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Researching Informational Technologies of Trust: From Blockchain to Paradata and Digital Archives

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ABSTRACT

Information science research has a long-time interest in diverse informational means of codifying, communicating and maintaining trust as an antecedent and outcome of information, and a central constituent of information practices. While the landscape of the gatekeepers and guarantors of access to trustworthy information for a long time remained relatively stable, since the turn of the millennium, it has evolved rapidly with several new and repurposed social and digital technologies developed and repurposed for mediating and preserving trust. The purpose of this panel is to engage in exploring from theoretical, practical and empirical perspectives such technologies across the information field. The panelists present research conceptualizing, documenting, developing and describing informational technologies of mediating and preserving trust specifically addressing: 1) what different approaches to mediating and maintaining trust exist and can be identified in information science and technology research and practice; 2) how different information technologies of trust influence the understanding and conceptualisations of trust and trustworthy information; and 3) what novel insights from the current state-of-the-art research can be drawn for helping practitioners to empower and put people first when interacting with informational technologies of trust in different areas of the information field, including knowledge organisation and information behaviour and practices, records management, digital preservation, and development of information systems and services.

KEYWORDS

trust, information, records, archives, digital repositories

INTRODUCTION

Contemporary society is confronted with significant epistemic challenges around knowledge acquisition and dissemination. Central to these challenges are the issues of misinformation and disinformation, exacerbated by the digital age. The widespread use of disinformation distributing bots on social media and the creation of deepfakes now make it increasingly difficult to differentiate between reliable and unreliable information sources. This complexity adversely affects public understanding of critical areas such as health, politics, and science.

The problem is further intensified by echo chambers and filter bubbles, products of social media algorithms that limit exposure to diverse perspectives, thus reinforcing misconceptions. This leads to growing scepticism towards experts and traditional knowledge sources, often driven by political and ideological divisions. Such mistrust undermines the acceptance of scientific consensus on issues like climate change or vaccinations. These epistemic challenges collectively undermine the foundations of trust, reciprocity and care essential for both societal and cultural cohesion and genuinely productive and people-centric outcomes of interactions with information technologies.

Information science research has a long-time interest in diverse informational means of codifying, communicating and maintaining trust as an antecedent and outcome of information, and a central constituent of information practices (Wilson, 2010; Kelton et al, 2008). While the landscape of the gatekeepers and guarantors of access to trustworthy information for a long time remained relatively stable, since the turn of the millennium, it has evolved rapidly (Lemieux, 2022; Tallerås & Sköld, 2020). Both technology development, including the ubiquitous digitalisation of the information ecosystem with fast advances in generative artificial intelligence, and social change with a proliferation of dis- and misinformation and decreasing social trust have transformed many of the proven mechanisms of how information becomes and remains trustworthy. At the same time, however, several new and repurposed social and digital technologies have been developed and repurposed for mediating and preserving trust.

The purpose of this panel is to engage in exploring from theoretical, practical and empirical perspectives such technologies across the information field. The panelists present research conceptualizing, documenting, developing and describing informational technologies of mediating and preserving trust specifically addressing: 1) what different approaches to mediating and maintaining trust exist and can be identified in information science and technology research and practice; 2) how different information technologies of trust influence the understanding and conceptualisations of trust and trustworthy information; and 3) what novel insights from the current state-of-the-art

research can be drawn for helping practitioners to empower and put people first when interacting with informational technologies of trust in different areas of the information field, including knowledge organisation and information behaviour and practices, records management, digital preservation, and development of information systems and services.

EARLIER RESEARCH

Earlier information science and technology research has inquired into trust from multiple perspectives, including in relation to information technologies, information practices and sources. While the critique of Kelton et al. (2008) on the “relative dearth of research on trust in the field of information science” has certain validity in comparison to the vast volume of work in the management information systems field (Lemieux, 2022), the interest in trust and information has been steady and goes back several decades. Trust functions both as an antecedent and outcome of successful information activities (e.g. Widén-Wulff & Ginman, 2004; Huvila, 2013). Trust is also premise of accepting the truthfulness and relevance of information (Fallis & Whitcomb, 2009) and it influences information seeking (de Alwis, 2006), sharing (e.g., Meyers et al., 2009; Pilerot & Limberg, 2011) and use (e.g., Yakel et al., 2023; Yoon, 2017).

