Developing People-centric Data Governance with Service Design

Jaana Helsing, Tanja Korhonen
Kajaani University of Applied Sciences, Kajaani, Finland
jaana.helsing@gmail.com, tanja.korhonen@kamk.fi

People are in the center when creating Data Governance practices. Data Management can be developed into a user-centric using Service Design principles to address challenges in Data Governance, Data Quality, and data interoperability. This article emphasises the importance of placing people at the center of Data Governance. Through literature review, survey, and co-creation workshops, a service concept was designed to foster collaboration and shared ownership. Findings reveal gaps in Data Governance and Data Management practices, highlighting the need for structured Data Management frameworks and human-centred approaches. The paper contributes to theory and practice by demonstrating how Service Design supports cultural adoption and co-creation in Data Management.

DOI
https://doi.org/10.18690/um.fov.4.2026.22

ISBN
978-961-299-152-4

Keywords:
data management,
data governance,
stakeholder engagement,
human-centered design,
service design

University of Maribor Press

1 Introduction

Data has emerged as a critical strategic asset for organizations seeking to drive innovation, optimize operations, and enhance decision-making capabilities (Wallis, 2021). In contemporary digital transformation initiatives, effective data management is no longer merely a technical function but a strategic enabler that demands cultural change and sustained human engagement (Pedrosa & Araujo Freitas, 2024). Organizations increasingly recognize that robust data governance frameworks are essential for ensuring data quality, interoperability, and trustworthiness: prerequisites for advanced analytics, automation, and evidence-based decision-making.

Despite significant investments in data platforms, governance frameworks, and technical infrastructure, many organizations struggle to realize the full value of their data assets. A persistent gap exists between the availability of sophisticated data management frameworks such as DAMA-DMBOK and their practical adoption in organizational contexts. (Earley & Henderson, 2017) Research reveals that this implementation gap stems primarily from human and cultural factors rather than technical limitations: unclear ownership and accountability, fragmented cross-functional collaboration, resistance to change, and governance processes that fail to align with everyday work practices (Erander & Granat, 2024; Mazzarella, 2024).

In today's digital transformation, Data Management is not just a technical function, it is a strategic enabler that requires cultural change and human involvement. Organisations often struggle with fragmented practices and unclear ownership. (Justy et al., 2023.) They face cultural barriers that prevent them from fully using their data. These barriers include difficulty in moving away from a status quo mindset. Long-standing workplace cultures and fixed ways of working make it less likely for employees to use or share data. (Chakravorty, 2020.) Cultural transformation is critical: Data Governance must be embedded into everyday work, not imposed as bureaucracy.

Service design offers a promising pathway to bridge this gap by placing people at the center of governance development. Service design principles, including co-creation, user journey mapping, prototyping, and ecosystem thinking provide actionable methods for translating abstract governance policies into tangible, user-friendly touchpoints (Figueiredo et al., 2024; Mariani, 2024). By reframing data governance

as a service rather than a compliance mandate, organizations can design governance processes that align with user workflows, foster collaboration, and build shared ownership across business units and functional domains.

This paper addresses the question: *How can service design principles be integrated into data governance development to create people-centric practices that enhance adoption, accountability, and organizational value?* Drawing on a constructive research approach, we present a case study from an energy sector organization where we applied service design methods: literature review, stakeholder surveys, and co-creation workshops, to develop a user-centric data governance operating model. Our research makes three primary contributions: (1) a synthesized framework linking service design interventions to data governance capabilities, (2) empirical evidence of organizational barriers and how co-creative methods address them, and (3) practical guidance and artifacts for embedding people-centric governance into organizational practice.

The remainder of this paper is structured as follows. Section 2 reviews foundational concepts in data management and data governance, emphasizing the human dimension. Section 3 describes our research methodology, including survey design and co-creation workshop approaches. Section 4 presents empirical findings from the current state assessment, survey results, and workshop insights. Section 5 discusses the target state design and service concept development. Section 6 concludes with implications for research and practice, along with recommendations for operationalizing people-centric data governance in institutional settings.

