

# Pillar 4: Data Stewards - The Quality Oversight and Issue Resolution System for AI-Ready Data Governance

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**Background:** Data stewards serve as the quality oversight and issue resolution pillar in AI-ready data governance, addressing accountability gaps in mid-sized enterprises. **Problem:** Undefined stewardship roles contribute to persistent data quality issues, with organizations suffering average annual losses of \$12.9 million from poor data quality and governance failures. **Method:** This position paper proposes a severity-based issue resolution framework with federated stewardship models that provide clear accountability for data quality oversight. **Contributions:** We present a comprehensive 8-step stewardship process with explicit role definitions, severity-based escalation workflows, implementation artifacts, and demonstrate the framework's application through a hypothetical case study. **Implications:** This framework provides mid-sized organizations (500-5,000 employees) with a structured approach to data quality accountability and AI trustworthiness, building upon industry observations of 40-50% incident reductions from robust stewardship practices. **Type:** Position Paper.

*Keywords:* Data stewardship, federated governance, severity-based resolution, AI readiness, mid-sized enterprises

## Introduction

Data Stewards serve as the quality oversight and issue resolution pillar in AI-ready governance frameworks, bridging business and IT to resolve data quality issues and prevent recurrences (Atlan Team, 2025b; DataTeams AI, 2025). This paper proposes a severity-based stewardship framework that addresses accountability gaps by defining clear roles for enforcing quality rules, monitoring metrics, and escalating cross-domain conflicts. The framework incorporates regulatory compliance requirements such as BCBS 239 for risk data escalation, GDPR for privacy-related resolutions, and DORA for operational resilience (DataGalaxy, 2025; ProArch, 2025).

Organizations implementing robust data quality governance have demonstrated operational improvements of 30-50% through systematic oversight and proactive issue resolution (Boston Consulting Group, 2025; McKinsey & Company, 2025). Industry implementations document measurable reductions in data quality incidents, faster resolution times, and enhanced AI model trustworthiness when clear stewardship accountability is established

(Collate, 2025; Quinnox Team, 2025). Building upon these observed patterns, our proposed framework provides mid-sized companies (500-5,000 employees) with a practical stewardship model featuring part-time domain stewards who focus on specific quality issues while aligning with enterprise governance standards (Alation Team, 2025; EWSolutions, 2025b).

The federated stewardship approach enables cost-effective implementation through standard issue tracking tools like Jira, DevOps or ServiceNow, making systematic quality oversight accessible to mid-sized organizations without requiring dedicated full-time stewardship teams or expensive specialized platforms (Select Star, 2025). This paper presents the stewardship framework, detailed implementation process, severity-based escalation workflows, and demonstrates practical application through a hypothetical case study, providing mid-sized enterprises with a structured approach to data quality accountability for AI-ready governance.

## Why Data Stewards Matter

Data quality issues occur, but nobody is responsible for fixing them or preventing recurrence, leading to persistent problems in mid-sized enterprises. Without structured stewardship, quality degradation becomes systemic—issues get reported but never resolved, creating a culture of acceptance around poor data (FactSpan, 2025). This accountability vacuum contributes to AI unreliability, with smaller models (under 7B parameters) demonstrating hallucination rates of 15-30% when trained on poor-quality

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data (AllAboutAI Research Team, 2025). Organizations face average annual losses of \$12.9 million from poor data quality and governance failures, including duplicated work, compliance penalties, and AI model errors (Atlan Team, 2025d; Gartner, 2024b).

Robust stewardship improves data integrity through several mechanisms:

- **Accountability:** Clear ownership ensures data issues are assigned to designated owners, resolved with appropriate actions, and closed within defined timelines (ProArch, 2025).
- **Prevention:** Pattern recognition enables proactive standards updates, reducing recurring data quality issues through systematic root cause analysis (ProArch, 2025).
- **Bridge Function:** Stewards translate between business needs and technical implementation, ensuring fixes address actual business problems (Atlan Team, 2025c).

