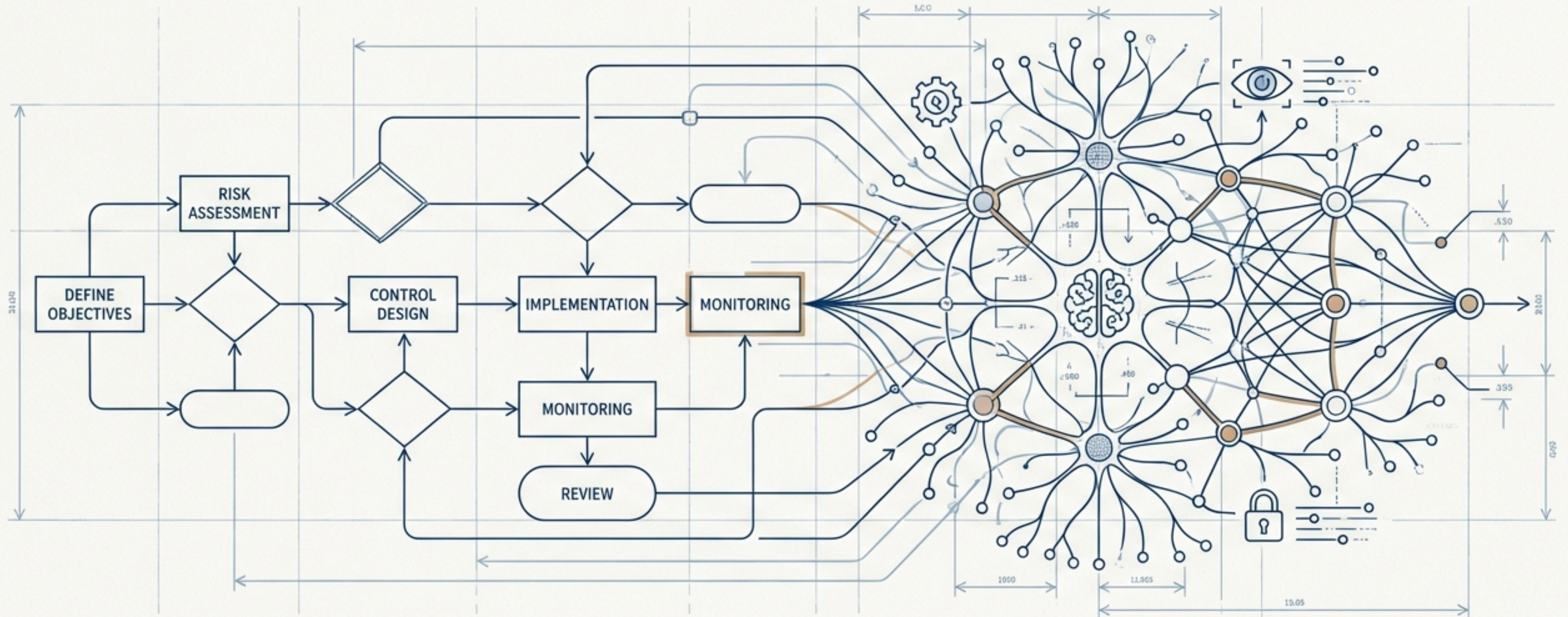


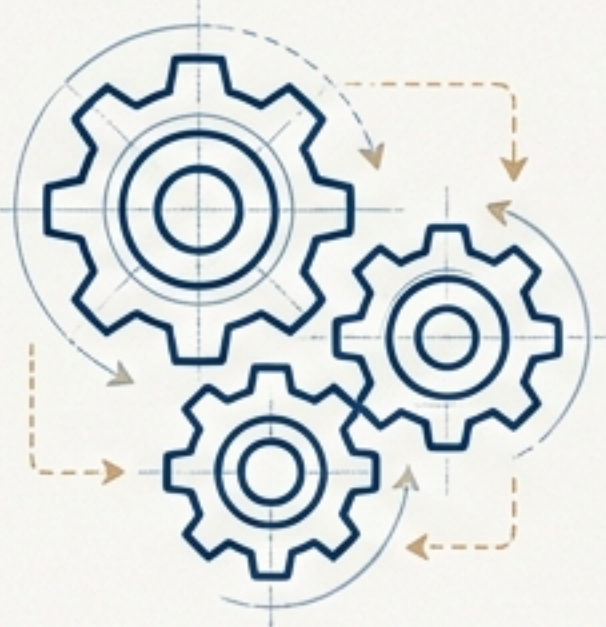
Governing AI Through Process

A Blueprint for Aligning Business Process Management with ISO 42001



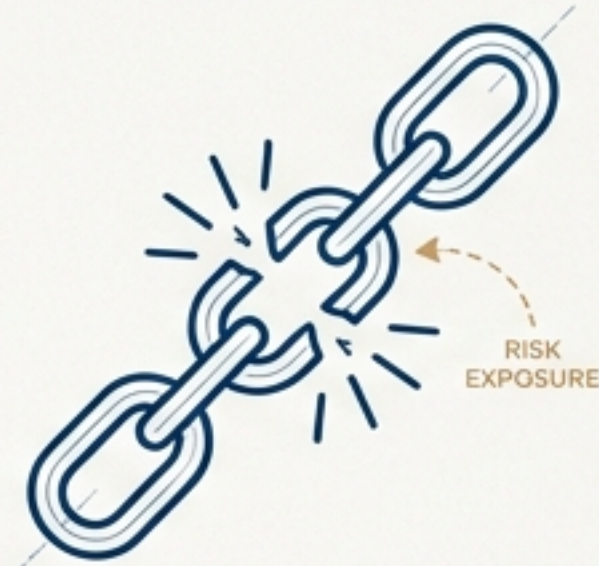
Based on the research by D. de Borba & R. Brinkhues (2025).