2 Foundations and Development of Data Management

In contemporary organizations, data is widely recognised as a strategic asset that enables evidence-based decision-making, operational efficiency, innovation, and regulatory compliance. Yet, the realisation of this value depends on disciplined Data Management practices that span Data Governance, Data Architecture, Data Modeling, Data Quality, Metadata, Data Security, and lifecycle management (Earley & Henderson, 2017). Previous studies frame Conceptual foundations for understanding data and its management, and a practical, strategy-aligned approach for developing Data Management capabilities. Organisations must pair robust Data Governance with user-centric design and product thinking to achieve sustainable impact from data (DalleMule & Davenport, 2017; Wallis, 2021). Recent enterprise

frameworks emphasize that data governance functions defining clear policies, roles, and data quality standards are central to ensuring data integrity and regulatory alignment (Madhavan, 2024). Governance adoption improves when capabilities are explicitly defined, empirically validated and measured, rather than treated as abstract principles, reinforcing the case for operational, people-centred design of governance services (Merkus et al., 2023). Recent systematic analyses of governance frameworks emphasize the importance of clearly defined roles, decision rights, and maturity models for organizational data governance success (Acev et al., 2025).

2.1 Data Management

Data Management encompasses planning, execution, and oversight across the data lifecycle, ensuring control, protection, and value realization (Earley & Henderson, 2017). The DAMA-DMBOK wheel (see Fig. 1) centers Data Governance and links Data Architecture, Data Modeling, Data integration/interoperability, Data Quality, Metadata, storage/operations, Data Security, Master/Reference data, and analytics/BI as mutually reinforcing capabilities (Earley & Henderson, 2017).

Figure 1: Knowledge Areas of Data Management (Adapted from Earley & Henderson, 2017)

Data Governance defines decision rights, standards, accountability, and escalation mechanisms for data across the enterprise (Abraham et al., 2019; Khatri & Brown, 2010). Critical success factors include executive sponsorship, cross-divisional

participation, defined ownership/stewardship, measurable quality metrics, and ongoing training (Cheong & Chang, 1005, 2007). Operating models can be centralised, decentralised, federated, hybrid, or networked; the "best fit" depends on business strategy and the offense–defense balance (DalleMule & Davenport, 2017; Earley & Henderson, 2017). Recent work shows that co-eliciting governance requirements with stakeholders, covering usability, compliance, lineage, access, and organisational design, helps overcome adoption barriers in multi-stakeholder settings (Haberl, Malin & Thalmann, 2022). Organisations can operationalise this using lightweight service-design artefacts, such as the Data Product Canvas and Data Service Cards, to embed policy, quality and accountability in daily delivery (Fruhwirth et al., 2020; Breitfuss et al., 2020).

Data does not manage itself; people do. Successful adoption requires change management, clear role definitions, and communities of practice to embed new behaviors (Earley & Henderson, 2017; Kosonen, 2019). This human dimension is often underestimated but is decisive for governance maturity and the scale-up of Data Quality and Metadata practices (Heisig, 2009).

2.2 Developing Data Management: Data Strategy and Data Governance

A Data Strategy clarifies data's purpose, availability, organisation, use, and capabilities, aligning defense (risk, compliance, integrity) with offense (growth, innovation, customer value) (DalleMule & Davenport, 2017; Datastrategiaopas, 2021; Earley & Henderson, 2017). It sets vision, principles, objectives, and a roadmap, typically supported by a dedicated Data Management Strategy covering governance, architecture, quality, metadata, master/reference, security, and analytics (Wallis, 2021; Earley & Henderson, 2017).

Knowledge or Data Management efforts fail when culture, measurement, strategy, structure, leadership, IT problems, and lack of standards are not addressed holistically (Liebowitz, 2016). Development must integrate social and organisational factors, not just technology, to improve efficiency (e.g., faster data discovery, fewer manual reconciliations) and reduce risk (Kaario & Peltola, 2008). Unified governance frameworks that integrate cultural change considerations, process alignment, and

stakeholder engagement are essential for organizational adoption, particularly in highly regulated sectors (Dibouliya, 2025).

EU-level instruments such as GDPR, Data Governance Act, Digital Services Act, Digital Markets Act, Data Act, and the AI Act shape expectations for data transparency, portability, fairness, and safety (Traficom, n.d.; Office of the Data Protection Ombudsman, n.d.). Industry-specific regimes (e.g., DORA, PCI-DSS, Solvency II, BCBS 239) further reinforce governance requirements (Finanssivalvonta, n.d.; Earley & Henderson, 2017). The energy sector operates under an extensive regulatory framework encompassing EU internal energy market rules, climate and decarbonisation legislation, security-of-supply requirements, and critical-infrastructure cybersecurity and data regulations, making accountability and Data Management central compliance enablers rather than purely operational concerns (Zhang et al., 2025). Embedding privacy, retention, and access controls in the development lifecycle is non-negotiable.

