GS1 Standards Development Process - Comprehensive Analysis

Research Date: 2025-12-19

Purpose: Understand how GS1 standards are developed to identify problem spaces where ISA could provide value

Executive Summary

GS1 standards emerge from a **consensus-driven, multi-stakeholder process** managed through the Global Standards Management Process (GSMP). The system balances competing interests across retailers, manufacturers, solution providers, and regulators while maintaining global interoperability. Standards development involves formal work requests, iterative drafting in work groups, pilot testing, community review periods, and ratification through electronic ballots requiring two-thirds approval.

The process has evolved significantly to reduce delays—removing bureaucratic layers, allowing groups autonomy on consensus determination, and creating fast-track paths. Despite these improvements, inherent tensions remain between speed and consensus, precision and adoption, innovation and stability.

1. Process Architecture

1.1 Governance Structure

GS1 operates through a layered governance model where the **Board Committee for Standards (BCS)** holds ultimate approval authority delegated from the Management Board. Below this sit three key bodies:

Architecture Group: Ensures technical coherence across the GS1 system, reviews standards for architectural consistency, and provides guidance on deep technical issues spanning multiple domains.

Industry Engagement Steering Committee (IESC): Manages community engagement, qualifies user needs, and assigns tactical actions. Comprises 10-12 voting members representing the GSMP member base by size and sector, with three-year staggered terms.

GSMP Operations: Facilitates all work groups and governance groups, manages work request routing, drafts charters, handles motions and voting, and ensures process compliance.

1.2 Work Group Types

Standards Maintenance Groups (SMG): Maintain existing standards through errata corrections, minor enhancements, and periodic reviews. Can approve errata without full community review if no concerns are raised.

Mission-Specific Work Groups (MSWG): Created for specific projects to develop new standards or major enhancements. Disbanded upon completion. Must meet minimum membership requirements to ensure cross-sectional representation.

Work groups organize flexibly—some use core editorial teams meeting weekly with peripheral teams consulted monthly, others employ sub-teams for specialized work efforts. Distributed work groups allow participation in different languages or time zones, coordinated through Member Organizations.

2. The Four-Step Development Lifecycle

Step 1: Work Requests and Steering

Initiation: Any GSMP member or Member Organization can submit a work request. The submission must include business case, scope, affected stakeholders, estimated resources, and alignment with GS1 strategy.

Assessment: GSMP Operations reviews for completeness, then routes to steering assessment covering two areas:

- Does the request meet entrance criteria for new GSMP work?
- Is the proposed solution aligned with GS1 architectural principles?

Approval: GS1 Global Office Leadership Team confirms strategic alignment and resource availability. GSMP Operations drafts work group charter if new MSWG formation is required.

Key Friction Point: Work requests can be returned multiple times for additional information. No clear public criteria exist for what constitutes "sufficient" business case or "adequate" stakeholder representation.

Step 2: Requirements Analysis

Work groups convene to analyze business requirements, document use cases, and establish success criteria. This phase produces Business Requirements Documents (BRDs) capturing:

- Problem statement and scope boundaries
- Stakeholder needs across supply chain actors
- Functional and non-functional requirements
- Constraints (regulatory, technical, economic)
- Success metrics and validation approach

Key Friction Point: Requirements often reflect compromises between conflicting stakeholder interests. Retailers may prioritize granular data while manufacturers resist implementation costs. No formal framework exists for quantifying trade-offs.

Step 3: Development

Iterative drafting of technical specifications, implementation guidelines, and conformance requirements. Work groups meet regularly (weekly to monthly depending on structure) to refine drafts. Most decisions achieved through discussion-based consensus during meetings.

Consensus Mechanism: Defined as "general agreement characterized by absence of sustained opposition to substantial issues by any important part of concerned interests." Explicitly NOT unanimity. Co-chairs judge whether consensus has been reached.

Formal Checkpoints:

- **Work Group Motion**: Used to confirm readiness for community review. Conducted by asking for objections (voice vote in meetings or 7-day email period). Carries if voting minimums met and two-thirds affirmative.
- **Work Group Ballot**: Used when motion insufficient or attendance low. Each voting member casts explicit yes/no vote via Community Room. Requires two-thirds affirmative.

Pilot Testing: Standards often require real-world validation before ratification. Pilots test technical feasibility, implementation costs, and business value. Pilot results inform final revisions.

Key Friction Points:

- Consensus delays when stakeholder interests diverge significantly
- Pilot testing adds months but is essential for credibility
- Backward compatibility constraints limit design options
- Regional variations require adaptation mechanisms

Step 4: Community Review and Ratification

Community Review: Draft posted for 60-90 day public comment period. All GSMP voting members can submit comments whether or not opted into the work group. Non-members can submit comments if they sign IP Contribution Form.

Comment Resolution: Work group reviews each comment and decides response (accept change, adopt different change, or no change warranted). Each resolution decided by consensus and recorded. Comment resolutions posted publicly before ballot.

