Proposal for a Process Governance Integrity Model

Building a Governance Integrity Model to Prevent Organizational Fraud and Departmental Conflicts

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***Abstract*—This paper elucidates the mechanisms by which recurring fraud, quality deviations, and departmental conflicts in organizations requiring high reliability, such as nuclear power generation, manufacturing, quality inspection, and the public sector, are generated structurally rather than accidentally, and proposes a new control theory, Process Governance Integrity (PGI), to address their root causes. PGI imposes Engineering/ Management/ Governance (EMG) invariant that must be satisfied by Engineering, Management, and Governance at process junctions, strictly guaranteeing the preconditions, execution trails, and postconditions before and after the process, resulting in a process in which deviations are structurally impossible. PGI is a unified process governance method that manages process governance completeness, a topic not addressed in existing theories such as Business Process Re-engineering, Theory of Constraints, Toyota Production System, and Functional Resonance Analysis Method.**

Keywords- Business Process Governance Integrity; Governance Integrity model; Business Process Conflict; EMG Invariant.

I. INTRODUCTION

Fraudulent practices, such as fraudulent inspections at nuclear power plants, fraudulent inspections in manufacturing, falsification of quality data, and cover-ups by administrative organizations, are most prevalent in organizations that require control. These are not the result of individual fraud but are a phenomenon that inevitably arises from flaws in the process structure. At the Hamaoka Nuclear Power Plant in particular, conflicts between the Nuclear Power Headquarters (management and management) and the Nuclear Civil Engineering Department (technology) deepened, causing the review process to malfunction, resulting in data fraud [1].

Behind this fraud lies a structural inconsistency in which technology, management, and administration are disconnected at the connection point, leading each department to pursue "local optimization."

The Swiss cheese model explains that many accidents and violations manifest at the interdepartmental connection points due to underlying organizational factors (role mismatch, procedural gaps, lack of responsibility transfer).

Recent empirical studies [2] have also confirmed that poor communication and weak procedural design can lead to a chain reaction of decision-making errors and violations.

This research aims to formalize process governance integrity, which has not been addressed in previous theories, as a process theory, and to present a theory that structurally prevents injustice and conflict.

The rest of this paper is organized as follows. Section II describes related research. Next, Section III proposes an EMG Invariant to ensure comprehensive completeness across all business processes. Section IV describes an application example of EMG Invariant. In Section V, we discuss our considerations, and in Section VI, we present a summary and future issues.

II. RELATED WORK

Below, we discuss related research on business process control.

A. Theory of Constraints (TOC)

Goldratt's Theory of Constraints [3] identifies and improves constraints but does not address control of process nodes.

The outline of TOC is as follows.

[Objective] Improve constraints to achieve overall optimization.

[Basic Philosophy] The weakest constraint determines overall performance.

[Process Perspective] View the entire flow as a single chain.

[Key Data] Constraint throughput/throughput

[Application Areas] Manufacturing, services, R&D, supply chain.

[Strengths] Overall optimization and bottleneck improvement are immediate results.

[Weaknesses] Misidentifying constraints can worsen problems.

B. Business Process Re-engineering (BPR)

BPR seeks to dramatically reform processes by eliminating waste in existing business processes. This makes it easy to destroy safety processes, and if misused, can destroy an organization. Hammer and Champy [4] emphasized that many failures in BPR stem not from technology or tool issues, but from "cultural resistance" and "failure to change people's mindsets." Therefore, BPR is both a technology-driven transformation and a cultural change model. The outline of BPR is as follows.

[Objective] Radical redesign of business processes.

[Basic Philosophy] Reconstruct business processes from scratch.

[Process Perspective] Destroy and reconstruct existing processes.

[Key Data] Structural data required for complete process redesign.

[Application Areas] Corporate reform, digital transformation, and structural transformation.

[Strengths] Large-scale reform and dramatic improvement in competitiveness.