To translate governance into day-to-day practice, a layered operating model is needed, with each level carrying distinct responsibilities. At the Executive level, leadership sets vision, policy and priorities. At the Strategic Common level, a Data Governance Board establishes shared standards, taxonomies and training. The Tactical level manages subject areas, definitions, stewardship, quality rules and the data lifecycle, while the Operational level applies standards in projects, documents metadata and lineage, monitors quality indicators and manages access. Together, these layers clarify decision rights, collaboration points and stewardship practices, which strengthens adoption. (Cheong & Chang, 2007; DalleMule & Davenport, 2017; Earley & Henderson, 2017)

Effective Data Management produces timely, relevant, and trusted information at lower total cost of ownership and greater speed, thus supporting both defensive and offensive objectives (Hawtin & Lecore, 2011; DalleMule & Davenport, 2017). Quantifiable benefits include reduced manual work, faster access to data, improved compliance posture, stronger collaboration/literacy, and better ROI on data initiatives (Hawtin & Lecore, 2011; Cheong & Chang, 1006, 2007). Without governance, data risks such as inefficiency, quality failures, compliance breaches,

outages, and missed opportunities, compound (Earley & Henderson, 2017; Redman, 1998).

3 Research Methodology

The study employed a constructive research approach, which is well-suited for solving practical problems through the creation of new knowledge and artifacts (Lukka, 2003; Piirainen & Gonzalez, 2013). The goal was to design a user-centric Data Management service for an energy sector company by combining theoretical insights with empirical evidence. This approach ensured that the resulting concept was both academically grounded and operationally relevant. The original reseach data was gathered as part of thesis (Helsing, 2025).

The methodology integrated qualitative and quantitative methods within a mixed-method framework, structured into three phases:

Phase 1: Literature Review. A systematic review of academic and industry sources established the theoretical foundation for Data Management and Service Design. Frameworks such as DAMA-DMBOK and service-dominant logic (Vargo, Maglio, Akaka, 2008), informed the conceptual model.

Phase 2: Empirical Data Collection

- Survey: Distributed to 40–50 participants across business units, IT, and enabling functions
- The survey captured perceptions of current Data Management maturity and improvement priorities. Responses (n=16) were analyzed using descriptive statistics to identify gaps in areas such as Data Quality, Metadata Management, and Data Governance.
- Co-Creation Workshops: Two workshops applied the Six Thinking Hats (De Bono, 1985) method to generate ideas and validate needs. These sessions facilitated cross-functional dialogue, enabling participants to define Data Governance roles, articulate pain points, and envision target-state capabilities.

Phase 3: Service Design Application. Service design principles (Stickdorn & Schneider, 2011) guided the development of the Data Management service concept. Tools such as personas and customer journey mapping represented user needs and designed touchpoints. The Double Diamond process (Design Council, n.d.) structured iterative prototyping and refinement with phases of Discover, Define, Develop and Deliver.

Data Collection and Analysis

Survey data was analysed through descriptive statistics (frequencies, percentages) that summarised maturity levels and priority areas. Visualisations such as bar charts highlighted patterns in responses. Workshop data was analysed using content analysis clustered insights under governance, quality, and usability themes. Outputs informed the design of the Data Governance Operating Model and service components. Findings were synthesised into a target operating model, a roadmap, and measurable objectives using the OKR (Objectives and Key Results) framework.

This methodology ensured alignment between theory and practice, combining evidence-based design with stakeholder co-creation. By embedding service design into Data Management development, the approach delivered a solution that is both technically robust and user-centric.

4 Findings

4.1 Current State of Data Management

The empirical work (survey and workshops) surfaced a consistent set of pain points. Respondents described fragmented practices, unclear ownership, and manual workarounds that undermine trust in data and slow delivery. Key pain points:

- Unclear ownership and accountability: Roles are undefined and stakeholders "don't know whom to contact".
- Data Quality issues: Inaccurate and inconsistent data hinders automation, forecasting, optimisation, and investment planning.
- Metadata and lineage gaps: Context, definitions, and lineage difficult to find.