The Strategic Imperative for AI Governance



The Situation: AI is Transforming Operations

Artificial Intelligence is being rapidly embedded into core business processes to drive intelligent automation, predictive optimization, and large-scale personalization. This is no longer a future trend; it is a present-day reality.



The Complication: A Critical Governance Gap

This rapid adoption has created a dangerous gap between innovation and oversight. Organizations face significant risks from algorithmic bias, a lack of transparency, and non-compliance with a complex web of emerging regulations (e.g., AI Act, GDPR).



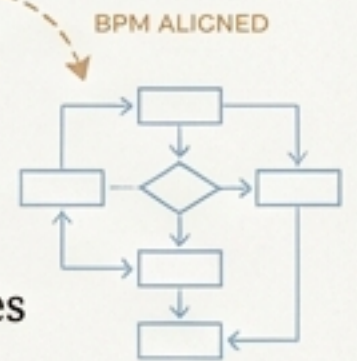
The Question: How Do We Bridge the Gap?

How can we systematically govern AI within our existing business processes to ensure it is responsible, compliant, and fully auditable, without stifling innovation?



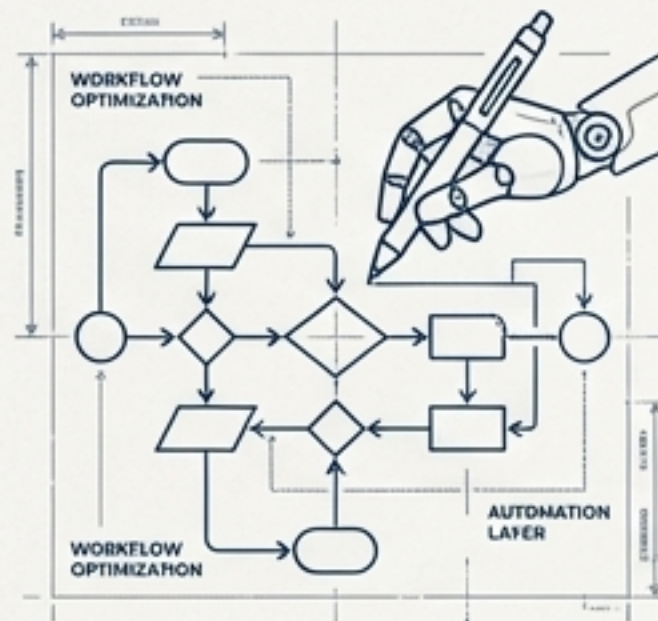
The Answer: A Process-Oriented Framework

Aligning Business Process Management (BPM) with the ISO/IEC 42001 standard provides a certifiable, internationally recognized framework. This blueprint transforms abstract principles into concrete, auditable business practices.



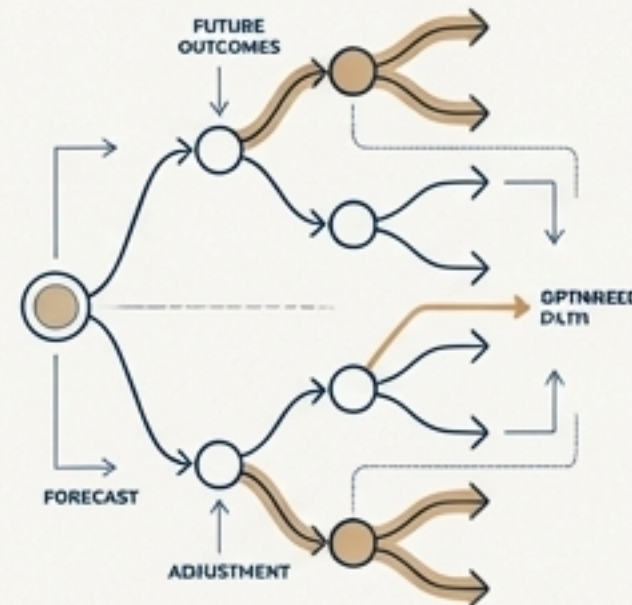
AI Is Already Reshaping How Business Gets Done

The integration of AI into Business Process Management (BPM) is a qualitative shift, enabling unprecedented capabilities.



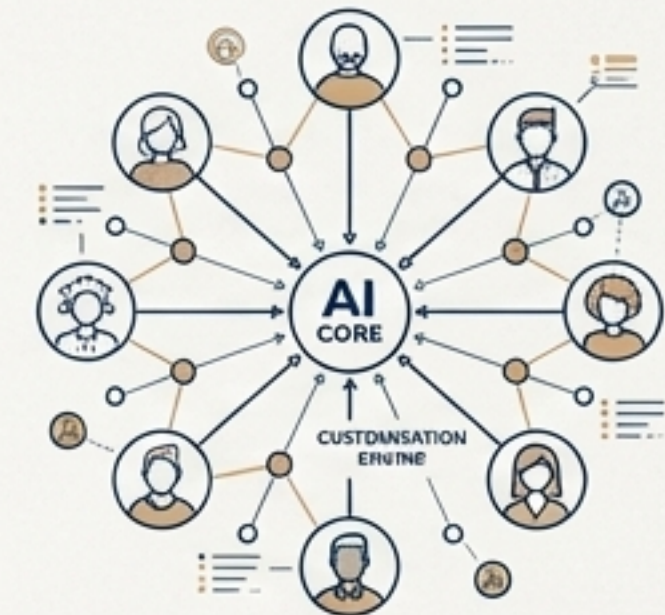
Intelligent Automation

AI models perform complex tasks previously exclusive to humans, redefining workflows and operational efficiency.