Community eBallot: All GSMP voting members vote yes/no on final draft. Duration typically 7-14 days (extended if spanning holidays). Carries if voting minimums met and two-thirds affirmative. Abstentions count toward quorum but not toward two-thirds calculation.

Final Approval: BCS reviews and unanimously approves. Standards Oversight Group (Management Board members not on BCS) has 7 days to object. If no objections,

standard is ratified. If BCS cannot reach unanimous approval or Oversight Group objects, escalates to full Management Board.

Key Friction Points:

- Comment resolution can be contentious—work groups must justify decisions to dissenting commenters
- Two-thirds threshold means significant minority can block standards
- Unanimous BCS approval is high bar, occasionally requires Management Board escalation

3. Membership and Voting Rights

3.1 Direct Participants

Opted-In Work Group Members: Organizations signing GSMP IP Policy and opting into specific work groups. Full rights to access work-in-progress, participate in drafting, and vote (except non-voting members). One organization, one vote regardless of number of representatives.

Non-Voting Work Group Members: Organizations not members of GS1 or any Member Organization. Can attend meetings and contribute but cannot submit formal comments or vote. Do not count toward membership minimums.

GSMP Community Members: Organizations signing GSMP IP Policy. Can review and comment during Community Review and vote in Community eBallots even if not opted into work group.

3.2 Indirect Participants

End Users and Solution Providers: Represented by local Member Organizations who relay contributions. MO must identify each indirect participant represented.

Industry Trade Organizations and Regulatory Bodies: Input sought by work groups on specific topics. Must sign IP Contribution Form for each contribution.

General Public: In some cases, work groups post drafts for public comment prior to eBallot.

3.3 Voting Minimums

Work groups must meet minimum membership requirements to ensure balanced representation. Typical minimum: 2 data sources (one side of trading relationship), 2 data recipients (other side), 2 solution providers, 12 total voting organizations. Failure to meet minimums triggers remedial actions or charter revision.

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4. Decision Tensions and Trade-offs

4.1 Precision vs. Adoption

More detailed standards provide greater interoperability but increase implementation barriers. Small and medium enterprises may lack resources for complex standards. Work groups must balance granularity against accessibility.

Example Tension: Should product attributes include hundreds of optional fields (comprehensive but overwhelming) or dozens of required fields (limited but manageable)?

4.2 Flexibility vs. Interoperability

Allowing optionality reduces consistency. If standard permits multiple ways to represent same information, systems must handle all variants. But rigid standards may not accommodate diverse business models.

Example Tension: Should location identifiers allow both GLN and alternative schemes (flexible but complicates validation) or mandate GLN only (interoperable but excludes non-GS1 adopters)?

4.3 Speed vs. Consensus

Fast-tracking standards risks stakeholder buy-in. Rushing through community review may miss critical issues. But slow processes lose relevance as business needs evolve.

Example Tension: Should standards for emerging technologies (IoT, blockchain) use expedited paths (timely but less vetted) or full process (thorough but potentially obsolete upon publication)?

4.4 Innovation vs. Stability

Frequent updates accommodate new capabilities but create upgrade fatigue. Organizations invest in implementations and resist changes. But static standards become outdated.

Example Tension: Should barcode symbology standards add new data carriers every few years (innovative but disruptive) or maintain stable set (predictable but limiting)?

4.5 Global vs. Local

Global standards enable worldwide interoperability but must accommodate regional variations in regulatory requirements, language, and infrastructure maturity.

Example Tension: Should pharmaceutical traceability standards mandate uniform global approach (interoperable but may violate local regulations) or allow country-specific adaptations (compliant but fragments ecosystem)?

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5. Process Evolution and Speed Improvements

Release 3.2 (Feb 2018) made significant changes to accelerate standards development:

Removed Bureaucratic Layers: Eliminated requirement for Standards Management Group formation to make process changes. Reassigned tactical actions to IESC.

Increased Work Group Autonomy: Allow work groups to determine how they achieve consensus for motions/ballots rather than prescribing specific procedures.

Created Fast-Track Path: Documents unchanged from Community Review can skip directly to Community eBallot without additional revision cycle.

Enabled Flexible Team Structures: Formalized use of sub-teams and core/peripheral team models to maintain momentum while ensuring broad input.

Key Insight: GS1 recognizes process speed as critical competitive factor. Standards that take years to develop may be obsolete upon publication. Streamlining efforts focus on removing delays while preserving quality and legitimacy through consensus.

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6. Documentation Requirements

Standards development generates extensive documentation:

Business Requirements Documents (BRDs): Capture problem statement, stakeholder needs, use cases, and success criteria.

Technical Specifications: Define data structures, encoding rules, communication protocols, and conformance requirements.

Implementation Guidelines: Provide practical guidance for adopters including examples, best practices, and common pitfalls.