In our broad sense of understanding social and digital informational technologies consisting of all conceivable types of conceptual and technical machinery or equipment to deal with information, previous studies have identified a plethora of such apparatuses that are used in diverse ways to engender, manage and upkeep trust (Huvila, 2017). The earlier work on such technologies has multiple facets.

First, the informational technologies of trust can be placed on a continuum from social and/or conceptual to technical digital or non-digital apparatuses. At the social end, Wilson’s (1983) notion of cognitive authority can be perceived as a social informational technology of trust whereas blockchain and cryptography lie in the technical end of the spectrum.

Second, technologies are used to generate trust through focusing on different underpinnings of the trustworthiness of different actants. This is especially apparent in how proponents of blockchain solutions describe algorithmic technologies and social trust as two, essentially, opposite technologies to address the same issue of being able to rely on the authenticity and validity of particular assets (Lemieux, 2022). While blockchain renounces the need of institutional mediation, the repository seals of approval provide an example of a technology that aims corroborating (social) trust on repository contents through verifying the technical and organisational trustworthiness of repository institutions and their capacity to perform their expected tasks (Waters & Garrett, 1996).

Third, in addition to the purpose, the predominant technologies vary also depending on the context of their use. In archives and records management, the preeminent informational technologies of trust are the record (Duranti, 1995) and the appended system(s) of archival description and metadata (Duff & Harris, 2002) and standardised digitisation workflows, whereas in knowledge organisation and data management, metainformation, including metadata and paradata, have a comparable function (Pomerantz, 2015; Huvila, 2022).

Finally, our rough and so far, preliminary categorisation of what we term as informational technologies of trust, suggest that different technologies can have very different outcomes in terms of what types of trust, trustworthiness, and for example, credibility they produce. Previous work has shown that while trust in digital information is not detached from how people trust on non-digital sources, its mechanisms can be very different (e.g., Kelton et al. 2008). Moreover, same technologies can also produce and sustain parallel and opposite forms of distrust, mistrust (i.e. negative betrayal of trust), and lack of trust, or untrust (Huvila, 2017; Marsh & Dibben, 2005).

LAYOUT OF THE PANEL

The panel starts with an introduction to information and trust as a topic of research and practice with a brief overview of earlier work in the area. After the introduction, all panellists give short lightning talks on their work relating to different informational technologies of trust, with a specific focus on theoretical and empirical insights and reflecting on implications for information practice, policy and action. After the lightning talks, the panellists provide brief commentaries on their colleagues’ presentations with a focus on identifying commonalities and differences in how trust is enacted and managed using the discussed technologies and how the technologies influence and are underpinned by diverse concepts of trust and trustworthiness. During the final 30 minutes of the panel, the audience is invited to join the discussion. The discussion is guided by the moderator (Huvila) and facilitated by a series of questions based on the panellists’ presentations. Before the closing of the panel, the panellists are invited to give short, at the most a couple of sentences long reflections of how they would push the state-of-the-art of research on informational technologies of trust. The panel closes with an invitation from the moderator to contribute to the discussion started at the panel.

The presentations and commentaries combine two parallel approaches to engage with information, trust and its management. All presentations explicate how information and trust are conceptualised in four different contexts

across the information field and how these different understandings coincide and diverge. At the same time, all presentations also engage with the question of what implications the discussed technologies have in particular contexts or situations whether they are positive, negative, or possibly for example, stabilising or transformative. By bringing these two perspectives together, the panel inquires into the nexus of information and trust and different approaches to how they are conceptualised and practiced in different social and digital technologies. Further, the panel delves into the practical and theoretical implications of diverse informational technologies of trust for empirical information and technology research, theory and practice.