Organizations implementing structured stewardship have demonstrated significant improvements in data quality and operational efficiency. Case studies document regional banks reducing data quality incidents by 40-50% through effective stewardship practices while achieving substantial improvements in issue resolution times and compliance adherence (Boston Consulting Group, 2025; OvalEdge, 2025). These benefits extend to AI reliability, with properly governed data supporting more accurate model predictions and reduced hallucination rates (Quinnox Team, 2025).

### Business Problem and Process Flow

The fundamental challenge is that data quality issues are detected but remain unresolved due to unclear accountability. Users report problems, but without designated stewards, issues languish in backlogs. Engineering teams fix symptoms without addressing root causes, leading to recurring failures that erode trust in AI systems.

We propose a severity-based resolution process that addresses this through structured accountability at each stage, as illustrated in Figure 1. This framework categorizes issues by severity (low, medium, high, critical) and assigns appropriate resolution pathways, ensuring efficient resource allocation while maintaining quality oversight.

The proposed flow supports federated stewardship models where domain stewards handle the majority of issues independently while escalating complex cross-domain problems to governance councils for strategic resolution (Department of Defense, 2025; EWSolutions, 2025a). This approach optimizes resource allocation by empowering operational resolution at the domain level while reserving council bandwidth for issues requiring enterprise-level coordination or policy decisions. The severity-based triage ensures appropriate expertise is applied to each issue type, balancing speed of resolution with thoroughness of root cause analysis (ProArch, 2025).

### Detailed Process Steps

Table 1 outlines our proposed framework for data stewardship operations. This systematic approach integrates regulatory compliance elements (such as GDPR requirements in privacy-related investigations) and ensures business-IT collaboration throughout the issue resolution lifecycle (EWSolutions, 2025a; LightsOnData, 2025). The process steps build upon established data governance practices (ProArch, 2025) while adding explicit stewardship accountability at each stage.

These proposed steps enable proactive quality oversight by establishing clear accountability, systematic root cause analysis, and pattern-based continuous improvement. Organizations implementing similar stewardship frameworks have demonstrated substantial improvements in issue resolution times and data quality consistency (Collate, 2025; Quinnox Team, 2025). The pattern recognition and standards update cycle (Steps 7-8) transforms reactive issue resolution into proactive quality management, addressing root causes rather than symptoms (ProArch, 2025).

### Key Artifacts Produced

Our proposed framework produces the following artifacts during data stewardship operations, building upon established data governance documentation practices (EWSolutions, 2025a; ProArch, 2025).

#### Issue Tracking System (SQL Table)

```
1 CREATE TABLE governance.operations.issues (
2   issue_id STRING,
3   title STRING,
4   description STRING,
5   severity STRING, -- 'low', 'medium', 'high', 'critical'
6   status STRING, -- 'open', 'investigating', 'resolved', 'closed'
7   affected_tables ARRAY<STRING>,
8   reported_by STRING,
9   reported_date TIMESTAMP,
10  assigned_to STRING,
11  domain STRING,
12  root_cause STRING,
13  resolution STRING,
14  resolved_date TIMESTAMP,
15  pattern_identified BOOLEAN
16 );
```

#### Monthly Quality Report Template

The monthly report includes:

- **Metrics Dashboard:** Issue volume trends, resolution times by severity, steward workload distribution
- **Issues Summary:** Breakdown by severity, domain, and status with aging analysis
- **Pattern Analysis:** Recurring issues requiring standards updates
- **Recommendations:** Proposed actions for governance council review