[Weaknesses] Abstract and prone to misuse (easily disrupts safety processes).

C. Toyota Production System (TPS)

TPS [5] is strong in eliminating waste and stabilizing flow. However, there is a risk that important processes such as safety and quality may be treated as "waste" in the production process. The outline of TPS is as follows.

[Objective] Eliminate waste and achieve stable flow.

[Basic Philosophy] Just-in-time + automation + standardized work.

[Process Perspective] Stabilize and improve on-site flow.

[Key Data] Standardized work and waste analysis in the field.

[Application Areas] Manufacturing, quality control, logistics.

[Strengths] Strengthening quality, cost, and flow.

[Weaknesses] Misuse can lead to over-efficiency and lead to scandals.

D. Function Resonance Analysis Method (FRAM)

FRAM [6] can model the mechanism of accident occurrence to ensure resilience based on functional resonance. However, since the purpose is not to design a control system, it lacks preventive logic. The outline of FRAM is as follows.

[Purpose] Understanding fluctuations and resonances in complex systems and preventing accidents.

[Basic Concept] Emphasis on nonlinear inter-functional dependencies.

[Process View] Processes are fluctuating "collections of functions".

[Key Data] Inter-functional fluctuation and resonance patterns.

[Application Areas] Safety management, accident analysis, aviation, and medicine.

[Strengths] Analysis of accident mechanisms in complex systems.

[Weaknesses] Complex model requires skill for practical application.

E. Ji Koutei Kanketsu (JKK)

JKK [7] in Japanese is a word that translates to self (Ji), process (Koutei), and completion (Kanketsu). Self-process completion (JKK) is a method that optimizes the entire production process, not just a specific process.

JKK's requirements organization sheet describes acceptance criteria for each business process, as well as the criteria for determining whether the process output is good.

Defect Prevention Diagrams (DPDs) [8][9] make it possible to detect process deviations using exception conditions that were not available in JKK. Repetitive process control based on process exceptions enables reliable process operation that can respond to environmental changes. However, it does not address the design of control systems, such as not considering exception detection and responsibility for responding.

The outline of JKK is as follows.

[Objective] Maximize quality assurance and productivity throughout the entire process by preventing defects from being passed on to subsequent processes.

[Basic Philosophy] "Establishing conditions for good products." Establish a "scientific work process" that allows anyone to produce good products, rather than relying solely on the skills and awareness of individual workers.

[Process Perspective] "Causal chain." Manage the cause system rather than the result system, believing that a result (good product) always has a cause (procedure/condition).

[Important Data] "Conditions for good products (criteria and procedures)." Physical numerical values and procedural data for each task that guarantee a good product if followed.

[Area of Application] Originating in the manufacturing floor, now also applied to the work processes of staff departments (administrative and planning).

[Strengths] "Thorough prevention of recurrence." When a problem occurs, it is viewed as a "lack of conditions for good products" rather than as individual responsibility, and procedures are corrected, resulting in an extremely high organizational learning ability.

[Weaknesses] "Vulnerable to malice and deception." Because it is assumed that well-intentioned workers will "follow the correct procedures," there are weak logical constraints to detect and block intentional data rewriting and organizational concealment (the devil's room).

F. Assurance case

An Assurance Case is a practical technique for conducting evidence-based arguments regarding claims of the form "the system is in a certain state." Assurance case is called Safety case to assure safety. To claim that "a system is safe," evidence is required. When logically proving that a safety claim is correct based on this evidence, it is necessary to clearly state the prerequisites for the safety claim to be valid. In other words, it is necessary to prove that the safety claim is correct under the prerequisites.

Goal Structuring Notation (GSN), proposed by Kelly [10], is a notation for assurance cases that logically explain claims based on evidence. Safety cases are recommended in the functional safety standard ISO26262 [11].

However, Assurance Cases have problems in that they can be retroactively adjusted, they become well-written "stories," and they are difficult to detect if they are tampered with.

