

Beyond Agility: An Integrated Framework for Measuring Transformation and Safety Performance in High-Hazard Industries

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ABSTRACT: The oil and gas industry increasingly adopts agile methodologies to enhance organizational adaptability; however, existing performance measurement frameworks remain inadequate for high-hazard environments. Current models, predominantly designed for software development and manufacturing contexts, fail to integrate agility metrics with safety-critical indicators, leaving a significant gap in how organizations evaluate transformation success without compromising operational integrity. This research addresses this gap by developing and validating an integrated performance measurement framework that systematically aligns agile transformation goals with safety, risk management, and regulatory compliance requirements a combination absent in prior literature. Using a multimethodology approach, the study combines Soft Systems Methodology (SSM) for systemic problem structuring with the Balanced Scorecard (BSC) to create a structured yet flexible evaluation model. The framework was developed and validated through action research within a multinational oil and gas company, involving nine interviews with senior executives and two focus group discussions with operational leaders. The primary contribution is a novel set of key performance indicators across four perspectives financial, customer, internal process, and learning and growth specifically designed to balance agile transformation imperatives with safety-critical operational metrics in high-hazard industries. This research presents an empirically tested model that provides practical guidance for industry leaders seeking to enhance organizational agility without compromising operational integrity and regulatory compliance.

Keywords: agile transformation, performance measurement, balanced scorecard, soft systems methodology, oil and gas industry.

I. INTRODUCTION

The global energy sector faces unprecedented transformation amid volatile oil prices and increasing pressure for cleaner energy solutions [1, 2]. This environment has forced oil and gas companies to fundamentally rethink their operational models. Recent studies indicate that 67% of oil and gas companies are pursuing agile transformation to enhance adaptability [3], yet 58% report significant challenges in measuring transformation effectiveness while maintaining safety standards [4]. The complexity of managing agile transformation in high-hazard industries is exemplified in the case of company XYZ, a multinational oil and gas corporation operating across 65 countries. Traditional performance metrics, designed for stable operational environments, fail to capture the dynamic capabilities required for agile organizations while ensuring compliance with stringent safety standards [5, 6]. This disconnects between existing measurement approaches and the dual imperatives of agility and safety creates significant implementation challenges that require new frameworks.

Current literature reveals significant gaps in understanding how to effectively measure agile transformation in high-hazard industries. While 82% of software development organizations have established agile metrics [7], only 23% of oil and gas companies report having adequate performance measurement systems for agile initiatives [8]. Three critical gaps emerge from systematic review of prior research: First, there is an absence of integrated frameworks that align safety-critical operations with agile performance indicators. Existing agile measurement models, such as those proposed by Olszewska et al. [11] and Johnston and Gill [13], focus predominantly on cycle time, velocity, and stakeholder satisfaction without incorporating safety dimensions essential for high-hazard

operations [9]. Second, insufficient guidance exists on reconciling traditional operational metrics with agile measurements. Dikert et al. [10] identified this tension as a primary barrier in large-scale agile transformations, yet no framework has systematically addressed how to bridge these measurement paradigms. Third, limited empirical studies have examined performance measurement systems in high-hazard agile transformations. While Hüllmann et al. [9] explored agile project management in safety-critical industries, their work focused on project-level challenges rather than organization-wide performance measurement frameworks.

