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Developing A Governance Framework for Learning and Employment Record (LER) Issuer Registries

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Abstract: Learning and employment records (LERs) are increasingly deployed in the context of verifiable credentials, enabling more reliable and faster credential verification. However, there exists a missing link in the trust chain in order to substantiate if the issuer of a verifiable credential is trustworthy. For this reason, LER issuer registries, or lists of trusted issuers, are an increasingly relevant research area. An integral element of issuer registries is the governance framework used, which is essential for promoting trust in the issuer registry and supporting technical adoption. This study develops a governance framework for LER issuer registries as a part of a non-profit/higher education consortium research project, in collaboration with a group of eighty-one advisors from academia, government, private industry, standards bodies, and nonprofits. This advisory group participated in the brainstorming/data collection and iterative refinement of a governance framework using a two-stage process modeled on Mayer et. al's "Integrative Model of Organizational Trust" (ability, benevolence, and integrity perceived trustworthiness factors). The final governance framework consists of 7 categories which comprise a total of 48 guidelines (full governance framework provided as a table within the paper). The impact of this study is that trust in LER issuer registries can be studied and supported using a theoretically-grounded governance framework developed among industry stakeholders, promoting trusted engagement and authority of the issuer registry.

Keywords: Issuer Registry, Trust Registry, Learning and Employment Records, Verifiable Credentials, Trust, Governance

1 Introduction

The 2024-2025 Issuer Registry open-source project, a collaboration between the Digital Credentials Consortium higher education consortium, the Credential Engine non-profit, and a targeted advisory group of 81 subject matter experts/implementers, aims to provide a replicable and scalable open-source issuer registry pilot for the LER (Learning and Employment Record) space. The goal of the project is to enhance trust in Learning and Employment Records by creating a technical and governance pilot for interoperable issuer registries. An issuer registry is a cryptographically supported list of trusted credential issuers, enabling near-instantaneous trusted credential evaluation. Rapid and trusted credential evaluation is a novel functionality compared to traditional credential evaluations for professional licenses and degrees, which may take weeks to months to complete [Bo24].

One objective of the Issuer Registry pilot project is to develop and integrate both the technical and governance needs of an LER issuer registry. It is understood that LER

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issuer registry technical and governance aspects are mutually interdependent [Tr24a]: an appropriate technological approach will only be adopted if the governance of the issuer registry is accepted; and the governance of the issuer registry will be enabled by the capacity of the implementing technologies. Previous academic research has not yet analyzed governance needs in the LER issuer registry space. As such, a stakeholder-informed and theoretically-grounded governance framework was developed in the first phase (governance phase) of the Issuer Registry project to ensure that the eventual issuer registry technology would be deployed in alignment with stakeholder needs.

The aim of the governance phase of the project was to react to stakeholder needs and incorporate them in a best practices framework which answered the question "What is the minimal governance framework for a viable issuer registry?", informed by industry needs and academic research on trust. Capturing the socio-economic and socio-technical needs of project stakeholders first via an open-response exercise and then by a review exercise ensured that the advisory group was able to effectively communicate relevant requirements. Given the need to ensure that the governance framework could be interpreted according to inter-organizational trust, the exercises were conducted with respect to ability, benevolence, and integrity as defined in Mayer et. al's Integrative Model of Organizational Trust [MDS95].

The end result of the governance phase of this project (captured in Tab. 3) is an organized and classified framework of governance best practices for use in Learning and Employment Record issuer registry implementations. The governance best practices, listed out by category (*Registry Overview and Purpose, Governing Parties and Oversight, Privacy Policy and Terms of Use, Issuer Information and Verification, Data Download Format, Technical Standards, Security and Operations*) and further classified by ability, benevolence, and integrity enable implementers, researchers, and users of LER issuer registries to better understand and deploy governance guidelines to establish trust.

2 Background

2.1 Trust Registries and Issuer Registries

Trust registries are secure digital lists run by a trusted entity, which contain information about multiple organizations [Di21]. To join or maintain participation in a trust registry, an organization has to meet certain criteria: an organization is added to a trust registry by the registry operator once these criteria are met. The end result is that organizations can be easily and instantaneously checked to confirm if they have a particular status, often designated by governments, accreditation bodies, or training groups. Trust registries are a part of technology infrastructure in government document signing [Eu25b], public health [Eu25a], university environments [Va24], financial services [Ga23], and for USA interstate digital driver's licenses [Am25]. Various standards have been used to implement trust registries, including [IS21], [ET16], and [He24], among others.