The existing research mentioned above has the limitation that none of them deal with the simultaneous three-tier control of engineering technology (E), management (M), and cooperate governance (G).

III. EMG INVARIANT

In the following, we propose an EMG invariant that serves as the basis for PGI. We then demonstrate that PGI generates a virtuous cycle of processes based on the EMG invariant.

A. PGI Prerequits

PGI is based on the EMG invariant, which states that the three elements of Engineering (technical validity), Management (procedural compliance and reproducibility), and Governance (accountability and legitimacy) must be satisfied simultaneously.

Fraud does not occur within a process, but at the process junctions between processes. PGI defines the EMG invariant at process junctions.

Preconditions, execution trails, and postconditions are defined for each process. PGI's three stages:

Precondition: The execution evidence of the preceding process and the EMG invariant must be satisfied at the junction.

Execution Trail: Full visibility of who did what and how.

Postcondition: The EMG invariant must be satisfied, with the three EMG parties approving the results created by the succeeding process based on the execution trail.

The EMG invariant requires simultaneous satisfaction of all three elements. This is because missing any one element creates a loophole.

Consider a business process where process P and process Q are connected at a connection point (P→Q). There are execution trails Trail P and Trail Q for process P and Q. The PGI invariant (PGII) for the connection point (P→Q) is PGII(P→Q). The record of EMG approval of this invariant is EMG(P→Q). Furthermore, the subsequent connection point of process Q can be expressed as (Q→), its PGI invariant as PGII(Q→), and its approval record as EMG(Q→). The PGI structure of processes P and Q is shown in Figure 1.

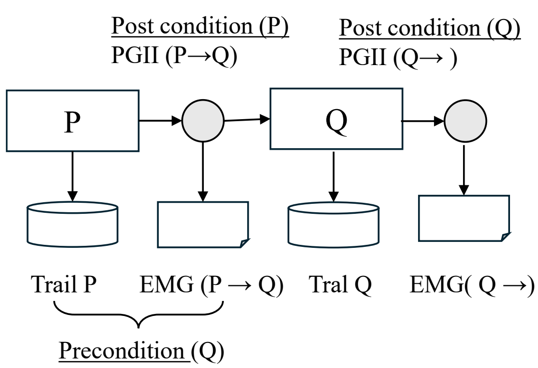

Figure 1. PGI structure.

B. PGI stops the vicious cycle and creates a virtuous cycle

Using Senge's [12] reinforcing loop and balancing loop, we explain how PGI can create a virtuous cycle in conflicts between the sales and production departments.

A typical vicious cycle (R-) between the sales and production departments is as follows: Sales pressures the production department to meet deadlines → weakened reviews → lack of evidence → on-site hesitation → fraudulent practices → further pressure from the sales department. This is a "self-reinforcing R- loop."

PGI's intervention in the B loop (balancing) enforces the following: Without evidence, subsequent processes cannot proceed → technical decisions cannot be overwritten by management → management accountability is recorded → the connection point is closed with three-party approval. This "forces a halt" to the negative vicious cycle (R-).

After implementing PGI, a positive virtuous cycle (R+) is naturally generated: improved integrity of evidence → increased transparency → increased trust → improved review quality → eliminated incentives for fraud.

IV. APPLICATION EXAMPLE

Below, we apply the proposed method to the case of the Chubu Electric Power Hamaoka Nuclear Power Plant.

A. The conflict in the Hamaoka Nuclear Power Plant

The fraud incident that occurred at Chubu Electric Power's Hamaoka Nuclear Power Plant [1] is outlined below.

The misconduct uncovered at Chubu Electric Power’s Hamaoka Nuclear Power Plant revealed deep structural problems in the organization’s nuclear division rather than a series of isolated technical errors. The core incident involved the inappropriate selection and manipulation of seismic ground-motion data used for regulatory safety reviews of Hamaoka Units 3 and 4. Japan’s Nuclear Regulation Authority (NRA) judged the data to be unreliable and suspended the plant’s safety review, prompting a broader investigation into the organization’s internal processes.

