

The Social Construction of Risk in Trustworthy Digital Repository Certification

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I conduct research in the areas of digital preservation, digital curation, and data reuse (including open data), focusing on social and ethical barriers that limit or prevent the preservation, sharing, and reuse of digital information.

Background

Digital Repositories

gesis

Leibniz Institute
for the Social Sciences

ICPSR



Trustworthy Digital Repository (TDR) Certifications

Certification	Locations of Certified Repositories
CoreTrustSeal (Data Seal of Approval, World Data Systems)	Africa, Asia, Australia, Europe, North America
Trustworthy Repositories Audit & Certification (TRAC) (ISO 16363)	Asia, North America
nestor Seal for Trustworthy Digital Archives (DIN 31644)	Europe

Study 1: TRAC (ISO 16363)

TDR Certification & Risk

“A trustworthy digital repository will understand threats to and risks within its systems. Constant monitoring, planning, and maintenance, as well as conscious actions and strategy implementation will be required of repositories to carry out their mission of digital preservation.”

(ISO 16363, 2012)

Classical Approach to Risk

(probability of event) * (magnitude of consequences) = risk

Social Construction of Risk in Digital Preservation

“The classical risk approach **assumes that it is possible to define and assess risks**. The assumption that risks can be objectified and calculated has met with a lot of criticism.”

(van Est et al., 2012, p. 1075)

A Model for the Social Construction of Risk



A Model for the Social Construction of Risk

Communication

- Perceptions of risk vary depending on the way in which information about those risks is communicated, including the source, method, channel, and means of communication.
- (e.g. Bostrom, 2014; Kasperson & Kasperson, 1996)



A Model for the Social Construction of Risk

Communication

e.g. Bostrom, 2014; Kaspersen & Kaspersen, 1996

Complexity

e.g. Perrow, 1999; Wilkinson, 2001

Expertise

e.g. E. Vaughan & Seifert, 1992; Wynne, 1992

Organizations

e.g. Hutter, 2005; D. Vaughan, 1996

Trust

e.g. Nelkin, 1989; Wildavsky & Dake, 1990

Uncertainty

e.g. Starr, 2003; van Est et al., 2012

Vulnerability

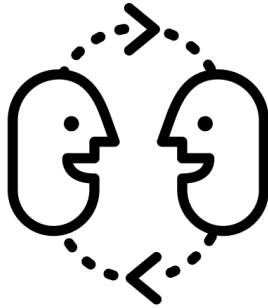
e.g. Murphy, 2006; Olofsson et al., 2014



Research Questions

1. How do auditors and repository managers conceptualize risk in the context of a TRAC audit?
2. What are the differences and similarities by which auditors and repository managers understand risk as it has been communicated by the developers of the ISO 16363 standard?
3. To what degree do the following seven factors which influence risk perception come into play in the audit process: communication, complexity, expertise, organizations, trust, uncertainty, and vulnerability?

Qualitative Research Methods



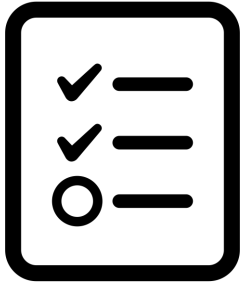
Semi-Structured Interviews

- Standard Developers (n=11)
- Auditors (n=10)
- Repository Staff (n=21)

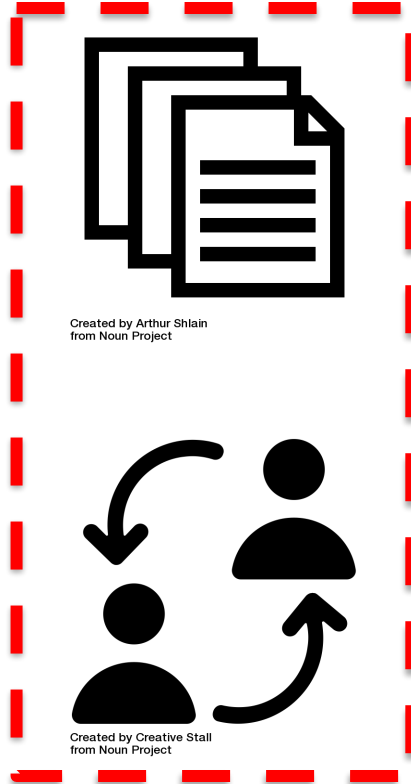


Document Analysis

- ISO 16363 Standard (including audit checklist)
- Audit Reports
- Repository documentation