An issuer registry is a specific kind of trust registry which contains organizations which are trusted to issue credentials (as opposed to a verifier registry). In the education domain, an issuer registry may list universities, schools, training courses, or testing centers.

2.2 Verifiable Learning and Employment Records

A key driver for the implementation of issuer registries in the education domain is the increasing scale and scope of educational and employment credentials, also known as Learning and Employment Records, or LERs [Go22]. These credentials, including course records, test results, or diplomas, can also be represented as digital credentials and can be implemented in a verifiable way [Sp25] [1E24]. Individuals or organizations which receive a credential from an issuer may want to confirm if the issuing institution is accredited and by whom. The method by which this verification can be completed is by creating a trust chain between the signed credential, the issuer, and an issuer registry. Currently, this trust chain for educational credentials is rarely made on an automated basis (and is often impossible to complete on an automated basis with paper records): a lack of automated checks may also increase delays and promote fraud [Bo24] [AD11]. Pilot implementations of issuer registries can demonstrate secure and rapid checks for issuer trust, which can serve as an enabling technology for verifiable LERs by completing this trust chain.

2.3 Governance and Trust

Digital governance is a concept which is discussed in various management fields. Relevant to the LER space is previous research that has been completed in the eHealth space, which involves a similar mix of institutional, personal, and governmental actors. [My16] defines governance components for maternal and child health registries to be "purpose specification, legal, fiscal, and operational responsibility, reporting requirements and enforceability, data quality, data security, confidentiality policies, and data access, and public engagement." These areas are relevant in some cases to LER issuer registries but may not be relevant regarding eHealth reporting requirements, confidentiality policies, and public engagement, due to the relatively non-sensitive nature of the data accessible via an LER issuer registry.

Other work on governance in digital platforms [Sc18] has described a classification of relevant trust elements for multi-sided platforms (MSPs, or platforms where users offer goods or services): "Governance structure", "Resources and documentation", "Accessibility and control", "Trust and perceived risk", "Pricing", and "External relationships." However, LER issuer registries do not follow the same economic logic as MSPs. An issuer registry is not necessarily more successful if adapted more widely or if more issuers join the issuer registry: in fact, some LER issuer registries will be more successful if specialized within specific subject domains. Additionally, low-quality offerings on MSPs would be expected to be offered at prices according to supply and demand, while an LER issuer registry may

in fact be provided at no cost and the level of trustworthiness of an issuer in the registry is usually determined by contextual factors, not by the market. Broader considerations of issuer registry design also suggest that not all MSP trust elements from [Sc18] are relevant in the LER issuer registry context (such as platform "modules"; cultivation of the platform ecosystem through APIs; and output evaluation, penalization, or rewards). Additionally, LER issuer registries, given the nature of educational data and government involvement in the university sphere, may be subject to certain legal and regulatory constraints which are not mentioned in [Sc18]. In sum, the components of governance in the LER issuer registry space have not yet been formally defined in the academic literature nor evaluated or designed among stakeholders of LER issuer registries.

Given the novelty of LER issuer registry technology, establishing trust in these issuer registries is of particular academic and practical interest. The relationship between governance and trust is disputed within organizational management literature [PV09], with authors noting both a potential substitutive effect and potential complementary effect [EE12]. We hypothesize that the LER issuer registry space, involving relatively little competition but the need for high standardization between the issuer registry and other stakeholders, is characterized by a complementary effect in which "formal control can contribute to increasing trust when parties agree on formal control to realize a common goal" [EE12]. For this reason, we apply Mayer et. al's Integrative Model of Organizational Trust [MDS95] (ability, benevolence, and integrity) to governance in the LER space, with the aim of identifying how governance criteria for LER issuer registries are related to (and can potentially promote) trust.

3 Methods

Determining and classifying governance guidelines for the LER issuer registry space was completed within a group of 7 higher education consortium/non-profit facilitators and 81 advisory group members, consisting of experts from academia, state and national governments, private companies, standards bodies, and nonprofits. All advisory group members were informed at the project start that results would be public and available under open licenses.