Predictive Optimization

Systems anticipate bottlenecks, forecast outcomes, and recommend proactive adjustments to business processes in real-time.



Large-Scale Personalization

AI enables customized services and interactions at a scale that was previously impossible, enhancing customer value.

“AI should be understood as a construct of human intellect that mirrors rationality and creativity, expanding the boundaries of knowledge...” - Rybalko (2024)

Innovation is Outpacing Oversight, Creating Significant Risk

Despite the potential, there is a lack of consolidated guidelines to ensure AI systems operate responsibly. This gap manifests in several critical areas:

Absence of Integrated Governance Models:

Silos between IT, business, and compliance teams lead to “ownerless” controls and unclear accountability.

Innovation



Regulatory Uncertainty:

A complex and overlapping landscape of frameworks (AI Act, GDPR, Data Act) creates compliance challenges and legal exposure.

Governance



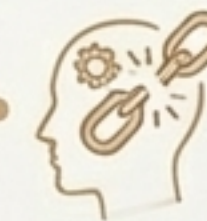
Lack of Standardized Metrics:

Without common standards, assessing algorithmic transparency and performance becomes subjective and unreliable.



Sociotechnical Challenges:

Ungoverned AI raises social concerns about bias, a lack of explainability, and risks to fundamental rights.



The Solution: ISO/IEC 42001 – The Global Standard for AI Management

ISO/IEC 42001:2023 is the first international, **certifiable standard** for an **Artificial Intelligence Management System** (AIMS). It provides a structured framework for responsible AI throughout its entire lifecycle.



Process-Oriented

It certifies the *management system*, not the AI technology itself. A technically brilliant model fails the standard if not embedded in governed processes.



Risk-Based

The level of control and evidence required scales proportionally with the criticality and impact of the AI system.



Technology-Agnostic

It does not prescribe specific algorithms or techniques, making it universally applicable across sectors and technologies.

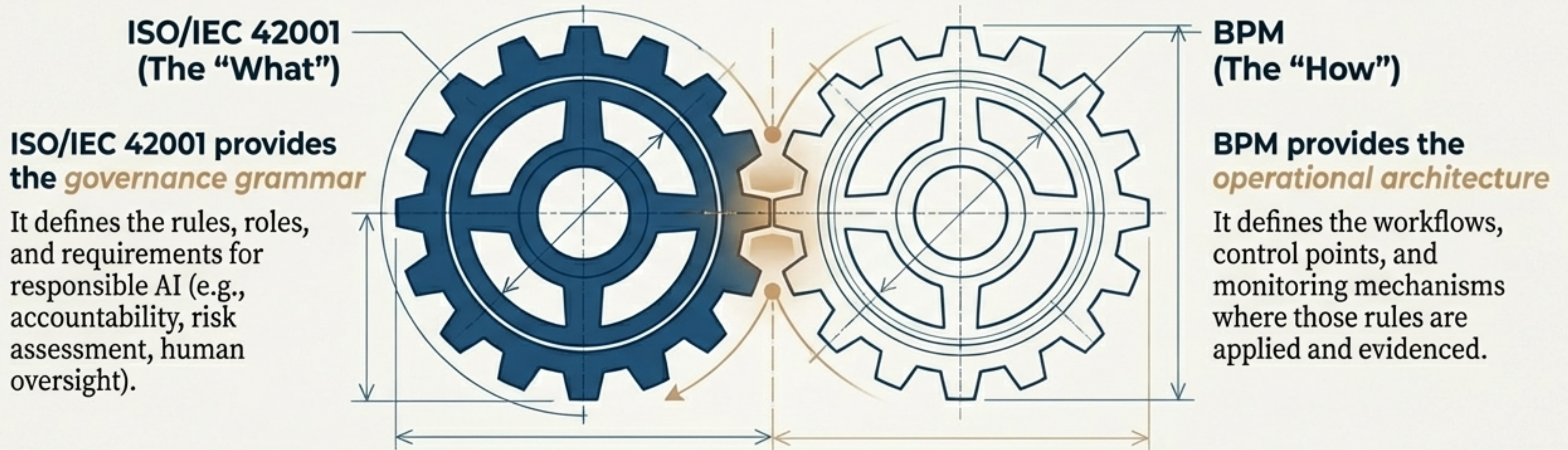


Integrates with Existing Systems

Built on the ISO high-level structure, it facilitates seamless integration with standards like ISO 9001 (Quality) and ISO/IEC 27001 (Security).











BPM Is the Operational Vehicle for Responsible AI

The principles of ISO 42001 are not meant to exist in a vacuum. Business Process Management (BPM) provides the connective tissue to embed AI governance directly into organizational workflows.



By aligning the BPM life cycle with the AIMS structure, organizations can plan, execute, verify, and improve AI within the natural flow of operations.