- Manual work and rework: Repeated data entry, ad-hoc access controls, and governance drop-off after projects.
- Limited cross-unit collaboration: Collaboration exists but is insufficient.

These findings echo the literature's view that Data governance and Data Quality management are cross-divisional and require sustained leadership, standards, and training (Cheong & Chang, 2007; Earley & Henderson, 2017).

4.2 Survey results

The survey (15.5.2025–16.6.2025) reached 40–50 employees and received 16 responses, representing Business (37.5%), Business IT (25%), Enabling functions (18.7%), and Group IT (18.8%). Data challenges were widespread:

- n=15 reported experiencing Data Quality issues several times in the past year; n=0 reported "not at all," confirming persistence and business impact (Redman, 1998; Loshin, 2020).
- Only n=1 model data systematically, while n=9 recognise the need, but lack processes or resources.
- n=10 say they have "some metadata" but no processes or guidelines; n=4 report having none.
- n=11 have only partially identified processes/owners
- Governance practices are emerging: n=10 have "started" practices, n=5 lack both ownership and management practices, and n=1 reports clear ownership and management.

Respondents highlighted need for group-level guidance that is described in table 1.

Urgency ranking (lower average = higher priority): Data Governance (avg 2.7), Data Modeling (3.3), Data Quality (3.4), Data Architecture (3.7). This aligns with DAMA's centrality of governance and foundational role of architecture and modeling (Earley & Henderson, 2017).

Table 1: Need for group-level support

Area	Need for Group-level Support
Data Architecture	66.7%
Metadata Management	60.0%
Data Platforms	60.0%
Data Governance	53.3%
Data Modeling	53.3%
Master / Reference Data	53.3%
Data Quality	40.0%
Data Security	40.0%
Data Flows / Integrations	40.0%
Document / Content Management	40.0%
Data Product Development	33.3%

4.3 Workshop insights

Two workshops were conducted: (1) a Data Governance Working Group session (7 participants) and (2) a Six Thinking Hats session (3 participants). Data Governance Working Group defined itself as a strategic enabler: building a shared language, clarifying roles, reducing duplication, and accelerating data-driven initiatives. 12-Month objectives include establish Data Subject Areas and Data Families, define taxonomy, standards, operationalise governance in real projects, and embed privacy and Data Quality. Value Proposition comes from efficiency, risk mitigation, transparency, collaboration, acceleration, and maturity. These outputs reflect critical success factors from Data Governance literature (Cheong & Chang, 2007; Khatri & Brown, 2010; Abraham et al., 2019).

The synthesis of the Six Hats Workshop was that with white (facts) hat, there are manual processes, lack of collaboration and need for Data Architecture support. Red (feelings) hat showed frustration when Data Governance is not a continuous effort and desire for visible and practical results. The yellow (benefits) hat revealed benefits with trusted, accessible, visible data as well as automation, reusable solutions, clearer governance. Black (risks) hat perceived bureaucracy and unclear value realisation and the Green (ideas) hat embraced communities, business-led roles and reusable data assets. Overall, participants asked for tangible artifacts (playbooks, templates, catalogs, lineage), business-led ownership, and community practices to sustain change, consistent with service design's co-creation methods and Double Diamond process (Design Council, n.d.; Koivisto et al., 2019).