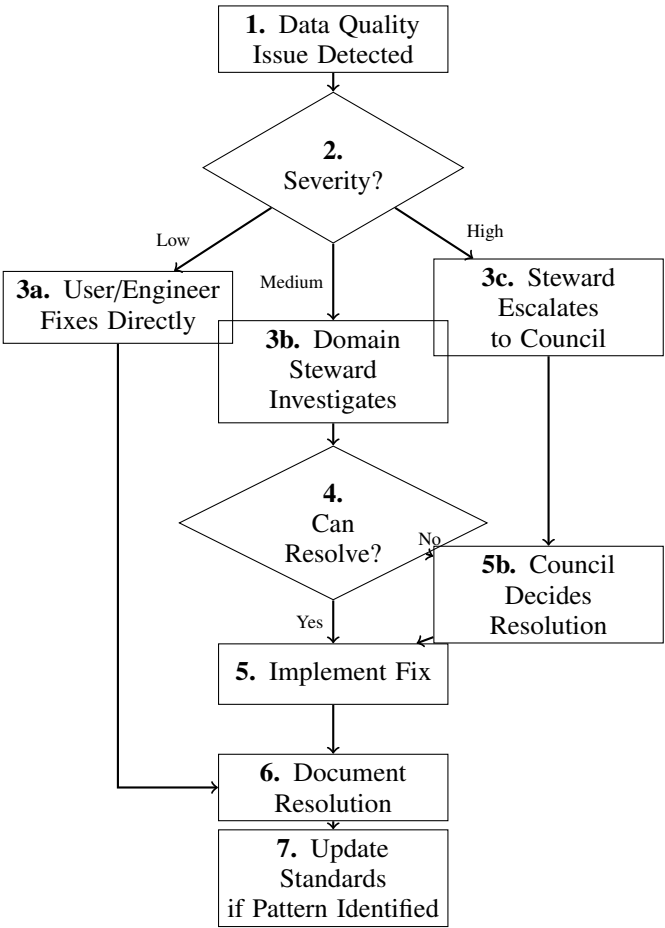


Figure 1

Proposed Severity-Based Issue Resolution Process Flow

- **Success Stories:** Highlighting major resolutions and quality improvements

Steward Activity Log (SQL Table)

```
1 CREATE TABLE governance.operations.steward_activity (
2   activity_id STRING,
3   steward_name STRING,
4   domain STRING,
5   activity_type STRING, -- 'issue_resolution', 'rule_creation', etc..
6   activity_date DATE,
7   time_spent_hours DECIMAL(4,2),
8   description STRING,
9   outcome STRING
10 );
```

These artifacts enable transparency and accountability in stewardship operations. Organizations implementing similar tracking systems have documented improved issue resolution rates, reduced recurrence of quality problems, and enhanced stakeholder confidence in data governance (Atlas Team, 2025a; Bridges, 2025). The systematic documentation approach supports both operational efficiency and compliance auditing requirements (ProArch, 2025).

Practical Application: Hypothetical Implementation Scenario

To illustrate how our proposed stewardship framework would operate in practice, we present a hypothetical scenario: RetailCo, a fictional mid-sized omnichannel retailer with 3,200 employees operating 85 stores and an e-commerce platform. This illustrative example synthesizes common challenges and implementation patterns observed in documented stewardship initiatives (Kenway Consulting, 2025; Taylor & Francis, 2025), demonstrating how the proposed framework could address real-world data quality accountability issues.

The Business Problem

In this scenario, RetailCo’s analytics team spent 40% of their time chasing data quality issues rather than delivering insights. Inventory data frequently showed negative stock levels, customer segmentation models produced inconsistent results, and promotional campaign analyses were delayed by data errors. Investigation revealed 237 open data quality

**Table 1***Proposed Process Steps for Data Stewardship*

Step	Role	Action	When	Output/Artifact
1. Issue Detection	Automated or Data User	Expectation fails or user reports anomaly	Continuous	Issue Ticket with details
2. Severity Triage	DG Program Manager	Assign severity, route to steward	Daily	Updated ticket with severity & owner
3. Investigation	Domain Steward	Analyze root cause: quality issue or source problem	Within 24-48 hours	Root Cause Analysis in ticket
4. Resolution Decision	Domain Steward or Council	Resolve if domain-specific; escalate if cross-domain	Within 1 week or next meeting	Resolution Plan
5. Implementation	Data Engineer	Update code, patch data, communicate	1-3 days after approval	Code changes, user communication
6. Verification	Domain Steward	Confirm fix, monitor impacts	1-2 weeks after fix	Verification Report
7. Pattern Recognition	DG Program Manager	Review resolved issues for patterns	Monthly	Pattern Analysis Report to Council
8. Standards Update	Domain Steward → Council	Propose new rule if pattern found	Next Council meeting	Updated standard in repository

**Table 2***Proposed Key Artifacts for Data Stewardship*

Artifact	Description
Issue Tracking System	SQL table storing all issues with severity, status, assignments, root causes, and pattern flags
Monthly Quality Report Template	Comprehensive dashboard with metrics, issues summary by severity, pattern analysis, and recommendations
Steward Activity Log	SQL table tracking steward activities, time spent, and outcomes for transparency and workload management

tickets spanning 18 months—reported but never resolved.