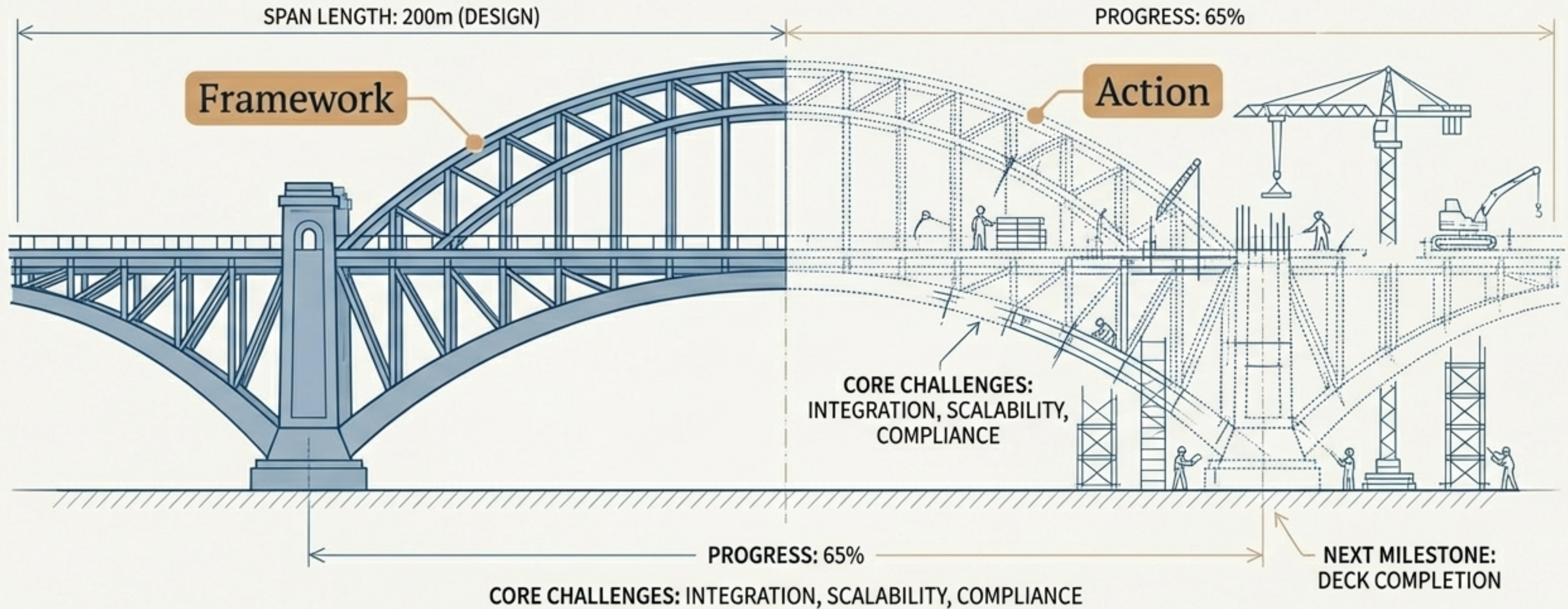
A Blueprint for Convergence: Mapping ISO 42001 to BPM

ISO/IEC 42001 Requirement	Corresponding BPM Practice
 Governance (Roles, Accountability, Human Oversight)	 Process Governance (Process Owners, KPIs, Supervision Mechanisms)
 Risk & Impact Management (AI Risk Matrix, AIA Reports)	 Process Analysis & Redesign (Risk ID, BPMN with Compliance Rules)
 Life Cycle Operation (PDCA) (Design to Decommissioning Controls)	 BPM Life Cycle (Modeling, Execution, Monitoring, Optimization)
 Performance Evaluation (Monitoring Indicators, Audits)	 Process Monitoring & Auditing (Event Logs, Process Mining)
 Support Infrastructure (Data Governance, Competencies)	 BPM Technology & Data (Workflow Engines, Ontologies, Log Mgmt)

ISO/IEC 42001 defines *what* must be managed, while BPM defines *how* these requirements are embedded into workflows.