Development of the governance best practices framework occurred in two stages: a data collection stage with 30 advisory members in a live session and 5 higher education consortium/non-profit facilitators, followed by an asynchronous review session open to all 81 advisory members; and an iterative refinement stage reviewed with 21 advisory members in a live session and 5 higher education consortium/non-profit facilitators, followed by an asynchronous review session open to all 81 advisory members.

3.1 Stage 1 (Data collection)

A brainstorming exercise for governance guidelines ("Map which features of a hypothetical organization running an issuer registry contribute to three aspects of trust") was conducted among 30 advisory group members using an online sticky note collaboration tool. First, definitions of ability, benevolence, and integrity from [MDS95] were presented to the advisory group in a live session. Then, a 3-circle collaborative digital Venn diagram mapping ability, benevolence, and integrity was shared with the group, with 7 sticky notes for governance guidelines already added to the diagram by the higher education consortium/non-profit facilitators to spark discussion. The 30 members present in the live session or the 81 members in the larger group added 22 sticky notes to the diagram and rearranged the notes over the following week. Additional notes were recorded by facilitators.

3.2 Stage 2 (Iterative refinement)

The data collected from Stage 1 was sorted into categories and refined by one of the higher education consortium/non-profit facilitators with a background in organizational governance. In this initial step, the goal was to isolate core sticky notes and themes to identify "the minimal governance framework for a viable issuer registry." This facilitator also referenced

Category name	**Description**
Registry Overview and Purpose	Defines the scope, objectives, and operational principles of the issuer registry.
Governing Parties and Oversight	Addresses the roles and responsibilities of the governing bodies and mechanisms for ensuring transparent, effective oversight of an issuer registry.
Privacy Policy and Terms of Use	Establishes the legal and contractual rights and obligations of the issuer registry with respect to data providers and data users.
Issuer Information and Verification	Details the processes and requirements for onboarding, verifying, and maintaining issuer data.
Data Download Format	Details the processes and policies regarding downloading issuer registry data.
Technical Standards	Establishes the technical foundation for an issuer registry based on specific standards used.
Security and Operations	Describes cybersecurity and technical operations information regarding how the issuer registry code is operated and maintained.

Tab. 1: Description of project output (final governance framework) categories for LER issuer registries.

policies from two academic credential networks ([Tr24b], [Ve23]) and previous notes taken during this project's advisory meetings. Several sticky notes were merged or split apart, and the sticky note "Skills Translation" was removed because it was not relevant to the level of the detail of the overall classification.

After the initial categorization, two more higher education consortium/non-profit facilitators refined the secondary classification for ability, benevolence, and integrity for each entry, based on [MDS95]. These labels were reviewed and edited again in a group of 5 higher education consortium/non-profit facilitators. Next, the document was presented to 21 advisory members in a live session for their review, followed by a chance for the larger group of 81 advisory members to review and comment. Within the live session, two more guidelines were added ("Credential holder privacy protections" and "Use/storage of private individuals' data") and 3 individuals made formatting or clarifying comments to the document. Following this process, an additional organizational step was completed by higher education consortium/non-profit facilitators.

4 Results

The final governance framework consists of 48 guidelines divided among 7 categories (Tab. 1). Each category is meant to stand alone, referring to a different facet of the registry implementation. The overall list captures information relevant to advisory group stakeholders in order to make an informed decision about how much to trust an LER issuer registry, assuming an LER issuer registry provides information corresponding to each guideline.

Ability, benevolence, and integrity from [MDS95] were classified among each guideline in each category (Tab. 2), with the highest number of guidelines classified under integrity

Category name	**Ability classif.**	**Benevolence classif.**	**Integrity classif.**	**Total guidelines**
Registry Overview and Purpose	4	4	5	5
Governing Parties and Oversight	5	7	5	8
Privacy Policy and Terms of Use	0	5	5	5
Issuer Information and Verification	10	7	13	14
Data Download Format	4	3	3	4
Technical Standards	7	0	4	7
Security and Operations	5	3	5	5
Totals	**35**	**29**	**40**	**48**

Tab. 2: Distribution of governance framework guidelines for LER issuer registries, with ability/benevolence/integrity definitions from [MDS95]. Classifications may overlap within a category, but all classifications will be less than or equal to the total guidelines per category (rightmost column).