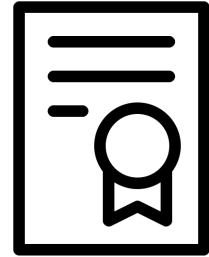


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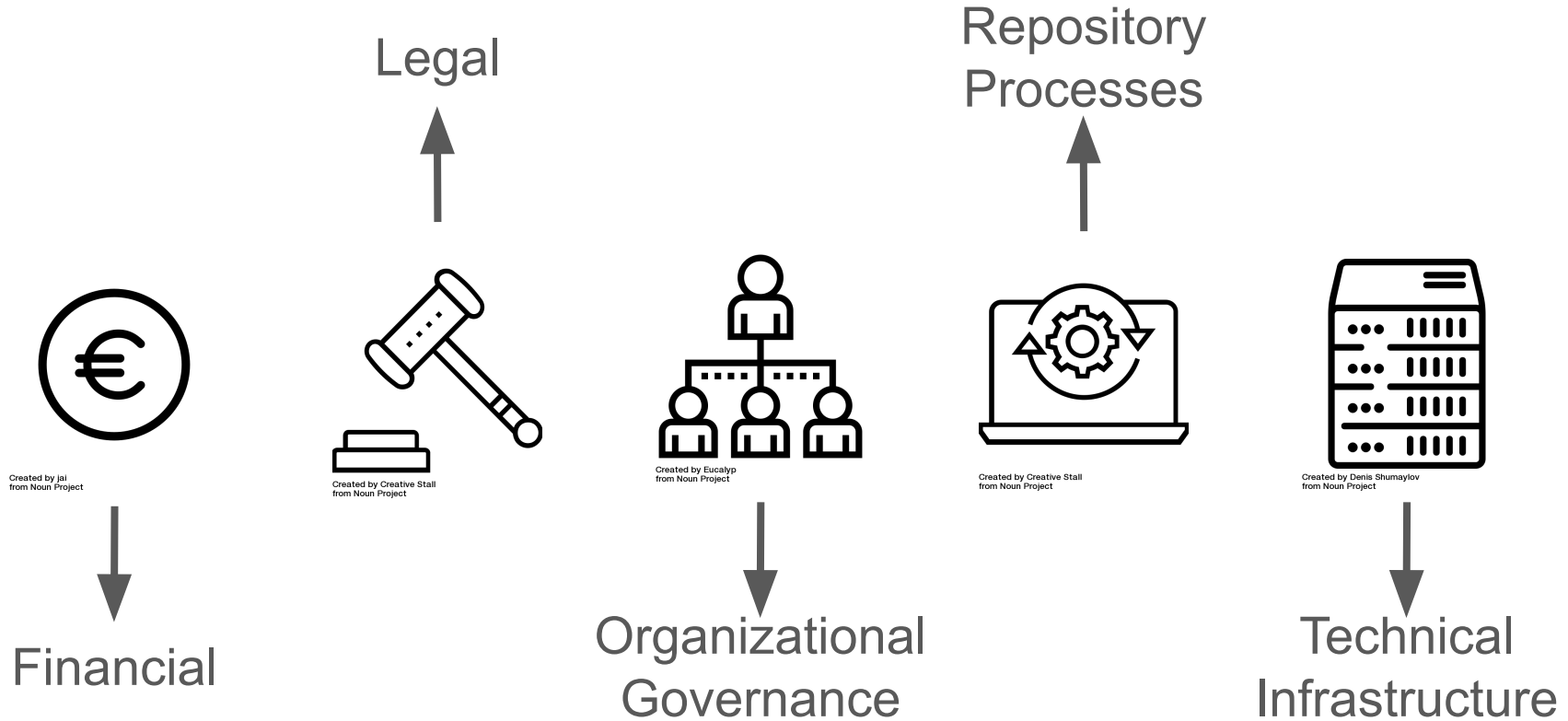
Findings