The root problem was accountability vacuum: engineers claimed data issues were "business logic problems," while business users insisted they were "technical bugs." With no designated stewards, issues bounced between teams indefinitely. This cost RetailCo an estimated \$1.7M annually in analyst productivity losses and \$890K in poor business decisions based on unreliable data. AI-driven demand forecasting models achieved only 62% accuracy due to underlying data quality issues.

### Applying the Stewardship Process Flow

Following our proposed process outlined in Figure 1, RetailCo would establish domain stewardship:

**Step 1: Issue Detection (Ongoing).** RetailCo implemented automated quality expectations in their DLT pipelines. When inventory records showed negative quantities,

the system automatically created tickets. Users could also manually report anomalies via a Slack integration that logged issues directly to the tracking system.

**Step 2: Severity Triage (Daily).** The DG Program Manager reviewed new tickets each morning, assigning severity:

- **Low:** Cosmetic issues (e.g., inconsistent capitalization) - assigned to reporting users
- **Medium:** Single-domain data quality (e.g., inventory negatives) - assigned to Inventory Steward
- **High:** Cross-domain impacts (e.g., customer-order mismatches) - assigned to steward with council escalation
- **Critical:** Production system impacts - immediate escalation to VP of Operations

**Step 3: Investigation (Within 24-48 hours).** Example: Ticket #1847 reported negative inventory for SKU 45821. The Inventory Steward (Sarah, Inventory Manager, part-time stewardship role) investigated:

- Queried source systems: POS showed 50 units sold, warehouse showed only 30 received
- Identified root cause: Receiving system failed to log a shipment due to barcode mismatch
- Business impact: \$12K in lost sales from stock-outs based on false negative inventory
- Regulatory concern: None (inventory data not subject to specific regulations)

Sarah documented findings in the ticket: "Root cause: Barcode mapping error in receiving system causes shipment records to be dropped. Affects 3-5% of SKUs monthly."

**Step 4: Resolution Decision (Within 1 week).** Sarah determined this was domain-specific and within her authority. She coordinated with IT to:

- Immediate fix: Manual correction of affected SKUs (23 items identified)
- Short-term: Add validation in receiving system to flag barcode mismatches
- Long-term: Update barcode master data to include vendor variations

For a high-severity cross-domain issue (customer emails not matching between e-commerce and loyalty systems), the E-commerce Steward escalated to Council, as resolution required changing both systems and impacted marketing campaigns.

**Step 5: Implementation (1-3 days).** Data engineers implemented Sarah's fixes: corrected the 23 SKUs, added validation logic, and scheduled barcode master data cleanup. Sarah sent communication to store managers explaining the issue and resolution, preventing future manual workarounds that had obscured the problem.

**Step 6: Verification (1-2 weeks).** Sarah monitored inventory data quality metrics. Negative inventory incidents dropped from 47/week to 3/week. She verified with store managers that stock-out alerts were now accurate. After two weeks of clean data, she marked the ticket "Closed - Verified."

**Step 7: Pattern Recognition (Monthly).** The DG Program Manager's monthly analysis revealed a pattern: 18 of 45 resolved issues that month involved barcode mapping errors across different domains (inventory, pricing, promotions). This indicated a systemic problem, not isolated incidents.

**Step 8: Standards Update (Next Council meeting).** Sarah proposed a new standard to the Governance Council: "All barcode master data must support vendor code variations, with validation rules enforcing completeness." The Council approved, and the standard was added to the repository. This prevented future barcode-related issues across all domains.