4.4 Target State and Service Concept

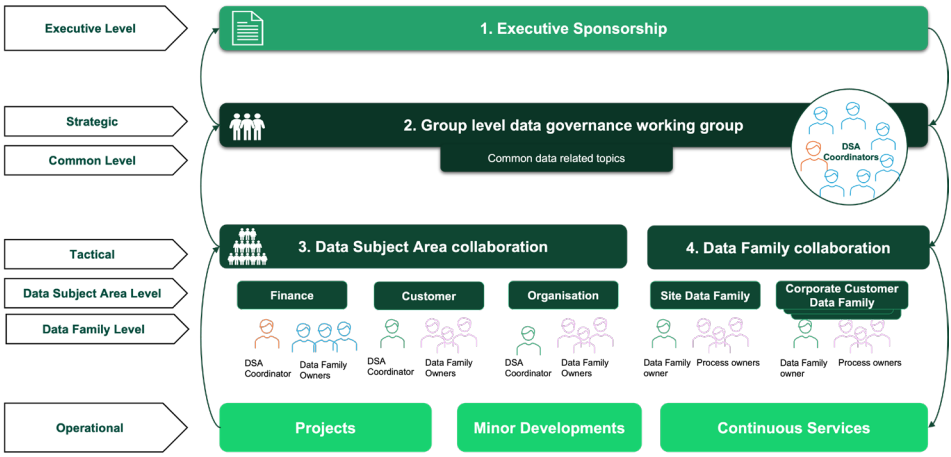

Figure 2: Data Governance Operating Model

Table 2: Design rationale for Data Governance Operating Model

Model element	Empirical finding	Design principle	Resulting design decision
Four-layer operating model	Governance activities dropped after project delivery; lack of continuity	Governance must span strategic, tactical, and operational levels	Operating model structured into four distinct responsibility levels
Data Family Owner role	Survey and workshops revealed unclear data ownership	Accountability should be business-led, not IT-driven	Dedicated business role accountable for critical data
Data Subject Area Coordinator	Fragmented collaboration across data families	Federated coordination improves cross-alignment	Coordinator role introduced at tactical level
Limited number of roles	Resistance to bureaucracy; preference for practical governance	Lightweight governance increases adoption	Role set kept intentionally minimal
Absence of a formal steering group in initial model	Workshop participants expressed concern over bureaucracy and low perceived value of governance forums	Lightweight governance structures improve adoption in low-maturity contexts	Steering group intentionally excluded from initial model; executive sponsorship used instead
Executive sponsorship without steering group	Need for prioritisation and escalation without adding decision layers	Clear sponsorship can provide direction while minimizing overhead	Named sponsor established to support authority and visibility

Using survey and workshop evidence, the study defined a vision and mission for Data Management. Vision is to *be a trusted enabler of data-driven success: data is discoverable, reliable, and readily available*. And mission is *to empower business units with user-centric Data Governance and architecture services, improving data quality, metadata, and master/reference data in collaboration with data family owners and practitioners.*

A Data Governance Operating Model was formed to support decision-making and collaboration around data. This clarifies decision rights and execution pathways, addressing the survey's ownership and collaboration gaps (Earley & Henderson, 2017; DalleMule & Davenport, 2017). The Data Governance Operating Model is presented in Figure 2, and its design rationale is provided in Table 2.

5 Discussion and Conclusions

Outcomes achieved through the study were shared understanding of current maturity and gaps, defined governance operating model and roles with a 12-month agenda and user-centric service concept prototype with personas, journeys, and component design. Implications related to embedding governance in delivery lifecycles (projects/products), making metadata/lineage visible, and productizing dat**a** are pivotal to shift from ad-hoc practices to trusted, reusable, and discoverable data. Without these steps, quality failures and duplication persist (Redman, 1998; Loshin, 2020); with them, data becomes an actionable asset (Nokkala, 2020; DalleMule & Davenport, 2017).

The findings of this study underscore a critical insight: Data Management is not solely a technical challenge, but it is fundamentally a human one. While frameworks, tools, and governance models provide structure, their success depends on the engagement, understanding, and collaboration of people across the organisation. Survey results revealed that gaps in ownership, unclear roles, and fragmented collaboration were among the most pressing issues. These are not technological failures; they are organisational and cultural challenges. Workshops reinforced this perspective. Participants expressed frustration when governance efforts ended after project go-lives and voiced a strong desire for visible, practical results rather than abstract frameworks. Service design methods proved invaluable in translating technical concepts into human-centered solutions.

The research demonstrates that putting people first is the cornerstone of successful Data Management. Organisations often invest heavily in platforms and tools, assuming that technology alone will solve data challenges. However, without clear roles, accountability, and cultural adoption, even the most advanced systems fail to deliver value. Data does not manage itself—people do. Ultimately, the path to trusted, discoverable, and actionable data runs through people. Prioritising human factors alongside technical solutions is essential to unlocking the full potential of data assets and driving innovation, compliance, and competitive advantage.