Risk

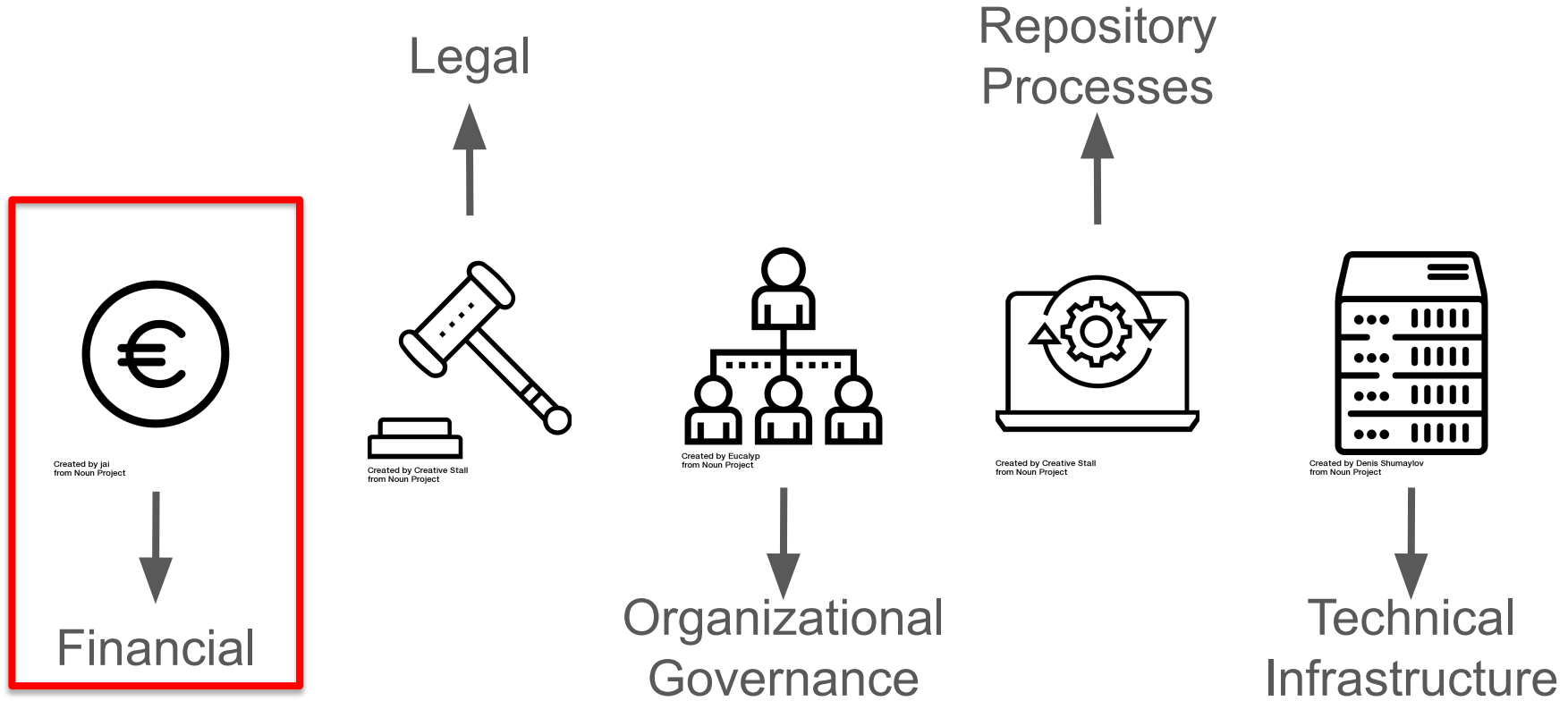
“Do I think that large amounts of people really understand how risk is constructed and what it means? No. ... I think it’s relatively easy to get information about solutions and how things are implemented, and it’s harder to put that in a framework where you’re measuring the likelihood if it happening against the potential of it happening, and what the downsides are there, and how you tie specific numbers to that.”

(Repository Staff 18)

Types of Risk



Types of Risk



Constructing Risk Through a TRAC Audit

ISO 16363: Governance & Organizational Viability

3.1.2.1 The repository shall have an appropriate succession plan, contingency plans, and/or escrow arrangements in place in case the repository ceases to operate or the governing or funding institution substantially changes its scope.