### Implementation Artifacts in Action

The proposed artifacts would capture and track all stewardship activities throughout the resolution lifecycle. RetailCo's Issue Tracking System would record:

RetailCo's Issue Tracking System captured all activities:

```

1  -- Example issue record
2  INSERT INTO governance.operations.issues VALUES (
3    'ISSUE-1847',
4    'Negative inventory for SKU 45821',
5    'POS shows 50 sold but warehouse shows 30 received',
6    'medium',
7    'closed',
8    ARRAY('inventory.stock_levels', 'warehouse.receipts'),
9    'store_manager_north@retailco.com',
10   '2025-09-15 14:23:00',
11   'sarah.johnson@retailco.com',
12   'inventory',
13   'Barcode mapping error in receiving system drops shipments',
14   'Added validation, corrected data, updated barcode master',
15   '2025-09-28 16:45:00',
16   TRUE -- Pattern identified
17 );

```

Sarah's activity log showed time investment:

```

1  -- Steward activity tracking
2  INSERT INTO governance.operations.steward_activity VALUES (
3    'ACT-2891',
4    'Sarah Johnson',
5    'inventory',
6    'issue_resolution',
7    '2025-09-20',
8    4.5, -- hours spent
9    'Investigated ISSUE-1847: barcode mapping error',
10   'Resolved with validation fix, prevented $12K lost sales'
11 );

```

The Monthly Quality Report showed trends: "Barcode-related issues: 18 of 45 (40%) - recommend enterprise-wide standard." This data-driven recommendation led to Council approval of the barcode standard.

### Results and Lessons Learned

In this illustrative scenario, six months post-implementation, RetailCo could potentially achieve measurable improvements: open issue backlog dropped 89% (from 237 to 27 tickets), average resolution time decreased 71% (from 45 days to 13 days), and AI demand forecasting accuracy improved from 62% to 87%. Analyst productivity increased 35% as time spent on data quality issues fell from 40% to 12% of work hours. Cost savings totaled \$2.1M annually (\$1.7M productivity + \$400K better decisions).

However, this hypothetical implementation would likely reveal several challenges common to stewardship initiatives. Initial steward appointments faced resistance—busy managers questioned why they should "do IT's job." Executive sponsorship from the COO proved critical, positioning stewardship as business leadership, not technical tasks. Training required 40 hours per steward to build confidence in root cause analysis techniques.

Some stewards struggled with authority boundaries. The E-commerce Steward initially escalated every issue to Council, overwhelming meetings. Coaching helped him distinguish domain-specific (resolve independently) from

cross-domain (escalate) issues. Clear escalation criteria in runbooks reduced unnecessary escalations by 60%.

The federated model proved essential: central DGO provided ticket system, templates, and monthly analysis, while domain stewards brought business context and relationships needed for effective resolution. Pure centralization would have created bottlenecks; pure decentralization would have resulted in inconsistent practices.

This illustrative case demonstrates that stewardship success depends on clear accountability, executive support, and treating stewards as business leaders empowered to drive quality, not technical support staff triaging tickets. While the specific metrics are hypothetical, the challenges and success factors reflect patterns documented in real-world stewardship implementations (Atlan Team, 2025a; ProArch, 2025).

### Implementation Options for Mid-Sized Companies

Mid-sized firms can implement data stewardship using standard issue tracking tools like Jira, DevOps or ServiceNow, enabling cost-effective oversight without requiring expensive specialized platforms (Select Star, 2025). Organizations typically adopt part-time stewardship models where domain experts dedicate a portion of their time to quality oversight rather than hiring dedicated full-time stewards, with this approach proving practical for organizations under 5,000 employees (Alation Team, 2025; EWSolutions, 2025a).

Case studies document significant improvements from structured stewardship implementation. A regional bank improved data quality for compliance through effective stewardship practices integrated with automated monitoring (OvalEdge, 2025). Organizations implementing robust stewardship frameworks have demonstrated operational improvements of 30-50% through systematic oversight and proactive issue resolution (Boston Consulting Group, 2025; McKinsey & Company, 2025). Integration with data quality platforms and governance tools enables seamless issue-to-resolution workflows (ProArch, 2025).