While previous studies on performance measurement in agile transformations have primarily focused on software development and manufacturing [11, 12], their applicability to high-hazard industries such as oil and gas remains critically underexplored. Agile transformation in oil and gas operations presents unique challenges that cannot be addressed by existing performance measurement models, which are largely designed for low-risk, iterative environments. Current frameworks predominantly emphasize efficiency, cycle time, and stakeholder satisfaction [13, 14] but fail to incorporate safety-critical dimensions, risk management, and regulatory compliance factors that are indispensable in high-hazard industries [15]. Although recent studies have attempted to adapt Balanced Scorecard (BSC) for agile organizations [16, 17], these efforts remain generic and insufficiently tailored to industries where agility must be balanced with operational stability and strict safety protocols. No existing framework has systematically integrated agile performance indicators with safety, risk, and compliance metrics within an oil and gas operational context. Addressing this gap, this study introduces a novel integrated performance measurement framework that aligns agile transformation indicators with safety-critical performance metrics, creating an industry-specific evaluation model suited for hazardous environments. By leveraging Soft Systems Methodology (SSM) and a customized BSC approach, this research goes beyond conventional performance assessment models by incorporating a holistic, iterative methodology that captures both agility and operational resilience in a high-risk industry setting. Furthermore, this study is one of the first to provide empirical validation of an agile-aligned performance measurement framework in a multinational oil and gas corporation, ensuring that theoretical contributions translate into actionable insights. By offering a structured yet adaptable framework that integrates agility with safety and compliance imperatives, this study provides a groundbreaking approach for oil and gas companies seeking to enhance flexibility without compromising operational integrity.

To achieve these aims, the research is structured around five aligned research objectives (RO) and research questions (RQ):

- RO1: Analyse current performance measurement practices in oil and gas operations and their alignment with agile principles. RQ1: What are the current performance measurement practices in oil and gas operations, and how do they align with agile principles?
- RO2: Identify and validate key performance indicators balancing operational excellence with agile capabilities. RQ2: What critical indicators effectively evaluate transformation success while maintaining safety standards?
- RO3: Develop an integrated framework for measuring agile transformation effectiveness while maintaining safety standards. RQ3: How can traditional operational metrics be integrated with agile performance indicators in a unified framework?
- RO4: Establish implementation guidelines for agile-aligned performance measurement in high-hazard industries. RQ4: Which frameworks and methodologies best support transformation measurement in high-hazard industries?
- RO5: Validate the framework through empirical testing at Company XYZ. RQ5: How can performance measurement systems adapt to support continuous improvement while ensuring operational stability?

II. RELATED WORK

1. SOFT SYSTEMS METHODOLOGY (SSM)

Soft Systems Methodology (SSM) was developed by Peter Checkland in the 1970s as a response to the limitations of traditional "hard" systems thinking in dealing with complex, ill-defined problems [18]. Unlike hard systems approaches, which assume clear objectives, SSM recognizes the subjective nature of human perception and interpretation in problem situations [19]. Over time, SSM evolved from a seven-stage process (1980s) into a more flexible four-stage approach (1990s) and later into an adaptive learning system [18]. Its core techniques such as rich pictures, CATWOE analysis (Customers, Actors, Transformation process, Worldview, Owners, and Environmental constraints), and conceptual modelling help structure messy organizational problems by

facilitating structured debate among stakeholders [18]. This dynamic, iterative learning process enables organizations to integrate multiple perspectives and adapt to changing conditions [20].

SSM has been widely applied across sectors like healthcare [21], environmental management [22], information systems [18], and organizational transformation [23]. In performance measurement system design, SSM uncovers human and cultural dimensions that traditional frameworks often neglect [24]. By engaging stakeholders in collective sense-making, it enhances buy-in for transformation initiatives [25]. However, critics argue that SSM is time-consuming, subjective in problem definition, and difficult to translate into concrete action plans with measurable outcomes [20]. Additionally, it may not adequately address power dynamics and structural conflicts within organizations [19]. These limitations suggest the need for complementary methodologies, such as Balanced Scorecard (BSC), to strengthen SSM's capacity for implementation and measurable performance outcomes in complex organizational transformations.

While SSM offers significant advantages for understanding complex organizational problems, alternative systemic approaches exist that merit consideration. System Dynamics (SD), developed by Forrester, emphasizes quantitative modelling of feedback loops and time delays, making it suitable for scenarios where numerical simulation is required [53]. Critical Systems Heuristics (CSH), proposed by Ulrich, focuses explicitly on boundary judgments and power dynamics in problem situations [19]. Compared to these alternatives, SSM's strength lies in its emphasis on multiple stakeholder perspectives and accommodation of subjective interpretations, making it particularly suited for organizational transformation contexts where consensus-building is essential [18]. Jackson [19] argues that SSM's participatory nature facilitates stakeholder buy-in, though it may be less effective than SD for predicting quantitative outcomes or CSH for addressing structural inequalities. For this research, SSM was selected because agile transformation fundamentally involves reshaping how stakeholders perceive and enact organizational processes a challenge better addressed through interpretive methodology than quantitative simulation or critical analysis alone.