6 Recommendations and Limitations

Data Governance should be integrated into project and product lifecycles rather than treated as a one-off activity. This approach ensures continuity and prevents governance from "dropping off" after go-live. Organisations should leverage Service Design principles to make Data Governance collaborative and user-friendly. Tangible artifacts such as playbooks, templates, and data catalogs should be developed to support adoption and usability. Implementing a layered operating model with clearly defined roles, addresses ownership gaps and accelerates adoption. Persistent quality issues and metadata gaps identified in the survey highlight the need for systematic modeling, lineage documentation, and quality monitoring. Resources should be allocated to these areas. Encourage cross-functional collaboration through communities and business-led roles to sustain cultural change and embed governance into everyday work.

The survey included 16 respondents, which may not fully represent the entire organisation or industry. Findings should be interpreted as indicative rather than exhaustive. The study focused on an energy sector company; recommendations may require adaptation for other industries with different regulatory and operational contexts. While service design offers a structured approach, translating concepts into practice requires sustained leadership commitment and resources, which were not tested in full-scale implementation. The research emphasised cultural and organisational factors; technology-related challenges (e.g., platform limitations, integration complexity) were outside the study's scope.

References

Abraham, R., Schneider, J., & vom Brocke, J. (2019). Data Governance: A conceptual framework, structured review, and research agenda. International Journal of Information Management, 49, 424–438.

Acev, D., Biyani, S., Rieder, F., Aldenhoff, T. T., & Blazevic, M. (2025). Systematic analysis of data governance frameworks and their relevance to data trusts. Management Review Quarterly. https://doi.org/10.1007/s11301-025-00545-1

Breitfuss, G., Fruhwirth, M., Wolf-Brenner, C., Riedl, A., de Reuver, M., Ginthoer, R., & Pimas, O. (2020). Data Service Cards – A supporting tool for data-driven business. In 33rd Bled eConference Proceedings, 599-614. University of Maribor Press.

Chakravorty, R. (2020). Common challenges of data governance. Journal of Securities Operations & Custody, 13(1), 23–43.

Cheong, L. K., & Chang, V. (2007). The Need for Data Governance: A case study. In Proceedings of the 18th Australasian Conference on Information Systems (ACIS 2007). Toowoomba, Australia: University of Southern Queensland, 1001-1006.

DalleMule, L., & Davenport, T. H. (2017). What's Your Data Strategy? Harvard Business Review, 112-121.

Datastrategiaopas (2021). Datastrategia – Miksi ja miten organisaationi tulisi laatia sellainen. Innolink Group Oy. Available 22.2.2025: https://www.innolink.fi/datastrategiaopas/

De Bono, E. (1985). Six Thinking Hats. London: Penguin Books.

Design Council (n.d.). The Double Diamond. Available 16.02.2025: https://www.designcouncil.org.uk/our-resources/the-double-diamond/

Dibouliya, A. (2025). Unified data governance framework for AI-enabled data warehouses in banking. European Modern Studies Journal, 9(4), 67-76. https://doi.org/10.59573/emsj.9(4).2025.7

Earley, S., & Henderson, D. (2017). DAMA-DMBOK: Data Management body of knowledge (2nd ed.). Data Management Association, 20-572.

Erander, L., & Granat, E. (2024). Governing data for artificial intelligence: A qualitative study of the human factors that affect governance of client-data for IT-consulting firms. Lund University.

Figueiredo, R. M. C., Pedrosa, G. V., Gardenghi, J. L. C., Venson, E., & Júdice, M. (2024). Co-design and co-creation in digital public services: A service design approach. *Proceedings of WCGE 2024*. https://doi.org/10.5753/wcge.2024.2505

Finanssivalvonta. (N.d.). Sääntelykokonaisuudet. Available 23.2.2025: https://www.finanssivalvonta.fi/saantely/saantelykokonaisuudet/

Fruhwirth, M., Breitfuss, G., & Pammer-Schindler, V. (2020). The Data Product Canvas – A visual collaborative tool for designing data-driven business models. In 33rd Bled eConference Proceedings, 515-528. University of Maribor Press.

Haberl, A., Malin, C. D., & Thalmann, S. (2022). A framework to identify data governance requirements in open data ecosystems. In 35th Bled eConference Proceedings, 359-374. University of Maribor Press.

Heisig, P. (2009). Harmonisation of Knowledge Management- comparing 160 KM frameworks around the globe. Journal of Knowledge Management, 13, 4-31.