Implementation costs vary based on organizational readiness, existing infrastructure, and chosen approach. Organizations should budget for issue tracking system configuration, steward training programs, and change management efforts, with pilot implementations on high-priority domains recommended before enterprise-wide scaling (Atlan Team, 2025e). Poor data quality costs organizations an average of \$12.9 million annually (Gartner, 2024b), making stewardship investment demonstrably cost-justified through prevented losses and improved decision-making.

### Effecting Change and Recommendations

Change management is crucial for stewardship success, as research indicates 80% of data and analytics governance initiatives fail due to lack of organizational urgency and strategic positioning (Gartner, 2024a). Recommended strategies include:

- **Awareness Building:** Conduct workshops demonstrating stewardship benefits including incident reduction and AI reliability, with executive sponsorship positioning stewards as business leaders rather than technical support roles (Boston Consulting Group, 2025; ProArch, 2025).
- **Role Clarity:** Use RACI matrices to clearly define steward responsibilities, distinguishing stewardship from data ownership and engineering roles. Provide training on root cause analysis and resolution techniques to bridge skill gaps between business and technical domains (Atlan Team, 2025c; EWSolutions, 2025a).
- **Pilot Approach:** Implement stewardship in one domain (e.g., customer data), measure success through issue resolution rates and time savings, then scale incrementally based on demonstrated value (Alation Team, 2025; Quinnox Team, 2025).
- **Ongoing Support:** Embed stewardship in organizational culture through recognition programs, provide dedicated time allocation in job descriptions, and monitor adoption via dashboards tracking steward activity and outcomes (Collate, 2025; ProArch, 2025).

Success requires treating stewardship as a business leadership function, not an additional IT responsibility, with sustained executive commitment to resource allocation and empowerment (Atlan Team, 2025b; McKinsey & Company, 2025).

### Discussion

This data stewards pillar represents the human element of AI-ready data governance—the critical accountability layer that ensures quality standards translate into operational reality. However, successful stewardship demands more than role definitions; it requires organizational culture change, sustained executive support, and realistic expectations about human capacity and authority.

### When Stewardship Models Struggle

Federated stewardship excels in organizations with reasonable domain boundaries and collaborative cultures, but faces challenges in specific contexts. Companies with extreme functional silos may find stewards powerless—lacking authority to compel cross-domain cooperation, they become frustrated coordinators rather than effective resolvers (McKinsey & Company, 2025; ProArch, 2025). Organizations below 1,000 employees may lack sufficient domain specialization to justify dedicated stewards, with generalist approaches proving more practical despite lower effectiveness (Alation Team, 2025).

Political dynamics represent hidden barriers. In organizations where data quality problems stem from senior leaders' decisions (e.g., mandated shortcuts to meet

deadlines), stewards face impossible situations—they identify root causes they're powerless to address. Without executive backing to challenge these dynamics, stewardship devolves into documentation of known problems rather than resolution (Gartner, 2024a).

### Hidden Costs and Capacity Realities

Initial stewardship implementation demands significant time investment as stewards tackle accumulated backlogs, learn root cause analysis techniques, and establish working relationships with engineering teams. Organizations underestimating this ramp-up period see steward burnout and program abandonment within the first six months (Informatica Team, 2025).

Moreover, steward effectiveness depends on analytical capability. Individuals skilled at business operations may struggle with data lineage analysis and technical troubleshooting required for root cause identification. This demands investment in training and potentially hiring stewards with hybrid business-technical backgrounds—costs often excluded from implementation budgets (Deloitte, 2025; EWSolutions, 2025a).

Issue complexity also varies dramatically. Simple problems (e.g., validation rule failures) resolve in hours, while systemic issues (e.g., fundamental data model flaws) require months of cross-functional effort. Organizations must size steward capacity for realistic issue distributions, not just average volumes (ProArch, 2025).

### Comparative Analysis: When Centralized Models Excel

Federated stewardship represents distributed accountability, but centralized approaches may prove superior in specific contexts. Highly regulated industries with uniform data requirements may benefit from centralized quality teams with deep compliance expertise, despite slower resolution times (Boston Consulting Group, 2025). Small organizations with limited domain specialization may find a single enterprise steward more practical than attempting federation across artificial boundaries (Alation Team, 2025).