PANELLISTS AND THEIR CONTRIBUTIONS

Isto Huvila, Uppsala University

One of the major hindrances to reuse of shared secondary data resources in scientific and scholarly research is the shortcomings in data documentation. This applies especially to the documentation of data making and processing procedures. Such information, termed paradata, forms a cornerstone of both how to approach a dataset in practice but often even more importantly, whether, to what degree and how it can be trusted. Huvila's contribution is based on empirical research conducted in the European Research Council funded CAPTURE project that investigates the documentation of research processes and paradata. He shows in his presentation how paradata both conceptually and technically has emerged as a 'datafied' response to the need to obtain and convey trust on datasets, how it has been anticipated to operate, and how paradata operates in practice.

Professor Isto Huvila holds the chair in information studies at the Department of ALM (Archival Studies, Library and Information Science and Museums and Cultural Heritage Studies) at Uppsala University in Sweden. His primary areas of research include information and knowledge management, information work, knowledge organization, documentation, and social and participatory information practices.

Victoria L. Lemieux, University of British Columbia

Blockchain technology was initially envisioned as a solution to these challenges, offering an immutable and transparent ledger for 'epistemic trust'. This trust, supported by blockchain's unique algorithmic governance ('trustless trust'), was believed to resolve issues of trust in human social relations. Early perceptions of blockchain technology even dubbed it a 'truth machine'. Current blockchain solutions aim to exploit this epistemic capability, ranging from tracking goods in supply chains in order to prevent fraud, to verifying legitimate and trustworthy information sources. Despite its promise, blockchain technology has often fallen short in comprehending the epistemic foundations of individual and societal trust, necessary for effective solution design. Issues with the accuracy, reliability, and authenticity of blockchain ledger records, coupled with public perception and usability concerns, suggest that blockchain has not fully realized its potential in establishing 'epistemic trust' and 'user trust'.

However, not all is lost. As Lemieux's work on shows, failures of specific blockchain projects and entire ecosystems can be seen as experimental forays into reimagining society to confront epistemic challenges and trust issues. Viewed not just as technology but as movements for societal transformation, each new blockchain configuration presents an experimental hypothesis on societal organization. These offer insights into novel social organization and interaction modes, potentially teaching contemporary society about how to overcome current epistemic challenges.

Victoria L. Lemieux holds a position as Professor of Archival Science at the University of British Columbia's School of Information, an affiliated faculty position in UBC's Department of Electrical and Computer Engineering, Faculty of Applied Science, and is a member of UBC's Institute for Computing, Information and Cognitive Systems. She is also founder and co-lead of Blockchain@UBC, the University of British Columbia's multidisciplinary blockchain research cluster. Her academic research focuses on risk to the availability of trustworthy records and how these risks impact upon transparency, financial stability, public accountability, and human rights. Victoria currently sits on the International Standards Organization's Technical Committee 307 (blockchains and distributed ledgers). She holds a doctorate from University College London (Archival Studies, 2002) and, since 2005, has been a Certified Information Systems Security Professional (CISSP).

Olle Sköld, Uppsala University

Archives are a key technology of trust that for centuries have had a notable importance for information provision in many fields of activity and work, from scholarly research to civic governance and management, to democratic change and development. Although there are long lines of study that interrogate trust in archives and archival trustworthiness from the viewpoints of political and ethical examination, trust remains a very important currency for archives that is deeply rooted in how archives manifest themselves and in how they are approached and understood colloquially, theoretically, and institutionally. One of the main underpinnings of archival trust is the nominally uncomplicated and frictionless trajectory of records from record creator to archival user and the archives' investment in preserving this trajectory as transparent and visible, reflected in archival work via e.g., notions and practices connecting to and maintaining provenance, respect des fonds, and original order.