(40 of 48 guidelines), followed by ability (35 of 48 guidelines), followed by benevolence (29 of 48 guidelines). The full governance framework with all categories, guidelines, and classifications is provided below (Tab. 3).

Category name	**Description**		
Registry Overview and Purpose	Defines the scope, objectives, and operational principles of the issuer registry.		
Guidelines and perceived trustworthiness factors	**A**	**B**	**I**
Purpose and scope of the registry.	•		•
Subject matter focus of the registry: Limited to issuers, potentially specific types of issuers.	•	•	•
Funding model and sources.		•	•
Business model and fee structure for issuers.	•	•	•
Use/storage of private individuals' data (storage of private data should ideally not occur, or should only occur on a minimum basis).	•	•	•
Category name	**Description**		
Governing Parties and Oversight	Addresses the roles and responsibilities of the governing bodies and mechanisms for ensuring transparent, effective oversight of an issuer registry.		
Guidelines and perceived trustworthiness factors	**A**	**B**	**I**
Organization: Organizational mission.		•	
Governing body or advisory board structure: Composition and roles.	•	•	•
Governing body or advisory board structure: Processes for decision-making and resolving disputes.	•	•	•
Responsibilities of the governing parties: Oversight of operations, policies, procedures, and performance.	•		
Responsibilities of the governing parties: Communication and transparency policies for governance decisions.		•	•
Responsibilities of the governing parties: General transparency and accountability to stakeholders.		•	•
Dispute resolution mechanisms: Protocols for handling conflicts or challenges related to registry governance.	•	•	•
Communication and reporting: Channels for stakeholder engagement. This could include messaging about updates to the registry, requests for updates from the participants, updates about the organization hosting the registry, etc.	•	•	
Category name	**Description**		
Privacy Policy and Terms of Use	Establishes the legal and contractual rights and obligations of the issuer registry with respect to data providers and data users.		

Guidelines and perceived trustworthiness factors	A	B	I
Limitation of liability: Provisions to hold the issuer registry owner harmless from certain claims or misuse of the registry.		•	•
Misuse of data: Policies and consequences for improper use of registry data.		•	•
Privacy and data protection requirements, including compliance with applicable laws.		•	•
Credential holder privacy protections (preventing “calling home”, etc).		•	•
Intellectual property and licensing considerations: Ownership and usage rights for registry content and data.		•	•

Category name	Description
Issuer Information and Verification	Details the processes and requirements for onboarding, verifying, and maintaining issuer data.

Guidelines and perceived trustworthiness factors	A	B	I
Process for initial issuer data submission: Mandatory and voluntary issuer information (Name, description, location, identifiers, credentials offered, contact information, etc).	•		•
Process for verifying issuer identity and legitimacy: Know Your Customer (KYC) process/other identification process.	•		•
Process for verifying issuer identity and legitimacy: Use of third-party services (if any).			•
Process for reviewing and maintaining issuer information: Initial verification steps and estimated processing time.	•		•
Process for reviewing and maintaining issuer information: Frequency and criteria for periodic reviews and estimated processing time.			•
Trust and reputation policies: Defining trust levels or scales based on criteria met (e.g., evidence-based ratings).	•	•	•
Trust and reputation policies: Addressing negative attestations or endorsements of issuers (e.g., “bad reviews”).	•	•	•
Issuer planned/emergency key rotation and/or key compromise policies (including response, audit, and notification policies).	•		•
Retention and archival policies: longevity of issuer data for long-term verification.	•		•
Policies for organizations that close, merge, or leave the registry.	•	•	•
Good-faith policies for payment defaults or non-renewal.		•	•
Policies for issuer removal: Voluntary exit or non-compliance.		•	•
Documentation for issuers.	•	•	•
Issuer support contact.	•	•	

Category name	**Description**		
Data Download Format	Details the processes and policies regarding downloading issuer registry data.		
Guidelines and perceived trustworthiness factors	**A**	**B**	**I**
Machine-readable and human-readable issuer registry retrieval methods.	•		•
Public vs. private registry access.	•	•	•
Documentation for users.	•	•	•
User support contact.	•	•	