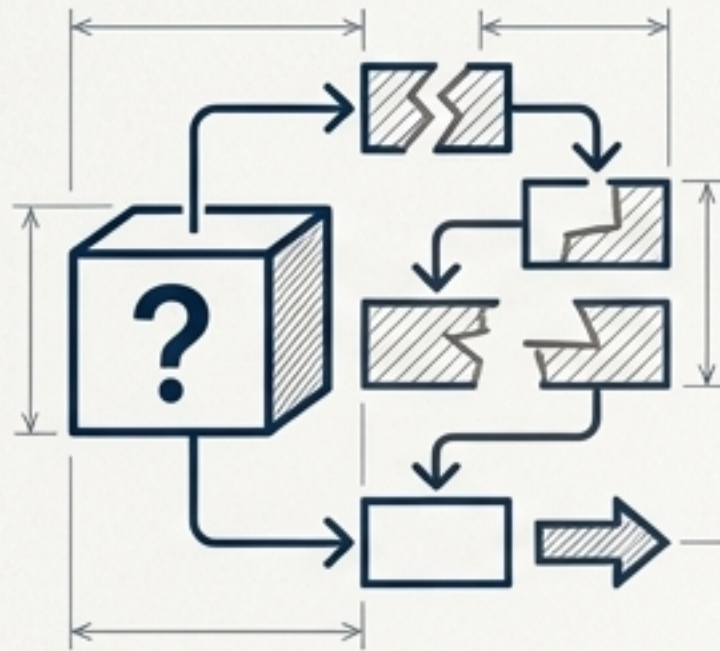


From Framework to Action: Navigating the Core Challenges



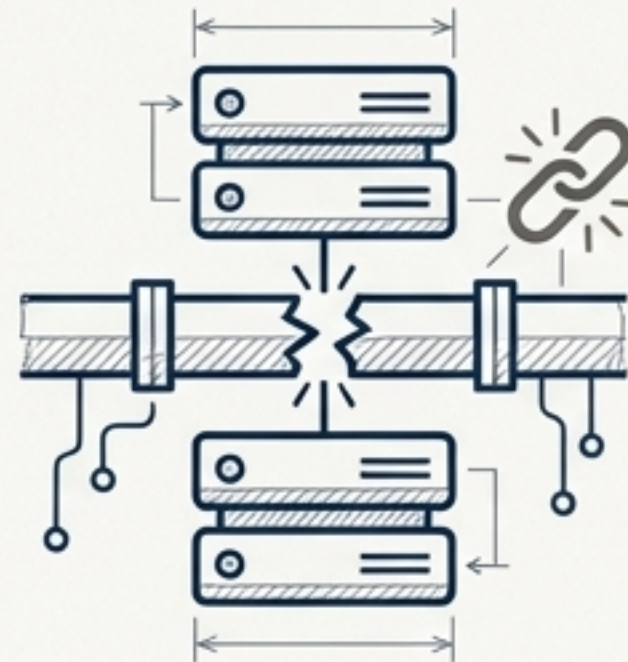
Bridging the gap between theoretical models and practical implementation, addressing key operational hurdles.

Three Core Challenges to Successful Alignment



1. Achieving Process-Anchored Explainability

The Challenge: Moving beyond generic “black-box” explanations. Explanations are often statistically plausible but fragile as auditing tools because they are not situated within the semantics of the process (tasks, roles, business rules).



2. Ensuring Data Governance and Quality

The Challenge: The “**silent infrastructure**” problem. Gaps in metadata, data lineage, and semantic repositories undermine **traceability**, **reproducibility**, and the reliability of any explanation or compliance check.