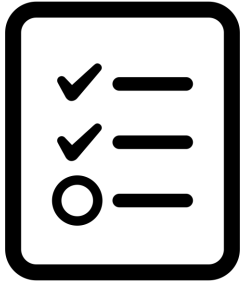
Supporting Text

This is necessary in order to preserve the information content entrusted to the repository by handing it on to another **custodian in the case that the repository ceases to operate.**

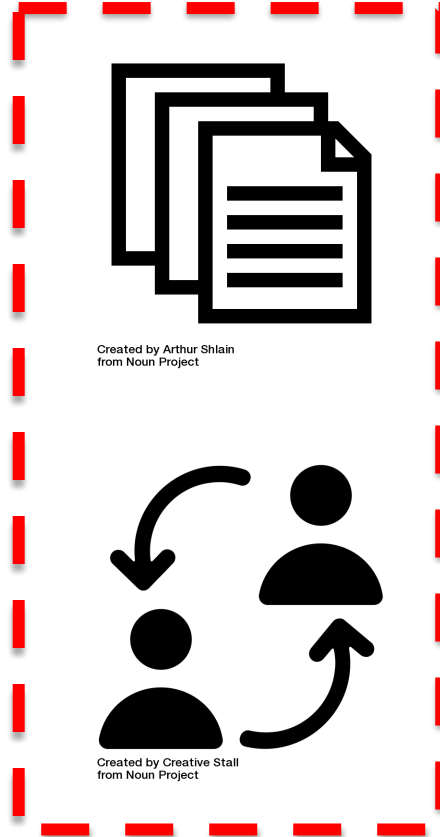
Examples of Ways the Repository Can Demonstrate It Is Meeting This Requirement

Written and credible succession and contingency plan(s)...

TRAC Audit

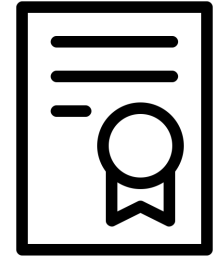


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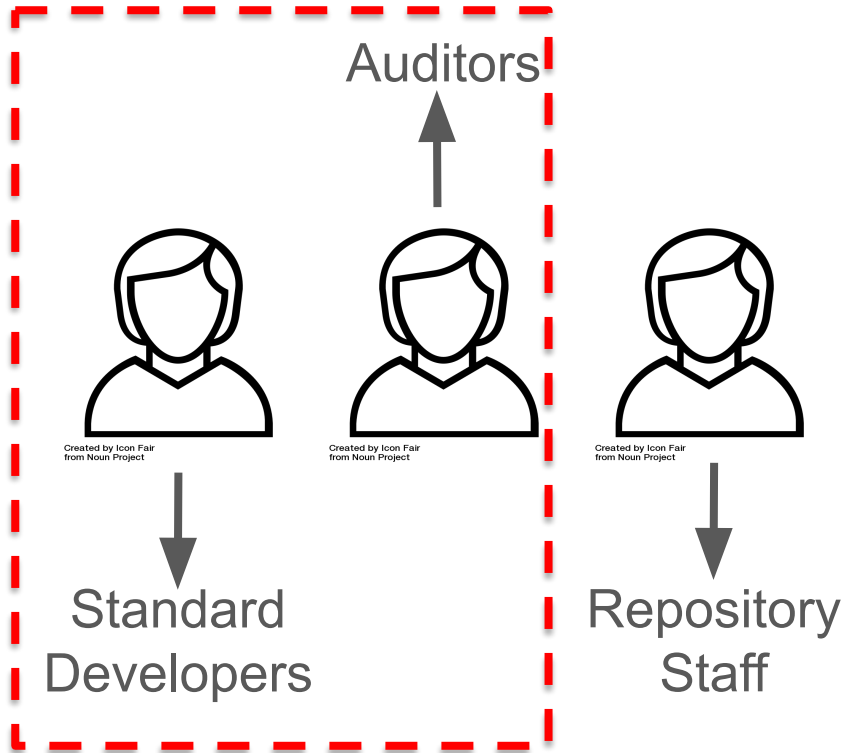
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Performing Trustworthiness

“What is really going to be the reason repositories are at risk, is almost all around having enough money to take care of the material . . . a succession plan to move it someplace else, where the community isn’t going to have enough money to take care of it. Or there’s going to be a, someone who magically dumps money on the secondary repository. Why couldn’t they dump money on the first repository? I mean, it’s just, I don’t know. It doesn’t make sense.”