Category name	**Description**		
Technical Standards	Establishes the technical foundation for an issuer registry based on specific standards used.		
Guidelines and perceived trustworthiness factors	**A**	**B**	**I**
DID URL/traditional URL/other identifiers used.	•		•
Machine-readable credential formats supported.	•		•
Issuer registry standard/standards used.	•		•
Cryptographic signing mechanisms: how external applications can confirm record integrity.	•		
Verification infrastructure: Mechanisms for validating records against the issuer's cryptographic signature.	•		
Verification infrastructure: Mechanisms for validating records against the issuer registry's cryptographic signature.	•		
Support for tamper-proof storage of records (e.g., append-only logs, blockchain).	•		•

Category name	**Description**		
Security and Operations	Describes cybersecurity and technical operations information regarding how the issuer registry code is operated and maintained.		
Guidelines and perceived trustworthiness factors	**A**	**B**	**I**
Security controls and data protection methods.	•	•	•
Service Level Agreement (SLA) commitments.	•	•	•
Issuer registry planned/emergency key rotation and/or key compromise policies (including response, audit, and notification policies).	•		•
Open-source or closed-source code.	•	•	•
Existence of production and test environments and automated testing.	•		•

Tab. 3: Full governance framework developed for LER issuer registries. A, B, and I columns refer to Ability, Benevolence, and Integrity perceived trustworthiness factors from [MDS95].

5 Discussion

The highest proportions of guidelines classified under the perceived trustworthiness factor of integrity (the largest group, consisting of a total of 40 of 48 guidelines) were found in in the categories *Registry Overview and Purpose*, *Privacy Policy and Terms of Use*, *Issuer Information and Verification*, and *Security and Operations*. These categories pertain to the performance elements of the LER issuer registry. These guidelines are likely to also be evaluated over time, in line with [MDS95], which notes that integrity depends on the "extent to which the party's actions are congruent with his or her words." It is likely that integrity will be perceived as low at the launch of a new LER issuer registry, unless launched by an entity which already enjoys a high perception of integrity.

The highest proportions of guidelines classified under the perceived trustworthiness factor of ability (consisting of a total of 35 of 48 guidelines) were found in in the categories *Data Download Format*, *Technical Standards*, and *Security and Operations*. These results suggest that ability is more likely to be attributed to the portion of governance which can be verifiably checked with reference to external standards and best practices (as opposed to *Governing Parties and Oversight*, *Privacy Policy and Terms of Use*, *Registry Overview and Purpose*, and *Issuer Information and Verification*, which are based on internal characteristics). As such, there is likely some element of transitive ability which is associated with LER issuer registries: if the LER issuer registry incorporates trusted external standards and best practices, its ability may be likely to be evaluated more highly.

The highest proportions of guidelines classified under the perceived trustworthiness factor of benevolence (the least numerous group, consisting of a total of 29 of 48 guidelines) were found in the categories *Privacy Policy and Terms of Use*, *Governing Parties and Oversight*, and *Registry Overview and Purpose*. These results suggest that LER issuer registries which have weak contractual restrictions, a pure profit motive, or an unclear purpose may be less likely to be evaluated as trustworthy under the trust factor of benevolence. Furthermore, more technically-oriented guidelines may have a limited impact on promoting the belief that the LER issuer registry wants to do good to other parties.

Issuer Information and Verification and *Governing Parties and Oversight* were the largest categories in the framework, containing 14 and 8 guidelines respectively. Both categories are particularly of interest because they contain within themselves the smaller governance frameworks used between the LER issuer registry and the governing board and between the LER issuer registry and issuers.

6 Limitations

The methods used in this project were specifically targeted towards the learning and employment record (LER) space. Given that LERs span the employment, educational, and government spaces it would be useful to consider in which ways the governance framework

developed in this area is specific to the LER space and in which ways it can also apply to other issuer registry types. Additionally, the kind of trust registry targeted in this research is an issuer registry, which provides a trusted list of issuers. A verifier registry would focus on providing a trusted list of verifiers and may not share the same governance categories or guidelines.

Two potential components of integrity according to [MDS95] are "the consistency of the party's past actions [and] credible communications about the trustee from other parties." Given that the governance guidelines in this study are meant to be applicable to any LER issuer registry, including new issuer registries, we are unable to evaluate the backward-looking or inter-organizational integrity aspects in this study although they may still be relevant. The trustor's "propensity to trust" [MDS95] will likely also need to be measured to understand why or why not certain LER issuer registries are trusted in practice.

