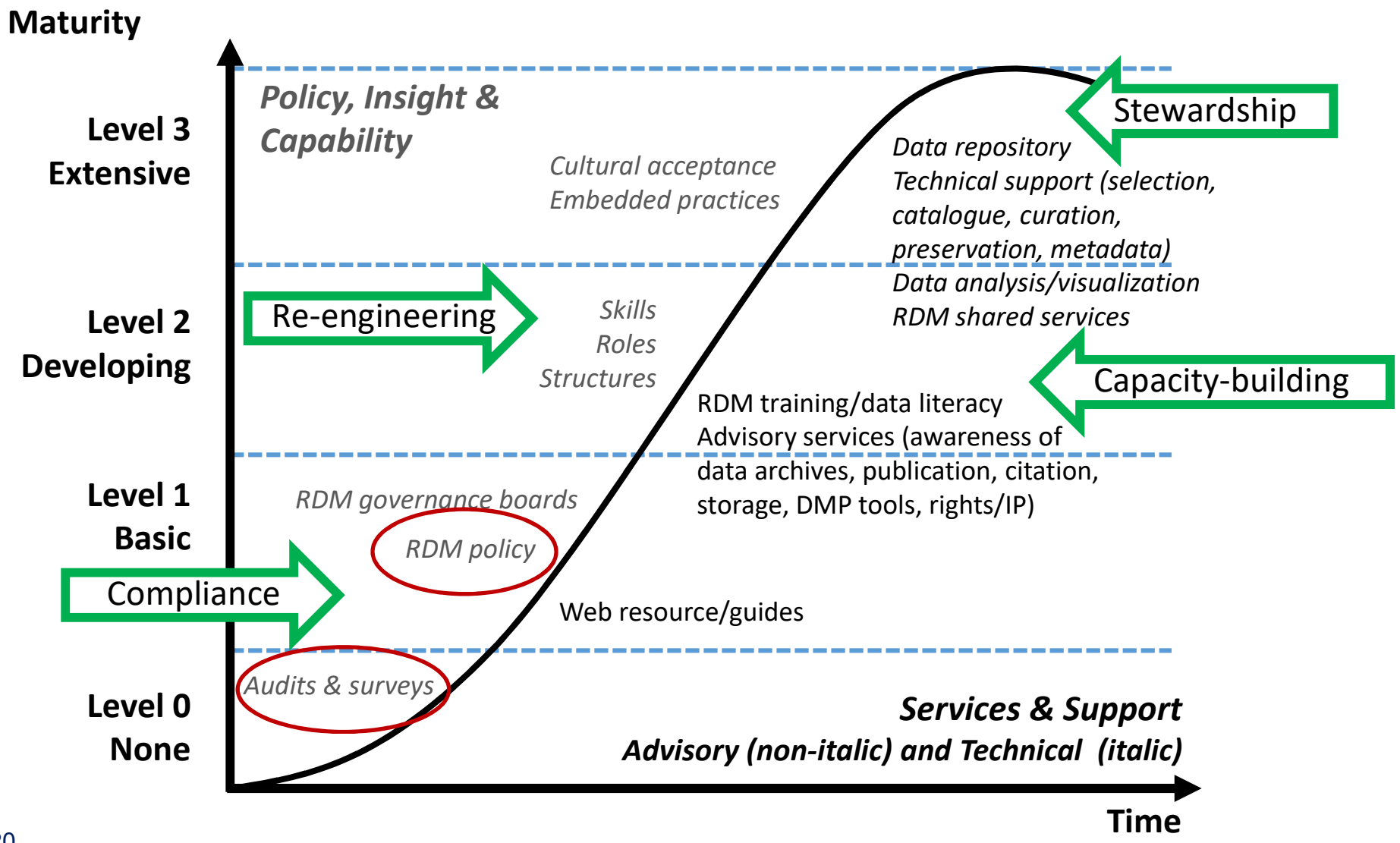
- ‘Maturity’:
  - “…as knowledge about, and services in, a particular area reach a full or complete level of development, they are ‘mature’”
- Concept applied in e.g.:
  - Software engineering
  - Data governance
  - Digital preservation
  - Data-intensive research
- Maturity models in e.g.:
  - RDM (ANDS, 2011)
  - Research projects’ data management (Crowston & Qin, 2011)

But ‘maturity’ concept problematic:

- May wrongly imply a single development path with a single end point
- May imply certain points on the path are ‘under-developed’ or ‘immature’

The University Of Sheffield.