(Repository Staff 12)

Different Perspectives

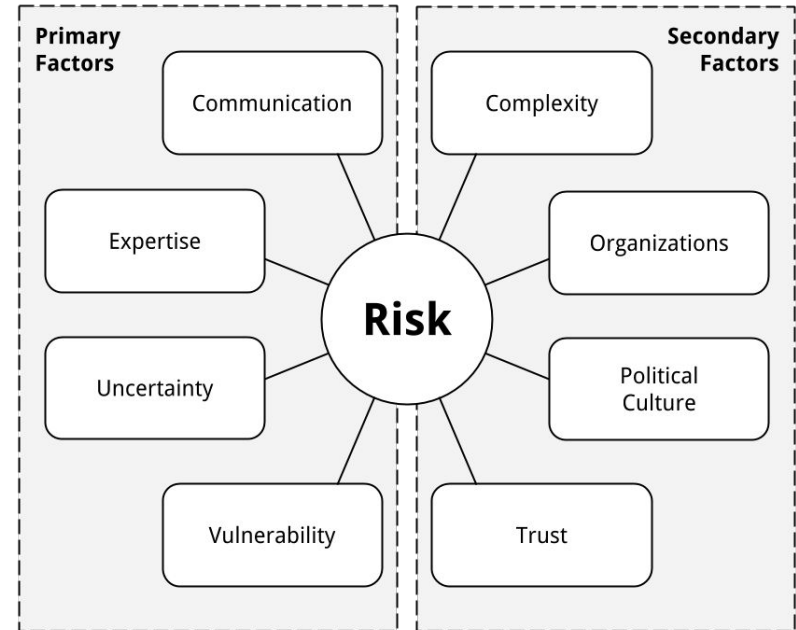
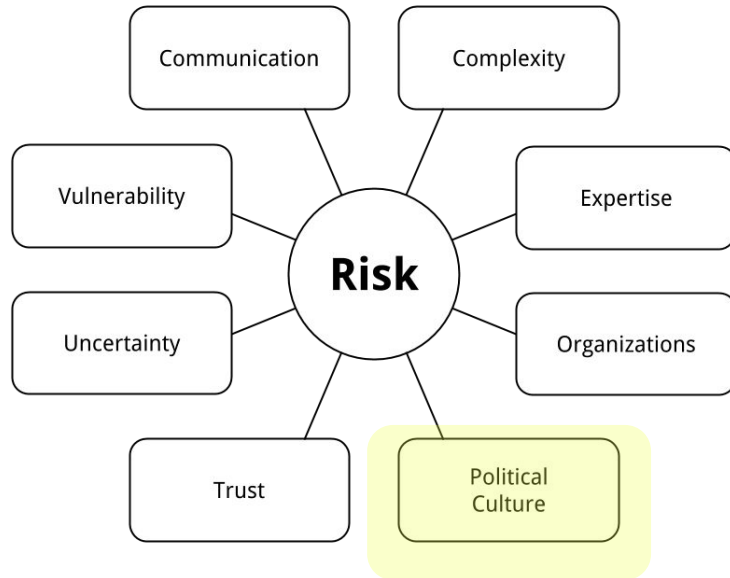


Technical
Economic
Organizational

Implications: Risk in Digital Preservation

Technical
Economic
Organizational
+ Social

A Revised Model for the Social Construction of Risk



Study 2:

CoreTrustSeal

(in progress)

Certification

Locations of Certified Repositories

CoreTrustSeal

(Data Seal of Approval, World Data Systems)