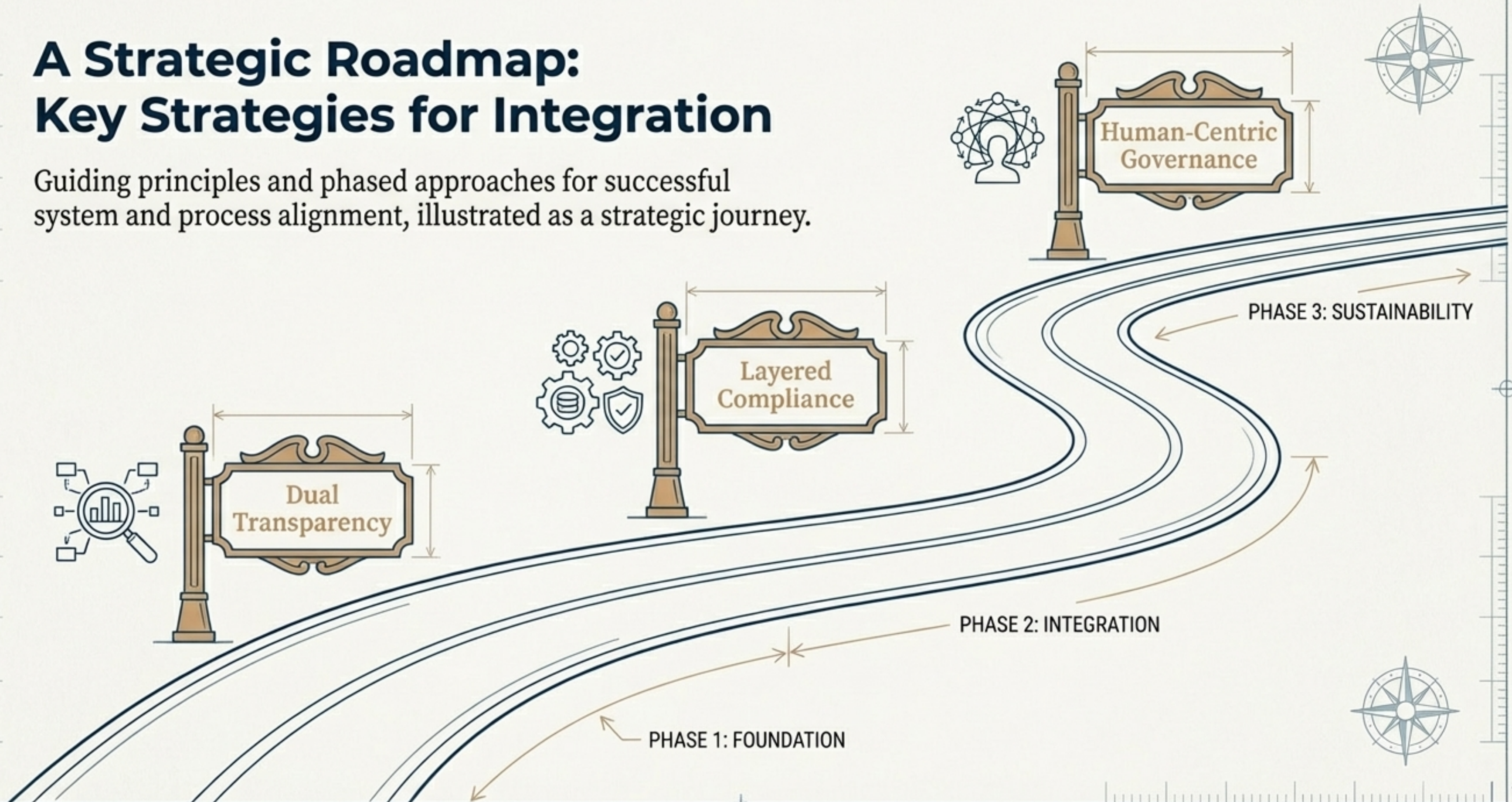


3. Managing Dynamic Compliance & Sociotechnical Factors

The Challenge: Translating abstract policies into computable rules that can handle real-world exceptions. This is compounded by **human factors** like skill gaps, resistance to change, and perceptions of fairness.

A Strategic Roadmap: Key Strategies for Integration

Guiding principles and phased approaches for successful system and process alignment, illustrated as a strategic journey.

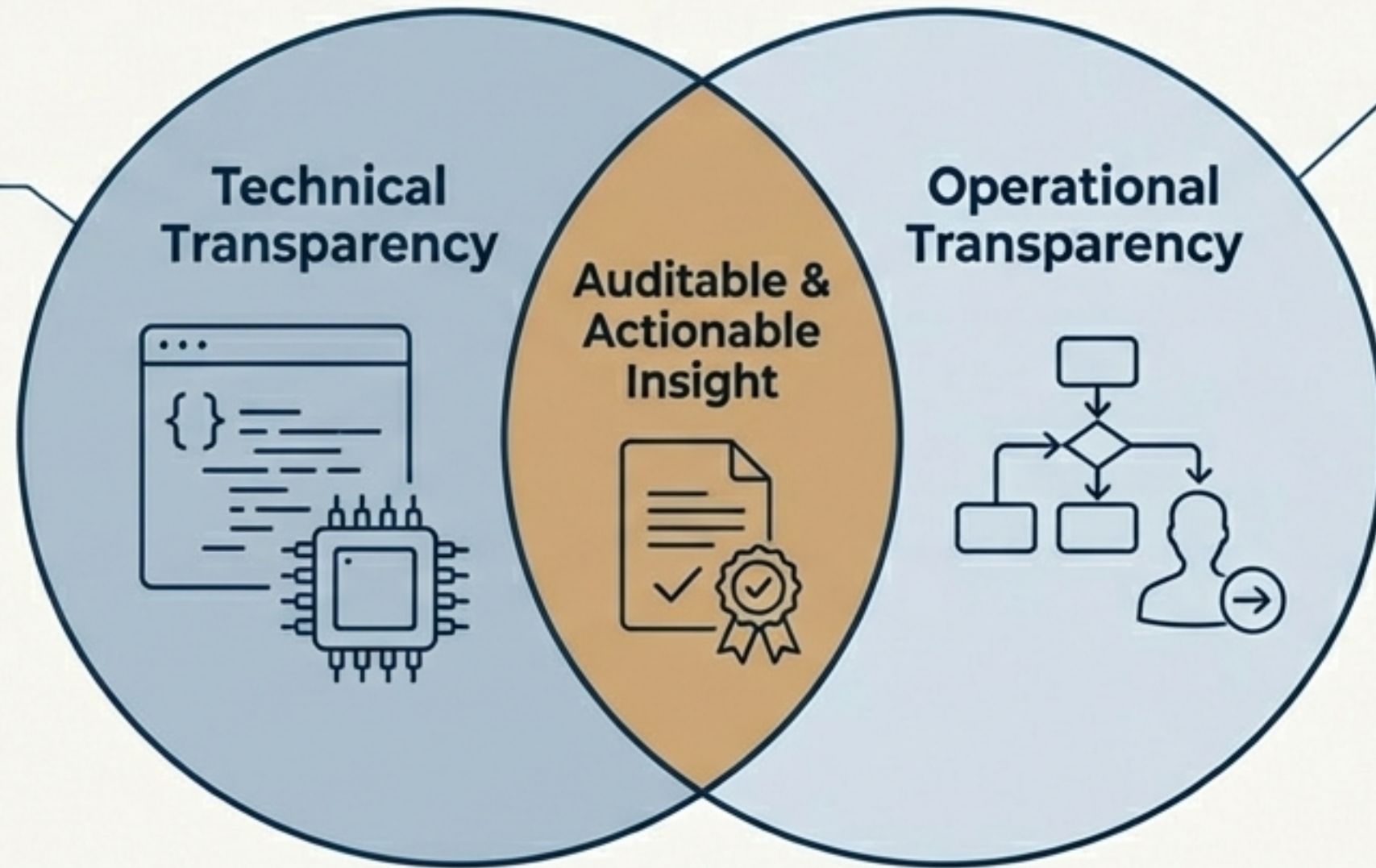


Strategy 1: Achieve Dual Transparency

Effective transparency is not a single concept. It requires a dual focus to be both technically sound and operationally useful.

Definition: Clarifying how the model produced its output (e.g., feature importance, decision paths).

Purpose: Essential for data scientists, developers, and technical auditors to validate model behavior.