At the heart of the issue was a structural conflict between two key divisions: the Civil Engineering Division, responsible for seismic modeling and ground-motion analysis, and the Nuclear Power Headquarters, which managed regulatory strategy and schedule commitments. Under pressure to accelerate safety review progress, the headquarters implicitly pushed for data that would avoid costly redesign requirements. Meanwhile, engineers in the Civil Engineering Division struggled to maintain scientific rigor under tightening deadlines. This misalignment created an environment in which “acceptable” outputs were prioritized over technically justified results.

The resulting misconduct—selecting seismic waveforms that favored regulatory approval, insufficient documentation of analytical reasoning, and inadequate internal review—was not simply a lapse in judgement but a manifestation of systemic weaknesses. These included poor process control at the interface between divisions, erosion of technical independence, and insufficient governance safeguards to ensure transparency and traceability.

The Hamaoka case illustrates how organizational pressure, fragmented authority, and inadequate process integrity can combine to compromise nuclear safety. It also demonstrates the need for a governance framework in which

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engineering, management, and executive oversight align structurally to prevent the recurrence of such issues.

B. PGI introduction

The main processes in the Hamaoka Nuclear Power Plant incident were Civil Engineering Department analysis, review of analysis results, and preparation of submission documents. The connection points for these three processes are Civil Engineering Department analysis → PGI connection point 1 → review → PGI connection point 2 → preparation of submission documents → PGI connection point 3.

The EMG invariants for these three processes are shown below for connection point 1 (Civil Engineering Department analysis → review) and connection point 2 (review → preparation of submission documents).

[Connection point 1]

Precondition 1 is the first process, so there is no preceding evidence, but the following 3 EMG conditions must be met: E: Analysis basis and parameters are fully recorded and their validity confirmed. M: Analysis procedures are followed, and review inputs are complete. G: Transparency is ensured, and tampering is denied.

Execution evidence 1 consists of the analysis log, waveform selection reasons, parameter history, and technical supervisor approval log.

Postcondition 1 (EMG confirmation) is: E: The technical supervisor confirms that the analysis results are usable for review. M: The management supervisor confirms that the process transitions are as per procedure. G: The person responsible for governance confirms that the evidence is accountable to external parties. This allows the review process to officially begin.

[Connection Point 2]

Precondition 2 is the prerequisite: the execution evidence from Connection Point 1 is complete, and the following 3 EMG conditions are met: E: All technical issues have been addressed. M: Review and approval records are complete, and procedure compliance has been confirmed. G: The decision-making process is transparent and arbitrariness is eliminated.

Execution Evidence 2 consists of review minutes, a history of issues and responses, an approval log (E/M/G), and reference document records.

Postcondition 3 (EMG confirmation) is the following: E: The review results are technically finalized and cannot be overwritten. M: The format and content are confirmed to be correct for input to the next process. G: Accountability to regulatory authorities is confirmed.

This ensures complete evidence of the waveform selection in the Civil Engineering Department analysis. Furthermore, arbitrary changes by headquarters are no longer possible, automatically requiring three-party approval. Finally, the conflict at the connection point disappears. As a structural consequence of this, it is clear that the Hamaoka Nuclear Power Plant fraud would not have been possible under the PGI structure.