One limitation of the study was the method used to recruit advisory group members and collect data/responses: advisory group members were recruited via snowball sampling, limited to a certain group of online participants who were willing, able, and informed enough to contribute to guideline development for governance for LER issuer registries. Not all of the advisory members provided feedback as a part of the study.

7 Future Work

An area of study particularly relevant to the LER domain is the consideration of issuer registry and issuer longevity, due to the fact that educational credentials usually are designed to last for the lifespan of the credential holder (or longer) [BA24]. Archiving is a consideration in the *Issuer Information and Verification* category of this study's governance framework and is an active consideration in industry in the EU/EEA Trusted Lists [Eu25b]. A relevant future area of research is the extent to which LER issuer registries should cache or archive the information of issuers who join the issuer registry and how this information may support trust.

One notable insight in [SMD07] is that ability, benevolence, and integrity trust factors may develop over different time periods: specifically, benevolence and integrity may be more correlated over short time scales but may become more separable over longer periods. This will likely be a relevant factor in the implementation of LER issuer registries due to the longevity of the issuer registries themselves. Additionally, further research on trust repair, as mentioned in [SMD07], may be useful in the LER context due to potential bad faith actors (such as "diploma mills") who may try to unscrupulously leverage issuer registries.

One area not measured in this study was the difference in trust or importance of different LER issuer registry governance guidelines based on stakeholder role (issuers, verifiers, third parties, other issuer registries) or background (academia, state and national governments, private companies, standards bodies, and nonprofits). These measurements may be useful

for understanding how to promote trust when designing the user experience of issuer registry websites, wallet applications, or other user-facing digital elements. Relevant studies in this area could be completed using prototypes or real versions of LER issuer registries, paired with governance documentation implemented according to the framework developed in this paper.

8 Conclusion

This research work opens up new possibilities in the emerging LER issuer registry literature, contributing a governance framework which was developed among a group of 81 subject matter experts/implementers and 7 higher education consortium/non-profit facilitators. This theoretically-grounded framework can help promote effective and trusted implementations of LER issuer registries, classified under the ability, integrity and benevolence perceived trustworthiness factors from [MDS95]. By providing a governance framework for LER issuer registries, increasingly relevant LER issuer registry technology can be more easily studied and adopted.

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References

[1E24] 1EdTech: Open Badges Specification 3.0, 2024, https://www.imsglobal.org/spec/ob/v3p0, accessed: 01/31/2025.

[AD11] Attewell, P.; Domina, T.: Educational imposters and fake degrees. Research in Social Stratification and Mobility, New Directions in Educational Credentialism 29 (1), pp. 57–69, 2011, https://www.sciencedirect.com/science/article/pii/S0276562410000685, accessed: 01/31/2025.

[Am25] American Association of Motor Vehicle Administrators: Verified Issuer Certificate Authority List, 2025, https://vical.dts.aamva.org/, accessed: 01/31/2025.

[BA24] Bochnia, R.; Anke, J.: Long-Lived Verifiable Credentials: Ensuring Durability Beyond the Issuer's Lifetime. In: Proceedings of the 19th International Conference on Availability, Reliability and Security. ACM, Vienna Austria, pp. 1–9, 2024, https://dl.acm.org/doi/10.1145/3664476.3669933, accessed: 01/31/2025.

[Bo24] Board of Nursing, Maryland Department of Health: Frequently Asked Questions (FAQs) About RN/LPN Licensure and APRN Certification, 2024, https://health.maryland.gov/mbon/Documents/FAQs-Licensure.pdf.

[Di21] Digital ID and Authentication Council of Canada: Pan-Canadian Trust Framework Trust Registries, 2021, https://diacc.ca/trust-framework-components/pctf-trust-registries/, accessed: 01/31/2025.

[EE12] Edelenbos, J.; Eshuis, J.: The Interplay Between Trust and Control in Governance Processes: A Conceptual and Empirical Investigation. Administration & Society 44 (6), Publisher: SAGE Publications Inc, pp. 647–674, 2012, https://doi.org/10.1177/0095399711413876, accessed: 01/29/2025.