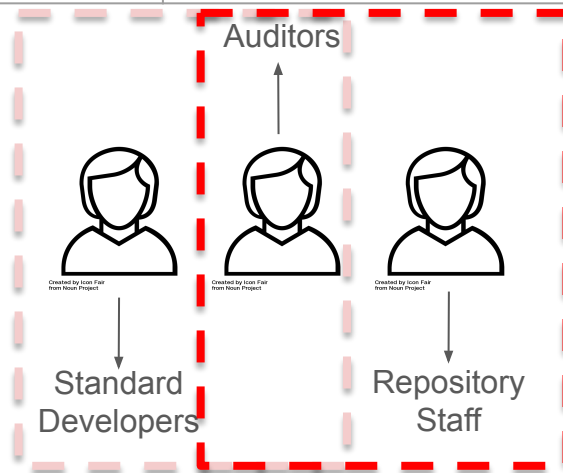
Africa, Asia, Australia, Europe, North America

Trustworthy Repositories Audit & Certification (TRAC) (ISO 16363)

Asia, North America

nestor Seal for Trustworthy Digital Archives (DIN 31644)

Europe



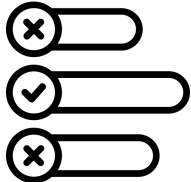
Goal

The goal of this research is to understand how stakeholders in the CoreTrustSeal trustworthy digital repository certification process construct their understanding of risk.

Research Questions

- How do stakeholders in the CoreTrustSeal audit/certification process construct their understanding the concept of risk?
- What are the similarities and/or differences in how these stakeholder groups understand risk?
- How do the following factors affect an audit: communication, complexity, expertise, organizations, political culture, trust, uncertainty, vulnerability?
 - Which factors emerge at the individual level, and which at the social/group level?
- How do stakeholders perceive the value of the CTS certification process?

Mixed Research Methods



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Phase 1: Survey



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Phase 2:
Interviews &
Document
Analysis



Created by Gen Khoun Lay
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Phase 3:
Observations



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Phase 4:
Workshop

Survey Distribution

- Sent via email to one representative from each CTS certified repository by the CTS Board
 - (or legacy certifications: DSA, WDS)
- Response rate: 54%
 - 163 certified repositories at the time of the survey
 - 88 complete responses

Survey: Preliminary Findings

Survey Participants: Certification Achieved

Which certification(s) has your repository achieved? Select all that apply. (n=88)	
CoreTrustSeal	61
Data Seal of Approval	27
World Data Systems	44
Other	8

- CTS only: 20
- CTS + DSA: 20
- CTS + WDS: 25
- CTS + DSA + WDS = 4

Survey Participants: Role

	What is your <i>current</i> role?	What was your role <i>at the time of the audit</i> ?
Administration	28	26
Digital Preservation	23	25
IT	6	8
Other	31	27
No answer	0	2

Survey Participants: Audit Process

What was your role in the certification process? Select all that apply. (n=88)

Prepared Documentation	80
Interacted directly with reviewers or auditors	54
Other	16