V. DISCUSSION

A. Novelty

The novelty of this proposal lies in its theorization of "control at process junctions," a concept that traditional safety engineering, quality assurance, and organizational control have been unable to fully address. PGI requires the existence of a unique execution trail A_p for each process and the EMG invariant EMG_p, which simultaneously establishes Engineering, Management, and Governance. This requirement is applied to all process junctions. This ensures an unbroken causal chain between processes, making it impossible for any process to proceed without referencing the authentic trail of the previous process. While traditional assurance cases are merely a documentation method for explaining safety and subject to retroactive additions and modifications, PGI structurally guarantees the generation of the trail itself, creating an assurance infrastructure that allows assurance cases to be generated whenever needed. Furthermore, by imposing invariants at the "natural joints"—the boundaries between technology, management, and business—PGI structurally prevents organizational conflicts and fraud, which are difficult to address with traditional business process design methods. PGI connection points consist of a trinity of "pre-conditions," "execution trail," and "post-conditions (EMG confirmation)," so if any one of these is missing, the connection point opens, preventing it from becoming an entry point for fraud.

B. Effectiveness

By applying this proposal to the Hamaoka incident, we demonstrated that the Hamaoka nuclear power plant fraud would not have occurred under the PGI structure. This result confirmed the effectiveness of this proposal. Because fraud and tampering are most likely to occur at the end of a process, the postcondition EMG serves as the final defense. Since the "validity of the result" cannot be determined from the execution trail alone, the result is confirmed through three-party approval of the EMG. Ensuring agreement among the three parties prevents the lack of responsibility and conflicts that occurred in the Hamaoka incident.

The existence of an execution trail Ap for every process p and the establishment of the EMG_p are conditions for the correctness of the PGII at all inter-process connection points.

The following two conditions must be met at a PGII connection point ($p \rightarrow q$):

(C1) The execution trail A_p of the predecessor process p exists.

(C2) The EMG invariant EMG_p is satisfied for that process p.

Unless these two conditions are met, the successor process q cannot start.

$PGI (\rightarrow q) = A_p \wedge EMG_p$

For a set of processes $P = \{p_1, p_2, p_3, \ldots\}$, PGI functions as a whole if the evidence and invariants hold for all processes.

$\forall p \in P, A_p \wedge EMG_p$) establishes PGII at all connection points ($p \rightarrow q$).

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PGI ensures a "causal chain" because a subsequent process cannot begin without the evidence of the preceding process. PGI ensures process quality because a process cannot be completed without the necessary technology (E), management (M), and governance (G). Furthermore, A_p and EMG_p are required at each connection point. The absence of any one of these breaks the chain. Therefore, PGI can prevent fraud at the "connection points."

C. Assurance case Generation from PGI

PGI automatically records the following records for each process execution: the preceding process execution trail, invariant verification record, EMG three-party approval log, and process completion record (execution trail). If a deviation is detected under any of these conditions, the process cannot be completed. These records can be combined and formalized to form an Assurance Case. If the process cannot be completed, an Assurance Case cannot be created. Therefore, rather than creating Assurance Cases from business process diagrams, PGI allows Assurance Cases to emerge naturally. Assurance Cases are descriptions that explain process safety, and PGI is the generation mechanism that structurally guarantees process safety. Therefore, with PGI in place, Assurance Cases can be generated at any time, eliminating the need for separate preparation. Furthermore, this creates a new form of assurance: authentic, immutable, and tamper-proof, rather than retroactive. Previously, to demonstrate the safety of a system, the reasons for its safety had to be presented in written Assurance Cases. However, PGI inevitably leaves behind evidence that the process can only be safe, so the log naturally becomes an Assurance Case, providing structural assurance. Figure 2 shows the Assurance Case generated using PGI and EMG.

D. Comparison of PGI and BPR/TOC/BPR/TPS/FRAM

Because Business Process Modeling (BPM) is a representation model of business processes, it cannot handle the authenticity of process execution or the control of departmental boundaries, and its resistance to organizational fraud and inter-departmental conflicts is low.

TOC looks at constraints but does not address control structures. BPR is reform-oriented but has a high risk of destroying control processes. TPS is strong in on-site improvements but can sacrifice safety processes if misused. FRAM is strong in accident analysis but does not address system design.

Table I summarizes the fraud resistance and inter-organizational conflict resistance of conventional methods.