Helsing, J. (2025). Developing data management with service design. Kajaani University of Applied Sciences. https://urn.fi/URN:NBN:fi:amk-2025091724768

Justy, T., Pellegrin-Boucher, E., Lescop, D., Granata, J., & Gupta, S. (2023). On the edge of big data: Drivers and barriers to data analytics adoption in SMEs. Technovation, 127, 102850. https://doi.org/10.1016/j.technovation.2023.102850

Kaario, K., & Peltola, T. (2008). Tiedonhallinta: Avain tietotyön tuottavuuteen. Jyväskylä: Docendo.

Khatri, V., & Brown, C. V. (2010). Designing Data Governance. Communications of the ACM, 53(1), 148–152.

Koivisto, M., Säynäjäkangas, J., & Forsberg, S. (2019). Palvelumuotoilun bisneskirja. Helsinki: Alma Talent Oy.

Kosonen, M. (2019). Tiedolla johtamisen käsikirja. Kaakkois-Suomen Ammattikorkeakoulu. https://urn.fi/URN:ISBN:978-952-344-183-5

Liebowitz, J. (2016). Successes and Failures of Knowledge Management. Harrisburg University of Science and Technology, Harrisburg, Pennsylvania, 9-22.

Loshin, D. (2020). Evaluating the Business Impacts of Poor Data Quality. Knowledge intetgrity, Inc, Silver Spring, Maryland.

Lukka, K. 2003. The Constructive Research Approach, in Ojala, L. & Hilmola, O.-P. (eds.) Case Study Research in Logistics, Publications of Turku School of Economics and Business Administration, Series B, B1:2003, pp. 83–120.

Madhavan, D. (2024). Enterprise data governance: A comprehensive framework for ensuring data integrity, security, and compliance in modern organizations. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 10*(5). https://doi.org/10.32628/cseit241051062

Mariani, I. (2024). Shaping public sector digital transformation through design: Translation approaches on training programs as multi-stakeholder ecosystems. *Proceedings of DRS 2024*. https://doi.org/10.21606/drs.2024.1048

Mazzarella, A. J., III. (2024). *Towards resilient data governance: An industry study on practitioner perspectives on the current state of data governance*. Doctoral dissertation. ProQuest Dissertations Publishing.

Merkus, J., Helms, R. W., & Kusters, R. J. (2023). Data governance capabilities: empirical validation in case studies of large organisations. In A. Pucihar, M. K. Borštnar, R. Bons, G. Ongena, M. Heikkilä, & D. Vidmar (Eds.), 36th Bled eConference Digital Economy and Society: The Balancing Act for Digital Innovation in Times of Instability (1 ed., pp. 35-48). University of Maribor Press. https://doi.org/10.18690/um.fov.4.2023

Nokkala, T. (2020). Governance of platform data: From Canonical Data Models to Federative Interoperability, University of Turku.

Office of the Data Protection Ombudsman (n.d.). Tietosuojalainsäädäntö. Available 23.2.2025: https://tietosuoja.fi/lainsaadanto

Pedrosa, G. V., & Araujo Freitas, L. M. (2024). Toward a human-centered and ecosystemic evaluation framework for public sector digital planning. Journal of Technology Management & Innovation, 20(3), 31–56.

Piirainen, K. A., & Gonzalez, R. A. (2013). Constructive synergy in design science research: A comparative analysis of design science research and the constructive research approach. LTA, 3–4, 206–234.

Redman, T. (1998). The Impact of Poor Data Quality on the Typical Enterprise. Communications of the ACM Volume 41, Issue 2, 79-82.

Stickdorn, M., & Schneider, J. (2011). This is service design thinking: Basic, tools, cases. Bis Publishers.

Traficom (n.d.). EU digital and data statutes in a nutshell. Available 23.2.2025: https://www.traficom.fi/en/communications/data-economy-and-digital-services/eu-digital and-data-statutes-nutshell?

Vargo, S. L., Maglio, P. P, Akaka & M. A. (2008). On value and value co-creation: A service systems and service logic perspective. https://doi.org/10.1016/j.emj.2008.04.003

Wallis, I. (2021). Data Strategy: From definition to execution. Swindon: BCS Learning & Development Limited.

Zhang, S, Maharajan, S., Bygrave, L.A., & Yu, S. (2025). Data Sharing, Privacy and Security Considerations in the Energy Sector: A Review from Technical Landscape to Regulatory Specifications. arXiv:2503.03539v1 [cs.CR], 5 March 2025