Repository Staff & Audit Reviewers

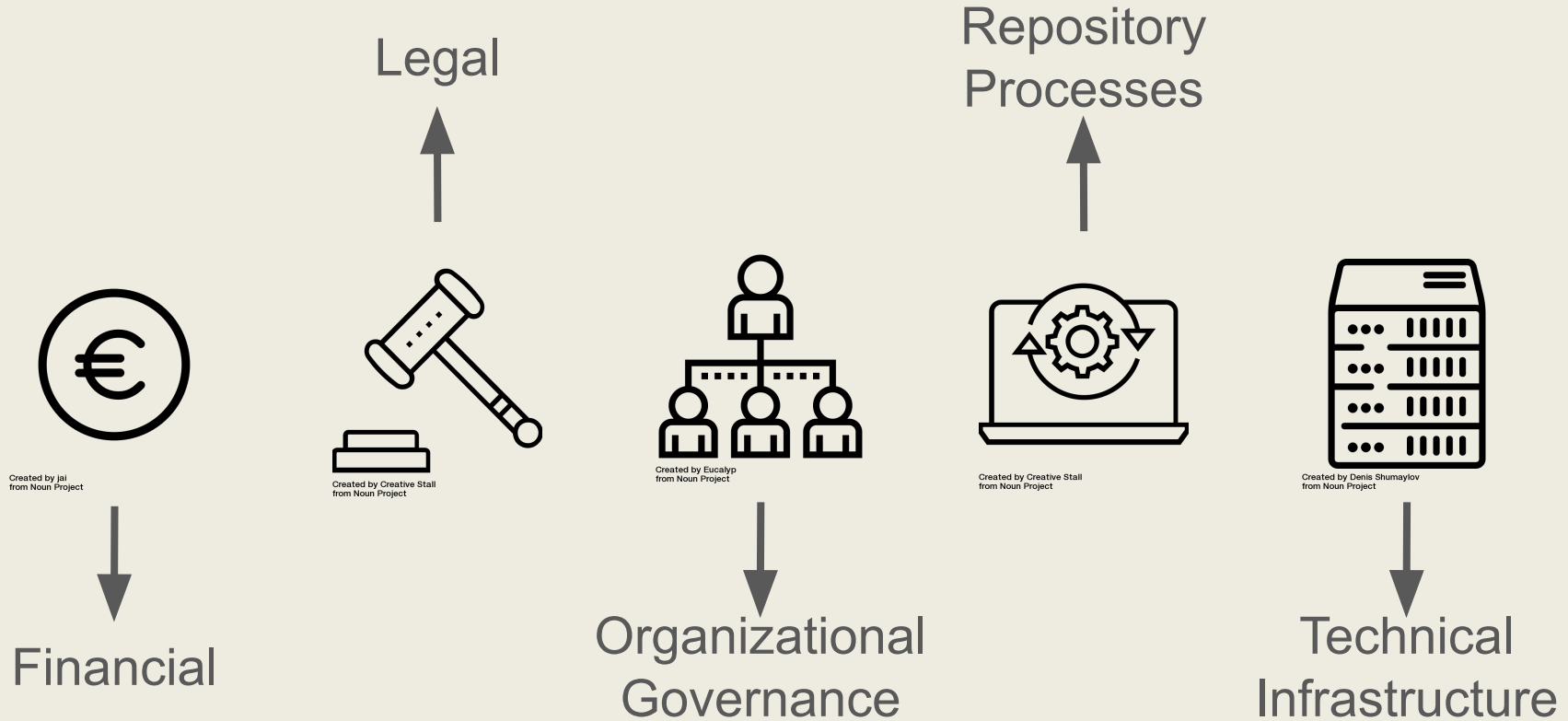
Have you served as a reviewer for another repository's CTS, DSA, or WDS certification?

yes	27
no	57
other	4

If yes, how many audits have you participated in as a reviewer?

1-2	7
3-5	9
6+	12
total	28

Reminder: Types of Risk from TRAC Study




Types of Risk

The items below indicate potential sources of risk for digital repositories, that could *interfere with a repository's ability to preserve digital content long-term*. Please rank them in order from most to least significant.

	Most Significant	Significant	Neither Significant nor Insignificant	Slightly Insignificant	Least Significant
Finance (e.g. funding sources)	56	10	8	10	4
Legal (e.g. rights)	12	2	16	13	45
Organizational Infrastructure (e.g., staffing)	15	33	25	9	6
Repository Processes (e.g., digital object management)	4	11	17	35	21
Technical Infrastructure	11	22	22	21	12

CTS Requirements

Listed below are the three main sub-sections of the CoreTrustSeal requirements for certification. Please rank them in order of importance for determining whether a repository is able to preserve digital content long-term.

	Most Important	Important	Least Important
 Organizational Infrastructure	46	21	21
Digital Object Management	31	35	22
Technology	11	32	45

Organizational Infrastructure: Continuity Plan

In the Organizational Infrastructure section of the CTS requirements, Requirement R3 states:

“The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.”

	Yes	No	Other
In your opinion, is a repository having a continuity plan necessary for long-term preservation of digital content?	40	0	5
Do you think that the items described in the guidance section above provide a sufficient evidential basis to demonstrate that a repository has met Requirement R3?	43	2	0
Do you think that meeting Requirement R3 as described above would demonstrate a repository’s trustworthiness with regard to long-term preservation of digital content?	32	1	12

Conclusions

Implications: Certification

(risk identification) + (documented mitigation strategy) = TDR certification

(risk identification) + (documented mitigation strategy) + (_____) = trustworthy

Next Steps & Future Work

- Survey
 - Qualitative analysis of write-in responses
- Interviews
 - Continue interviews with stakeholders in the CTS certification process
- Future research:
 - Further refine the Model for the Social Construction of Risk in Digital Preservation
 - Investigate how risk is constructed among repositories that conduct self-audits (systems with standard developers and repository staff, but no formal auditors)

Additional Reading

Frank, R. D. (2020). The Social Construction of Risk in Digital Preservation. Journal of the Association for Information Science and Technology. 71: 474-484.