Latest data and the maturity model
Developing support and services:

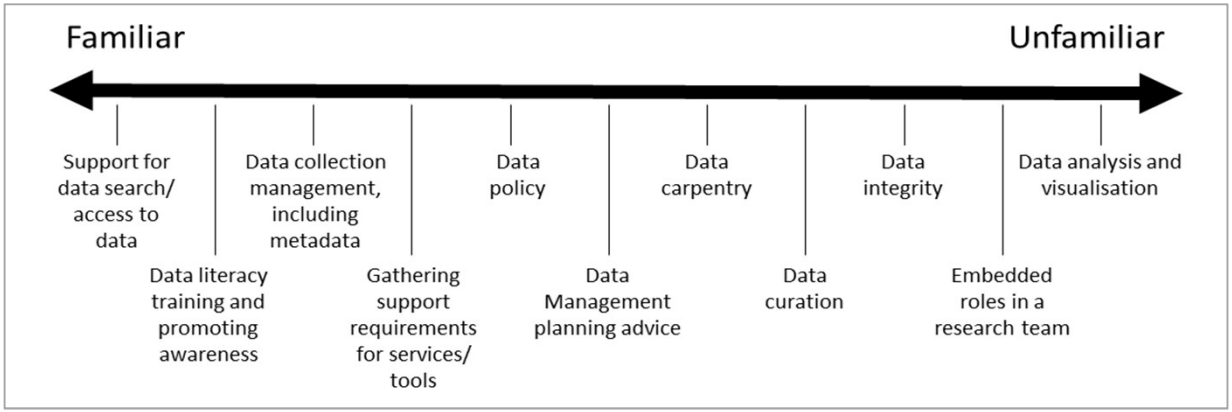


(Cox, Kennan, Lyon & Pinfield, 2017)

Determinants of Service

Three interlinked factors:

- Closeness to existing skills/service patterns
  - RDM services offered tend to close to traditional library service
    - Makes sense in terms of resource scarcity
    - Makes sense in terms of jurisdiction boundaries
- Resources required
- Evidence of immediate demand
  - Particularly Data Management Planning



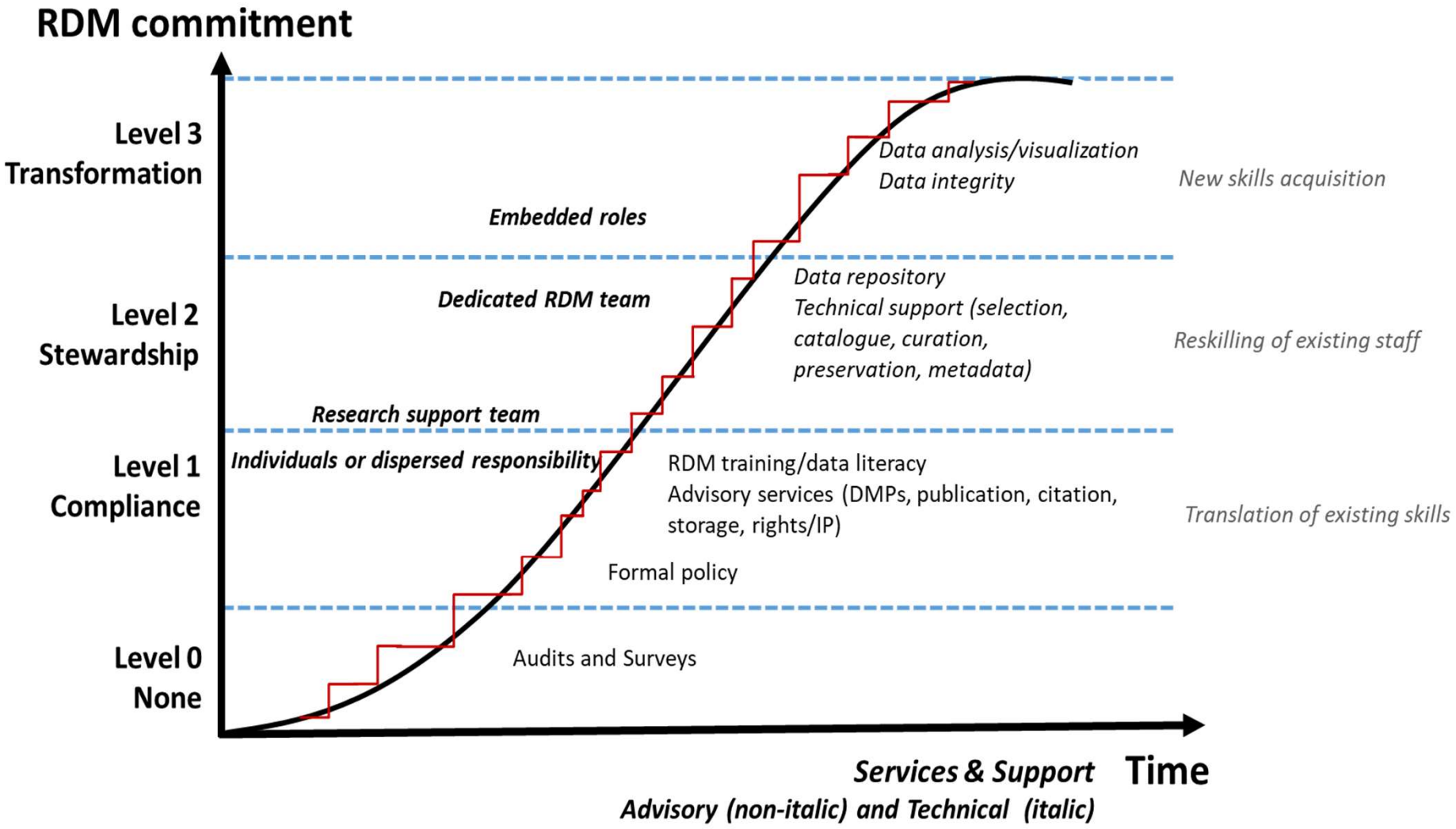
The data role spectrum (adapted from Cox, 2018)