Use Case Libraries: Document real-world scenarios demonstrating standard application across industries and regions.

Impact Assessments: Analyze costs (systems, training, operations), benefits (efficiency, accuracy, visibility), and risks (compatibility, adoption barriers).

Comment Resolution Records: Track all community review comments, work group decisions, and rationale. Serves as audit trail for due process.

Pilot Test Reports: Document pilot scope, participants, methodology, results, and lessons learned. Validate technical feasibility and business value.

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7. Appeals and Conflict Resolution

7.1 Due Process Appeals

If member believes process incorrectly followed:

1. Raise concern with work group co-chairs and facilitator

2. If unresolved, appeal to Vice President of Standards Development (30-day initial response)

3. If still unresolved, appeal to Board Committee for Standards (30-day initial response, decision is final)

7.2 Voting Results Appeals

If member believes vote outcome unduly influenced by one stakeholder group resulting in non-optimal outcome:

1. Appeal directly to Vice President of Standards Development

2. If unresolved, appeal to Board Committee for Standards (decision is final)

7.3 Architectural Consultation

Work groups can solicit Architecture Group input for:

- Clarification of GS1 system architectural principles

- Concerns that architectural principles not being adhered to

- Issues with deep architectural impact spanning multiple domains

Architecture Group provides findings and recommendations. If work group disagrees, can appeal to BCS.

8. Key Observations for ISA Relevance

8.1 Information Asymmetries

Stakeholder Knowledge Gaps: Participants have varying levels of expertise in technical standards, supply chain operations, and regulatory requirements. Small companies may lack resources to fully engage.

Regional Disconnects: Global work groups may not fully understand local market conditions, infrastructure limitations, or regulatory nuances.

Technology Evolution: Emerging technologies (AI, IoT, blockchain) introduce capabilities and constraints unfamiliar to many participants.

8.2 Decision Complexity

Multi-Dimensional Trade-offs: Decisions involve technical feasibility, economic impact, regulatory compliance, backward compatibility, and adoption likelihood. No single metric captures "best" option.

Stakeholder Preference Aggregation: Consensus requires reconciling conflicting interests. Current process relies on discussion and voting but lacks systematic framework for quantifying preferences and trade-offs.

Impact Prediction Uncertainty: Difficult to forecast how standards will perform in practice. Pilot testing provides evidence but limited scope. Full deployment may reveal unforeseen issues.

8.3 Process Friction

Work Request Ambiguity: No clear public criteria for what constitutes sufficient business case or adequate stakeholder representation. Requests can be returned multiple times.

Consensus Delays: When stakeholder interests diverge significantly, achieving consensus can take months or years. No formal mechanisms for breaking deadlocks beyond escalation.

Comment Resolution Burden: Community review can generate hundreds of comments. Work groups must review each, decide response, and justify decisions. Time-consuming and contentious.

Pilot Coordination Complexity: Organizing pilots requires recruiting participants, defining scope, collecting data, and analyzing results. Resource-intensive and adds months to timeline.

8.4 Knowledge Management Challenges

Institutional Memory: Work group membership changes over time. Rationale for past decisions may be lost. New members may reopen settled issues.

Cross-Standard Consistency: GS1 maintains dozens of standards across industries. Ensuring consistency in terminology, structure, and principles requires coordination.

Precedent Identification: When facing new decisions, work groups could benefit from understanding how similar issues were resolved in other standards. Currently relies on participant memory and facilitator expertise.

9. Unanswered Questions (Requiring Further Research)

1. **Quantitative Metrics**: What data is collected on standards development timelines, comment volumes, ballot participation rates, and pilot outcomes? Are there benchmarks for "healthy" process performance?

2. **Economic Impact Analysis**: How do work groups assess implementation costs and benefits? What methodologies are used? How reliable are estimates?

3. **Adoption Patterns**: Which standards achieve high adoption and which struggle? What factors predict adoption success? How is adoption measured?

4. **Failure Modes**: What happens when standards fail to gain traction? Are there examples of standards withdrawn or significantly revised post-publication?

5. **Regulatory Interaction**: How do regulatory requirements influence standards development? Are there cases where standards were mandated by regulation vs. voluntary adoption?

6. **Technology Disruption**: How has GS1 responded to disruptive technologies? Examples: transition from 1D to 2D barcodes, RFID adoption, blockchain for traceability.

7. **Competitive Dynamics**: How does GS1 compete with or complement other standards organizations (ISO, W3C, industry consortia)? When do organizations choose GS1 vs. alternatives?

Sources

1. GS1 Standards Development Overview:
   https://www.gs1.org/standards/development

2. GSMP Manual Release 3.4 (Sep 2019): https://www.gs1.at/sites/default/files/2020-05/GSMP-Manual.pdf

3. GS1 Work Request Documents: https://www.gs1.org/standards/wr