[ET16] ETSI: ETSI TS 119 612 V2.2.1 (2016-04) Electronic Signatures and Infrastructures (ESI); Trusted Lists, 2016, https://www.etsi.org/deliver/etsi_ts/119600_119699/119612/02.02.01_60/ts_119612v020201p.pdf, accessed: 01/31/2025.

[Eu25a] European Commission: EU Digital Covid Certificates Trust List, 2025, https://health.ec.europa.eu/ehealth-digital-health-and-care/ehealth-and-covid-19/eu-dcc-trust-list_en, accessed: 01/31/2025.

[Eu25b] European Commission: EU/EEA Trusted List Browser, 2025, https://eidas.ec.europa.eu/efda/trust-services/browse/eidas/tls, accessed: 01/31/2025.

[Ga23] Garber, E. et al.: GAIN in 2023, 2023, https://openid.net/wp-content/uploads/2023/07/GAIN-in-2023.pdf.

[Go22] Goger, A. et al.: Going Digital: How Learning and Employment Records Shape Access To Quality Education and Jobs, tech. rep., Center for Universal Education at Brookings, 2022, https://www.brookings.edu/wp-content/uploads/2022/12/WEB_Report_Going-digital_FINAL122022.pdf.

[He24] Hedberg, R. et al.: OpenID Federation 1.0 - draft 41, 2024, https://openid.net/specs/openid-federation-1_0.html, accessed: 01/31/2025.

[IS21] ISO/IEC: ISO/IEC 18013-5:2021, 2021, https://www.iso.org/standard/69084.html, accessed: 01/31/2025.

[MDS95] Mayer, R. C.; Davis, J. H.; Schoorman, F David: An Integrative Model of Organizational Trust. The Academy of Management Review 20 (3), pp. 709–734, 1995, https://doi.org/10.2307/258792.

[My16] Myhre, S. L. et al.: eRegistries: governance for electronic maternal and child health registries. BMC Pregnancy and Childbirth 16 (1), p. 279, 2016, https://doi.org/10.1186/s12884-016-1063-0, accessed: 01/27/2025.

[PV09] Puranam, P.; Vanneste, B. S.: Trust and Governance: Untangling a Tangled Web. The Academy of Management Review 34 (1), Publisher: Academy of Management, pp. 11–31, 2009, https://www.jstor.org/stable/27759983, accessed: 01/29/2025.

[Sc18] Schreieck, M. et al.: The Challenge of Governing Digital Platform Ecosystems. In (Linnhoff-Popien, C.; Schneider, R.; Zaddach, M., eds.): Digital Marketplaces Unleashed. Springer, Berlin, Heidelberg, pp. 527–538, 2018, https://doi.org/10.1007/978-3-662-49275-8_47, accessed: 01/27/2025.

[SMD07] Schoorman, F. D.; Mayer, R. C.; Davis, J. H.: An Integrative Model of Organizational Trust: Past, Present, and Future. The Academy of Management Review 32 (2), Publisher: Academy of Management, pp. 344–354, 2007, https://www.jstor.org/stable/20159304, accessed: 01/29/2025.

[Sp25] Sporny, M. et al.: Verifiable Credentials Data Model v2.0, 2025, https://www.w3.org/TR/vc-data-model-2.0/, accessed: 01/31/2025.

[Tr24a] Trust Over IP: ToIP Announces the Implementers Draft of the Trust Registry Query Protocol Specification V2.0, 2024, https://www.trustoverip.org/blog/2024/04/03/toip-announces-the-implementers-draft-of-thetrust-registry-protocol-specification-v2-0/, accessed: 01/31/2025.

[Tr24b] Trusted Learner Network: Trusted Learner Network - Governing Charter 1.0, 2024, https://tln.asu.edu/documentation/trusted-learner-network-governing-charter-10, accessed: 01/31/2025.

[Va24] Vaghetti, D.: eduGAIN OpenID Federation Pilot, Rome, IT, 2024, https://www.garr.it/en/docs/7172-sessione-6-0611-04-vaghetti-0611/file.

[Ve23] Velocity Network Foundation: Governance - Overview, 2023, https://www.velocitynetwork.foundation/main2, accessed: 01/31/2025.