Revision of the Maturity Model

- Our data suggests a potential revision to the stage model:
  1. Audit current status to develop an understanding of needs (at level 0 before any service exists) – but optional
  2. Develop policy / governance for RDM (level 1) – but optional
  3. Develop advisory services (level 2)
  4. Develop a data repository and associated technical services (level 3)
  5. Develop services around data analysis, visualisation etc.; research integrity; embedded roles (level 4)
- And/or reconsideration of ‘maturity’?

The University Of Sheffield.

Revised Maturity Model



The University Of Sheffield.

RDM as Transformational for Libraries?

- “The data does not appear to support the notion that RDM in itself, as it is currently being pursued, is a transformative force in academic library work…”
- “…libraries so far have tended to adjust by building the types of service which fit in with the existing activities and skillset of the profession…”
- “However, when combined with other new areas of work such as around open access and open scholarship, text and data mining (TDM), bibliometrics and advice on research-related social media communication, it seems that academic libraries are facing several waves of change…”
- “…in the long run it seems highly plausible to imagine that there will be transformational effects: RDM is just one wave of this rising tide.”

(Cox, et al. Forthcoming)

The University Of Sheffield.

References

ANDS. (2011). *Research data management framework: Capability maturity guide*. Melbourne: Australian National Data Service. Retrieved from http://ands.org.au/guides/dmframework/dmf-capability-maturity-guide.html

Bryant, R., Lavoie, B. and Malpas, C. (2017), *The realities of research data management : part two: scoping the university RDM service bundle.* Dublin (OH): OCLC. http://doi.org/10.25333/C3Z039

Cox, A.M. (2018), "Academic librarianship as a data profession: the familiar and unfamiliar in the data role spectrum", *eLucidate 15*(1-2) 7-10.

Cox, A. M., Kennan, M. A., Lyon, L., & Pinfield, S. (2017). Developments in research data management in academic libraries: Towards an understanding of research data service maturity. *Journal of the Association for Information Science and Technology*, *68*(9), 2182–2200. http://doi.org/10.1002/asi.23781

Cox, A. M., Kennan, M. A., Lyon, L., Pinfield, S., & Sbaffi, L. (Forthcoming). Maturing research data services and the transformation of academic libraries. *Under review*

Cox, A. M., & Pinfield, S. (2014). Research data management and libraries: Current activities and future priorities. *Journal of Librarianship and Information Science*, *46*(4), 299–316. http://doi.org/10.1177/0961000613492542

Crowston, K., & Qin, J. (2011). A capability maturity model for scientific data management: Evidence from the literature. *Proceedings of the American Society for Information Science and Technology*, *48*(1), 1–9. https://doi.org/10.1002/meet.2011.14504801036

Hayes, J. (2014). *The theory and practice of change management* (4th ed.). Basingstoke: Palgrave Macmillan

Kennan, M. A., Corrall, S., & Afzal, W. (2014). "Making space" in practice and education: research support services in academic libraries. *Library Management*, *35*(8/9), 666–683. http://doi.org/10.1108/LM-03-2014-0037

Whyte, A., & Tedds, J. (2011). Making the case for research data management. Edinburgh: Digital Curation Centre. Retrieved from http://www.dcc.ac.uk/webfm_send/487