PGI is structurally incapable of fraud, making it highly resistant to fraud. Furthermore, PGI's resistance to organizational conflicts is high because the EMG invariant structurally seals off departmental conflicts.

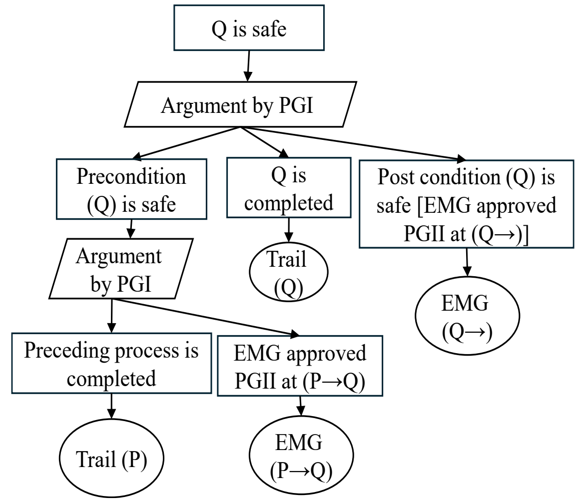

Figure 2. Assurance case generated from PGI structure

TABLE I. ISSUES OF CONBENTIONAL METHODS

Method	Resistance to fraud	Tolerance for organizational conflict
BPM	Low (cannot structurally prevent fraud)	Low (cannot handle the control of departmental boundaries)
TOC	Medium *(if constraint management is correct)*	Medium (depending on shared understanding of constraints)
BPR	Low (disruptive reforms tend to undermine safety processes)	Low (concentrated power, resistance, friction)
TPS	Medium to low (muda-elimination measures are prone to misuse)	Medium (emphasis on the field, potential for upstream/downstream conflict)
FRAM	Medium (potential for overemphasis on the field and upstream/downstream conflicts)	Medium (analysis-focused, weak control)
DPD	Medium (exceptions can be detected, but response is a challenge)	Medium (analysis-focused, weak control)

E. Achieving EMG Traceability

By recording Ep, Mp, and Gp for business process p, PGI's function as a "defect prevention measure" is traceable.

Forward tracing allows us to prove how E (technical truth) was accepted by M (management) and reflected in G (management) decision-making. Backward tracing, when fraud or an accident is detected, allows us to identify which "abnormal attribute value" in E was the cause, through the G layer's judgment and the M layer's verification process. Furthermore, traceability allows us to isolate the source of the inconsistency and initiate repairs by tracing back from the final state in which the connection points were normal.

F. *The Limitations of PGI*

The limitations of PGI lie not in theory, but in organizational resistance, as outlined below.

- Transparency makes responsibility visible
- Vested interests collapse
- Organizational psychology prioritizes short-term profits and rejects PGI
- Partial application of PGI creates loopholes and is counterproductive

This paper qualitatively clarifies the effectiveness of PGI using a single past case of misconduct. However, to confirm the effectiveness of PGI, it is necessary not only to apply it to other cases but also to quantitatively evaluate factors such as the effort required for process design.

VI. Conclusion And Future Work

PGI is the first control theory to integrate engineering, management, and governance, and it makes fraud and conflict "structurally impossible to occur." It also clarifies that fraud is not an "individual problem," but a structural problem resulting from a lack of control integrity. Furthermore, PGI can contribute to the design of controls in high-reliability organizations to realize process control that stops vicious cycles and creates virtuous cycles.

For more than three decades, business-process research—ranging from BPR and workflow engineering to BPM, Lean, Six Sigma, and safety-assurance methodologies—has attempted to improve organizational performance by optimizing process design, documentation, and continuous improvement. Despite these advances, a deep structural limitation remained largely unaddressed: none of the existing approaches systematically ensured the integrity of process execution across organizational boundaries. They improved how processes *should* operate but provided no mechanism to guarantee how they *actually* operate in real conditions marked by pressure, shortcuts, inconsistent governance, and interdepartmental conflicts.