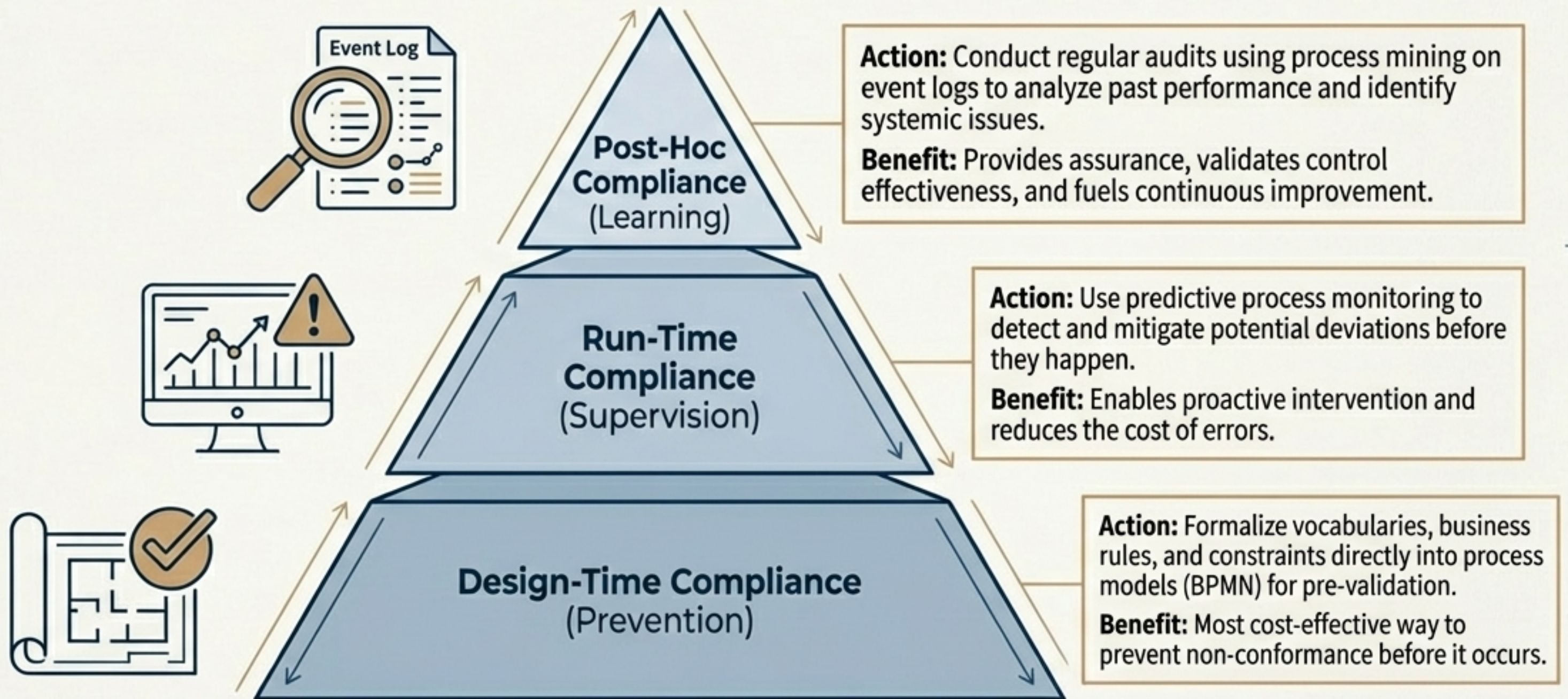
Definition: Explaining how the information should be used within the language of the business process (e.g., “This loan application was flagged because it failed credit rule C-14 in the underwriting stage”).

Purpose: Essential for operators, managers, and business auditors to make informed decisions and ensure compliance.

KEY TAKEAWAY: The goal is to standardize process-based explanations that are comprehensible to their target audience and can serve as auditable evidence.

Strategy 2: Build a Layered Compliance Architecture

A robust compliance strategy integrates controls across the entire process lifecycle. These layers are complementary, moving from prevention to real-time supervision and post-hoc learning.



Strategy 3: Place the Human at the Core of Governance

The AI management system must operate as a sociotechnical arrangement, not just a technological layer. Acceptance and effectiveness depend on how people interact with the system.



Establish Explicit Human Oversight: Define clear human-in-the-loop review cycles and response protocols for AI-driven alerts and recommendations.



Provide Role-Based Training: Equip employees with the digital capabilities and knowledge needed to understand, use, and challenge AI outputs relevant to their roles.



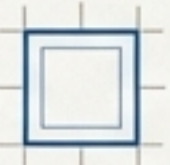
Design for Fairness and Trust: Ensure feedback from AI systems is clear about its source, consequences, and methods. Perceptions of fairness and legitimacy are critical for acceptance.



Institute Contestation Channels: Create formal mechanisms for users to question, appeal, or override AI-driven decisions, ensuring accountability and providing a crucial feedback loop.

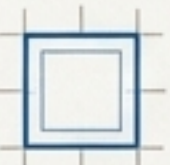
Your Implementation Checklist for AI Governance

A practical guide to embedding the principles of ISO 42001 within your business processes.



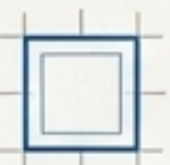
Establish Governance Roles

Define and assign Process Owners, Data Owners, and Model Owners with clear responsibilities and decision-making authority.



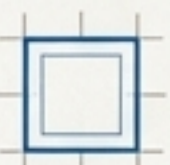
Standardize AI Impact Assessments (AIA)

Create templates that link purpose, context, data, risks, and mitigation plans to specific process controls.