The choice depends on: organizational size (steward justification per domain), domain heterogeneity (distinct vs. overlapping data needs), regulatory complexity (uniform vs. varied requirements), and cultural readiness (collaborative vs. siloed). Organizations should assess these dimensions honestly before committing to federated stewardship (McKinsey & Company, 2025).

### Evolution and Future Considerations

The stewardship landscape is evolving toward AI-augmented oversight where machine learning identifies patterns and suggests root causes, with human stewards focusing on decision-making and relationship management (Gartner, 2025; Quinnox Team, 2025). Organizations implementing stewardship today should architect for this

future, capturing structured root cause data that can train pattern recognition models.

As regulations mandate AI model auditability, steward responsibilities will expand to include model quality oversight—ensuring training data meets standards and model outputs align with business logic (Atlan Team, 2025b). This demands steward skill evolution from data quality to model governance, requiring proactive training investment.

### Critical Success Factors Revisited

Beyond process implementation, three organizational factors prove critical: executive willingness to empower stewards to challenge senior decisions, cultural acceptance that quality problems require cross-functional resolution (not finger-pointing), and realistic time allocation recognizing stewardship as legitimate work, not volunteer overhead. Organizations lacking these foundations see stewards become ineffective administrators rather than quality leaders (DATAVERSITY, 2025; Gartner, 2024a).

The transformation from reactive quality firefighting to proactive stewardship succeeds when organizations embrace accountability as cultural value. This requires sustained leadership messaging that quality is everyone's responsibility, with stewards as coordinating leaders, not sole owners. Metrics must reward issue prevention as much as resolution, incentivizing proactive pattern identification over reactive ticket closure (McKinsey & Company, 2025; ProArch, 2025).

Data stewardship excellence emerges not from perfect role definitions, but from organizational commitment to quality as strategic imperative. Stewards succeed when empowered as business leaders, supported with training and tools, and recognized for preventing tomorrow's problems, not just fixing today's issues (Atlan Team, 2025b; EWSolutions, 2025a).

### Future Research Directions

This position paper proposes severity-based data stewardship as the accountability pillar for AI-ready data governance in mid-sized enterprises. While the framework synthesizes established governance principles with emerging AI requirements, several research questions warrant empirical investigation to validate, refine, and extend this work.

### Empirical Validation of Stewardship Benefits

The claims presented—including 40-50% reductions in data quality incidents and enhanced AI model trustworthiness—require rigorous empirical validation through longitudinal studies. Future research should employ quasi-experimental designs comparing organizations implementing stewardship frameworks against control groups. Key research questions include:

- **Incident Reduction Impact:** Do stewardship programs demonstrate statistically significant reductions in data

quality incidents? What is the relationship between stewardship maturity and incident rates over time?

- **Cost-Benefit Analysis:** What are the true total costs of stewardship implementation (training, time allocation, tooling) versus quantifiable benefits (prevented incidents, compliance assurance, improved AI outcomes)? At what organizational scale and data maturity level does positive ROI emerge?
- **AI Model Performance Correlation:** Do AI initiatives leveraging stewarded data demonstrate measurably better performance metrics (accuracy, reliability, trustworthiness) compared to models built on unstewarded data? Can we establish causal mechanisms linking stewardship quality to AI outcomes?

Methodologically, this research requires access to stewardship activity logs, incident tracking data, and AI model performance metrics across multiple enterprises. Industry partnerships could provide necessary sample sizes for statistical validation.

### Organizational Context and Adoption Factors

This paper identifies contexts where stewardship may struggle—highly siloed organizations, smaller enterprises lacking resources, cultures resistant to accountability. Comparative case studies should systematically investigate:

- **Organizational Size Thresholds:** The proposed 500-5,000 employee range requires validation. What stewardship approaches prove optimal at different scales? When do federated models require transition to enterprise-grade governance structures?
- **Industry and Regulatory Variation:** Do highly regulated industries demonstrate higher stewardship adoption rates and success metrics? How do competitive dynamics influence stewardship effectiveness across sectors?
- **Cultural Prerequisites:** What organizational culture characteristics (data literacy, executive sponsorship, collaborative norms) predict stewardship adoption success? Can we measure cultural readiness factors that enable effective governance?