PGI directly overcomes this foundational weakness. PGI introduces two structural concepts absent from prior research:

Execution Trace (A_p) for every process p, and a triadic governance invariant (EMG_p)—Engineering, Management, Governance—that must be simultaneously satisfied at every process interface.

By embedding these invariants at all junctions between processes, PGI ensures that no process can proceed unless the preceding one is both *traceable* and *governance-complete*. Prior business theories focused on internal tasks; PGI focuses on the process junctions, the very places where most organizational failures occur.

Traditional business-process research also assumed that compliance and quality could be verified through documentation, audits, or post-hoc assessments. PGI replaces this fragile assumption with a structural guarantee: the process itself produces tamper-proof execution traces that constitute genuine evidence of correct performance. This allows PGI to generate an Assurance Case for any process—solving a problem that BPR, TPS, and safety methodologies could only address retrospectively and incompletely.

Another long-standing limitation in business-process literature was the lack of an integrated view of technical accuracy, managerial discipline, and governance legitimacy. PGI unifies these into a single invariant (EMG), ensuring that engineering rigor cannot be overridden by managerial pressure, nor can governance requirements be satisfied through superficial documentation. This resolves the endemic misalignment between functional silos that prior research could describe but prevent.

In summary, PGI is not merely an extension of BPR or BPM but a conceptual leap: the first framework that guarantees process integrity by design, ensures cross-boundary coherence, auto-produces trustworthy assurance, and structurally prevents organizational drift and misconduct. It addresses precisely what decades of business-process research left unresolved.

References

[1] The Japan Daily, Data Manipulation at Hamaoka Nuclear Plant Sparks Calls for Policy Reform,7 Jan. 2026,
[Online]. Available from: https://japandaily.jp/data-manipulation-at-hamaoka-nuclear-plant-sparks-calls-for-policy-reform/ [retrieved: Apr., 2026]

[2] G. D. Isbasoiu and D. Volosevici, "Organizational Determinants of Unsafe Acts: An Exploratory Study in Refinery Maintenance Operations", Safety 2025, vol.11, no.4, pp. 102, [Online]. Available from: https://doi.org/10.3390/safety11040102 [retrieved: Apr., 2026]

[3] H. Goldratt and J. Cox, "*The Goal: a process of ongoing improvement,"* (3rd rev.). Great Barrington, MA: North River Press, 2004.

[4] M. Hammer and J. Champy, "Reengineering the Corporation-A Manifesto for Business Revolution," Harper Business, 1993.

[5] T. Ohno, "Toyota production system: beyond large-scale production," Cambridge, Mass.: Productivity Press 1988.

[6] E. Hollnagel, "FRAM - the Functional Resonance Analysis Method: Modelling Complex Socio-Technical Systems." CRC Press, 2012.

[7] S. Sasaki, "Self-process completion - Quality is built in the process," JSQC selection, Japan Society for Quality Control, 2014. (in Japanese)

[8] S. Yamamoto, "Business Process Completeness," eKNOW, pp. 24-28, 2024, [Online]. Available from: https://www.proceedings.com/content/076/076892webtoc.pdf.
[Online] [retrieved: Apr., 2026]

[9] S. Yamamoto, "Defect Prevention Review by Process Relationship Matrix," eKNOW, 2025, [Online]. Available from: https://www.iaria.org/conferences2025/fileseKNOW25/eKNOW_60014.pdf [retrieved: Apr., 2026]

[10] T. Kelly and J. McDermid, "Safety Case Construction and Reuse using Patterns," University of York, 1997.

[11] ISO: ISO26262 Functional Safety, ISO, 2011

[12] P. Senge, "The Fifth Discipline: The Art & Practice of The Learning Organization," Second edition, Random House Books, 2006.