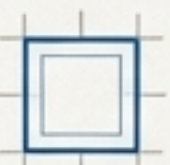
Adopt a Layered Compliance Model

Implement controls at design-time, run-time, and post-hoc stages, tailored to process criticality.



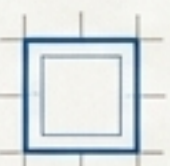
Maintain Living Data Catalogs

Implement comprehensive event log catalogs with metadata, clear data lineage, and quality policies.



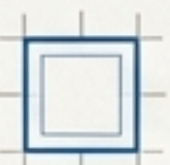
Integrate MLOps and ProcessOps

Implement versioning for both models and their explanations, with regression testing for any changes.



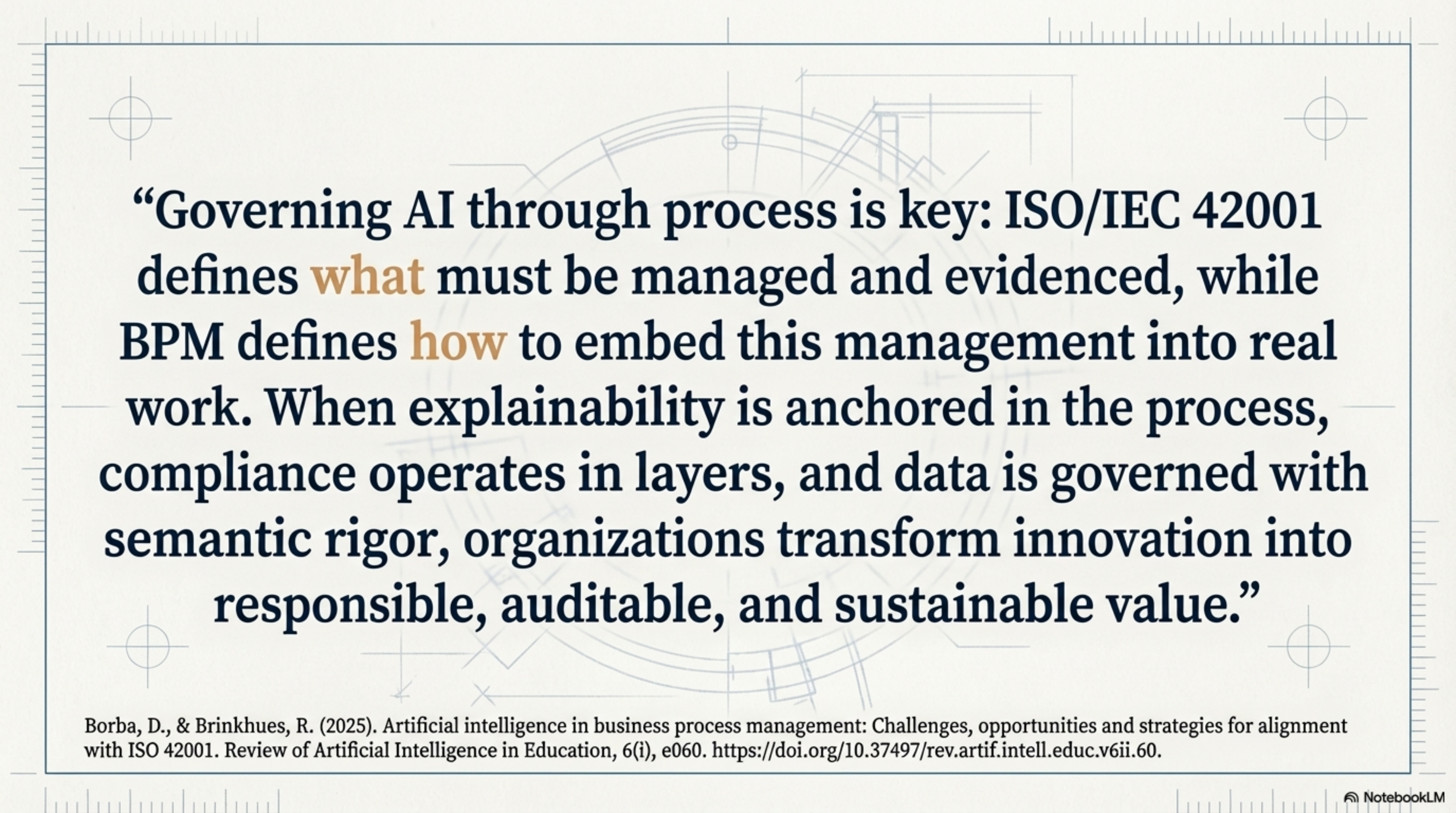
Institutionalize Human-in-the-Loop

Design and mandate human review channels, role-based training, and auditable feedback loops.



Use LLMs as Grounded Interfaces

If using Large Language Models for explanations, ensure they are anchored in verifiable artifacts (BPMN, logs) and subject to human review.



“Governing AI through process is key: ISO/IEC 42001 defines **what must be managed and evidenced, while BPM defines **how** to embed this management into real work. When explainability is anchored in the process, compliance operates in layers, and data is governed with semantic rigor, organizations transform innovation into responsible, auditable, and sustainable value.”**

Borba, D., & Brinkhues, R. (2025). Artificial intelligence in business process management: Challenges, opportunities and strategies for alignment with ISO 42001. *Review of Artificial Intelligence in Education*, 6(i), e060. <https://doi.org/10.37497/rev.artif.intell.educ.v6ii.60>.