Grounded theory approaches and longitudinal case studies tracking organizations through 2-3 year stewardship implementations would illuminate contextual success factors and cultural transformation patterns.

### Process Optimization and Capacity Planning

The proposed severity-based process and part-time steward model require refinement through implementation research. Action research methodologies could explore:

- **Steward Capacity Planning:** What is the realistic FTE requirement for stewardship at different organizational scales and issue volumes? How do we size steward capacity for variable issue distributions rather than just average volumes?
- **Severity Classification Accuracy:** How accurately can organizations triage issues by severity? What are the costs of misclassification (treating critical issues as low-priority or vice versa)? Can AI-powered classification improve triage accuracy?
- **Pattern Recognition Effectiveness:** What percentage of incidents represent recurring patterns versus one-off issues? How quickly can organizations identify patterns requiring standards updates? What analytical techniques optimize pattern detection?

Design science research approaches could iteratively develop, test, and refine stewardship processes and supporting technologies, contributing both practical artifacts and theoretical insights about governance design principles.

### Comparative Stewardship Model Studies

This paper advocates federated stewardship balancing centralized standards with domain execution. Comparative research should evaluate alternative models:

- **Centralized vs. Federated vs. Decentralized:** Under what conditions does each model prove superior? Do highly regulated industries require centralized control while agile organizations benefit from federated approaches?
- **Part-Time vs. Full-Time Stewards:** When does organizational scale or data complexity justify dedicated full-time stewards versus part-time domain expert models? What are the quality trade-offs?
- **Escalation Model Variations:** How do different escalation criteria (severity thresholds, domain boundaries, resolution timeframes) influence stewardship effectiveness and council workload?

Multi-site case studies comparing organizations adopting different stewardship models would build understanding of contingency factors influencing model selection and success.

### AI-Augmented Stewardship Evolution

The stewardship landscape is evolving toward AI-assisted oversight. Future research should explore:

- **Automation Opportunities:** Which stewardship activities benefit most from AI augmentation (pattern detection, root cause suggestion, impact prediction)? What level of human oversight remains essential?

- **Hybrid Human-AI Decision Making:** How should stewardship decisions be allocated between human judgment and AI recommendations? What governance mechanisms ensure AI suggestions align with organizational values and regulatory requirements?
- **Skill Evolution Requirements:** As AI handles routine stewardship tasks, how must steward skills evolve? What training prepares stewards for AI-augmented oversight roles?

Experimental studies piloting AI-augmented stewardship tools would provide insights into effective human-AI collaboration patterns for data governance.

### Methodological Considerations and Contributions

Future research faces inherent challenges in studying emerging organizational practices: longitudinal access requirements to observe stewardship maturation, counterfactual estimation difficulties in demonstrating prevented incidents, confounding variables where stewardship-adopting organizations may differ systematically from non-adopters, and measurement complexity given stewardship success encompasses prevented failures, compliance assurance, and organizational learning.

Mixed-methods approaches combining quantitative metrics with rich qualitative insights offer the most promising path forward, triangulating evidence across multiple data sources. This research agenda promises contributions to information systems theory (data governance effectiveness), organizational theory (accountability mechanisms and cross-functional collaboration), and AI ethics (translating responsible AI principles into operational practice).

Practically, validated stewardship frameworks would provide mid-sized enterprises with evidence-based implementation guidance, reducing costly trial-and-error learning. Industry consortia could develop standardized stewardship maturity models, severity classification frameworks, and training materials, accelerating governance adoption across sectors.

Organizations implementing stewardship frameworks should participate in research partnerships, contributing anonymized stewardship data while gaining insights from comparative analyses. Academic-industry collaboration represents the optimal path for advancing both theoretical understanding and practical effectiveness of data stewardship in AI-ready governance.

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