While it is comparably well known how trust is manifested, negotiated, and communicated in physical archives, there are few studies that explore how archival trust is impacted by the presently ubiquitous transition to and expansion of digital archives. Sköld's contribution to this panel delves into how digital archives function as a technology of trust within the framework of archival practices of academic and non-academic users. Sköld shows that the interplay between digital archives and digital archive users where trust emerges and becomes established in the socio-epistemological facets of archival practice is a contested space in part greatly impacted by established modes of archival work and archive functionalities in physical settings, but are also driven by actual and expected affordances of the digital medium, including affordances of metadata descriptions and information search. The research is based on focus-group research in the Labour's Memory project, funded by Riksbankens Jubileumsfond.

Olle Sköld is an assistant professor at the Department of ALM at Uppsala University in Sweden and a researcher in the CAPTURE (ERC 818210) and Labour's Memory projects (RJ IN20-0040). Sköld's research is characterized by an extensive focus exploring matters of documentation and preservation in the domains of labour and leisure and by a broad interest in the GLAM field, digital humanities, and knowledge production.

Devan Ray Donaldson, Indiana University Bloomington

In 1996, Don Waters and John Garrett first argued for audit and certification of Trustworthy Digital Repositories (TDRs) to produce a network of repositories and identify institutions that could actually be trusted with the responsibility of preserving important digital information for the long term (Waters & Garrett, 1996). Since the Waters and Garrett report was published, multiple standards for TDRs have been developed worldwide, including but not limited to Trustworthy Repositories Audit and Certification: Criteria and Checklist (TRAC) (RLG-NARA, 2007) and its subsequent Audit and Certification of Trustworthy Digital Repositories (ISO 16363) (ISO, 2012). TDR standards from Germany, including the Catalogue of Criteria for Trusted Digital Repositories (NESTOR, 2009) and the nestorSeal (NESTOR, 2013) and their subsequent, the international standard Criteria for Trustworthy Digital Archives (DIN 31644) (Deutsches Institut für Normung, 2012). Beyond the German TDR standards, other TDR standards include the requirements for the International Council for Science (ICSU) World Data System (WDS) regular members, the Data Seal of Approval (DSA) (Dillo & de Leeuw, 2015), and their subsequents – the Core Trustworthy Data Repositories Requirements (Edmunds et al., 2016) and CoreTrustSeal (CoreTrustSeal Standards and Certification Board, 2019). Now that some of these TDR standards are over a decade old, we can begin to analyze the text within repository audit reports as a means of understanding what repositories are doing over time to become and remain certified.

Donaldson contributes to the panel with insights from his studies of TDRs as informational technologies of trust since 2006 with respect to questions including how trustworthy are TDRs, does becoming certified make repositories better, and does recertifying make repositories better? He has conducted empirical research on publicly available repository audit reports to inquire into what evidence repositories provide to demonstrate compliance with TDR requirements (Donaldson & Russell, 2023) as well as what impact TDRs have on society (Donaldson & Russell, 2021). In cases where the same repositories get recertified over time, he has compared their audit reports to see whether what they say they are doing to be become certified has changed or evolved.

Dr. Devan Ray Donaldson is an Associate Professor of Information Science in the Department of Information and Library Science (ILS) in the Luddy School of Informatics, Computing, and Engineering at Indiana University Bloomington, where he directs the Master of Library Science program as well as specializations in Archives and Records Management and Digital Content, Curation, and Collections (DC3). Donaldson is also Affiliated Faculty with the Data Science Program and the Data to Insight Center (D2I) at Indiana University. His research interests include: archives, digital preservation, digital repositories, data sharing practices, data quality, mass digitization, research data management, trust, and security.

GENERATIVE AI USE

We confirm that we did not use generative AI tools/services to author this submission.

AUTHOR ATTRIBUTION

First Author: conceptualization, methodology, data curation, formal analysis, writing – original draft; writing – review and editing; Second to Fourth Author: methodology, data curation, formal analysis, writing – original draft; writing – review and editing.

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