<https://doi.org/10.1002/asi.24247> Available Open Access:
<http://hdl.handle.net/2027.42/149147>

Frank, R.D. Risk in trustworthy digital repository audit and certification. Archival Science (2021). <https://doi.org/10.1007/s10502-021-09366-z> Available Open Access:
<https://rdcu.be/cxJUD>

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- Participants
 - The Center for Research Libraries
 - Primary Trustworthy Digital Repository Authorisation Body Ltd.
 - Canadiana.org, Chronopolis, CLOCKSS, HathiTrust, Portico, & ScholarsPortal
 - CoreTrustSeal Board

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References

- Bostrom, A. (2014). Progress in Risk Communication Since the 1989 NRC Report: Response to “four Questions for Risk Communication” by Roger Kasperson. *Journal of Risk Research*, 0(0), 1–6.
<https://doi.org/10.1080/13669877.2014.923032>
- Consultative Committee for Space Data Systems. (2012). *Space Data and Information Transfer Systems — Audit and Certification of Trustworthy Digital Repositories (Standard No. ISO 16363:2012 (CCSDS 652-R-1))*. Washington, D.C.: Consultative Committee for Space Data Systems. Retrieved from
http://www.iso.org/iso/catalogue_detail.htm?csnumber=56510
- Hutter, B. M. (2005). “Ways of Seeing”: Understandings of Risk in Organizational Settings. In B. M. Hutter & M. Power (Eds.), *Organizational Encounters with Risk* (pp. 67–91). Cambridge: Cambridge University Press.
- Kasperson, R. E., & Kasperson, J. X. (1996). The Social Amplification and Attenuation of Risk. *Annals of the American Academy of Political and Social Science*, 545, 95–105.
- Murphy, M. (2006). *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers*. Durham [N.C.]: Duke University Press.
- Nelkin, D. (1989). Communicating Technological Risk: The Social Construction of Risk Perception. *Annual Review of Public Health*, 10(1), 95–113. <https://doi.org/10.1146/annurev.pu.10.050189.000523>
- Olofsson, A., Zinn, J. O., Griffin, G., Nygren, K. G., Cebulla, A., & Hannah-Moffat, K. (2014). The Mutual Constitution of Risk and Inequalities: Intersectional Risk Theory. *Health, Risk & Society*, 0(0), 1–14.
<https://doi.org/10.1080/13698575.2014.942258>

References

- Perrow, C. (1999). *Normal Accidents: Living with High-Risk Technologies* (Updated). Princeton University Press.
- Starr, C. (2003). The Precautionary Principle Versus Risk Analysis. *Risk Analysis*, 23(1), 1–3. <https://doi.org/10.1111/1539-6924.00285>
- van Est, R., Walhout, B., & Brom, F. (2012). Risk and Technology Assessment. In S. Roeser, R. Hillerbrand, P. Sandin, & M. Peterson (Eds.), *Handbook of Risk Theory* (pp. 1067–1091). Springer Netherlands.
- Vaughan, D. (1996). *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*. Chicago: University of Chicago Press.
- Vaughan, E., & Seifert, M. (1992). Variability in the Framing of Risk Issues. *Journal of Social Issues*, 48(4), 119–135. <https://doi.org/10.1111/j.1540-4560.1992.tb01948.x>
- Wildavsky, A., & Dake, K. (1990). Theories of Risk Perception: Who Fears What and Why? *Daedalus*, 119(4), 41–60.
- Wilkinson, I. (2001). Social Theories of Risk Perception: At Once Indispensable and Insufficient. *Current Sociology*, 49(1), 1–22. <https://doi.org/10.1177/0011392101049001002>
- Wynne, B. (1992). Misunderstood Misunderstanding: Social Identities and Public Uptake of Science. *Public Understanding of Science*, 1(3), 281–304. <https://doi.org/10.1088/0963-6625/1/3/004>