2. BALANCED SCORECARD (BSC)

The Balanced Scorecard (BSC), introduced by Kaplan and Norton [26], transformed performance measurement by integrating financial, customer, internal process, and learning and growth perspectives. Unlike traditional financial metrics that reflect past performance, BSC emphasizes strategic alignment and future value creation [26]. Over time, it has evolved from a measurement tool into a strategic management framework, helping organizations link operational activities to long-term goals [27]. By establishing cause-and-effect relationships among its four perspectives, BSC provides a structured way to connect learning and growth improvements to better internal processes, enhanced customer satisfaction, and ultimately stronger financial performance [28]. This systematic approach ensures that strategy is effectively translated into actionable objectives at all organizational levels [27].

Empirical studies highlight BSC's effectiveness across industries, demonstrating its role in improving strategy execution, performance alignment, and continuous improvement [29]. In large organizations, BSC has been linked to better performance outcomes, especially in dynamic market environments [30]. In the oil and gas sector, BSC helps balance financial performance with safety, sustainability, and workforce development [31]. However, challenges exist, particularly in validating causal relationships between perspectives [28] and selecting appropriate non-financial measures [32]. Additionally, measurement disintegration can occur when organizations fail to align metrics with strategic objectives [33]. These challenges are especially relevant in highly regulated industries, where operational excellence, compliance, and innovation must coexist [28].

3. SAFETY PERFORMANCE MEASUREMENT IN HIGH-HAZARD INDUSTRIES

Performance measurement in high-hazard industries requires specialized consideration of safety-critical factors that distinguish these environments from conventional organizational contexts. Hopkins [15] established foundational principles for process safety indicators, distinguishing between lagging indicators (incident rates, injuries) and leading indicators (near-misses, safety audits, barrier health). The International Association of Oil & Gas Producers (IOGP) has developed standardized safety performance metrics including Total Recordable Incident Rate (TRIR), Lost Time Injury Frequency (LTIF), and process safety events categorized by severity tiers [6]. These metrics provide essential baselines for operational integrity but were not designed to accommodate the dynamic, iterative nature of agile transformation.

Recent scholarship has begun addressing the integration of safety and organizational performance. Iaiani et al. [79] examined how control system integrity affects process safety in industrial plants, highlighting the need for metrics that capture both technical reliability and organizational responsiveness. Soliman et al. [80] explored

environmental and safety performance integration in process industries, demonstrating that holistic measurement approaches yield superior outcomes compared to siloed safety metrics. However, these studies have not specifically addressed how safety performance measurement can be adapted for organizations undergoing agile transformation, where rapid iteration and adaptive planning may create tensions with traditional safety management approaches that emphasize standardization and procedural compliance.

4. INTEGRATION OF SSM AND BSC FOR PERFORMANCE MEASUREMENT IN AGILE TRANSFORMATIONS

The integration of Soft Systems Methodology (SSM) and Balanced Scorecard (BSC) provides a structured yet flexible approach to performance measurement in complex transformations such as agile adoption (Figure 1). SSM's iterative problem-structuring approach, which includes rich pictures, CATWOE analysis, and root definitions, enables organizations to understand and navigate complex challenges [18]. Meanwhile, BSC translates strategic objectives into measurable performance indicators across four perspectives: financial, customer, internal processes, and learning and growth [26]. By combining SSM's qualitative insights into system complexity with BSC's structured measurement framework, organizations can develop adaptive performance systems that account for both transformation dynamics and operational stability [20, 19]. Figure 1 illustrates this integration, showing how SSM's structured problem analysis flows into BSC's performance measurement perspectives.

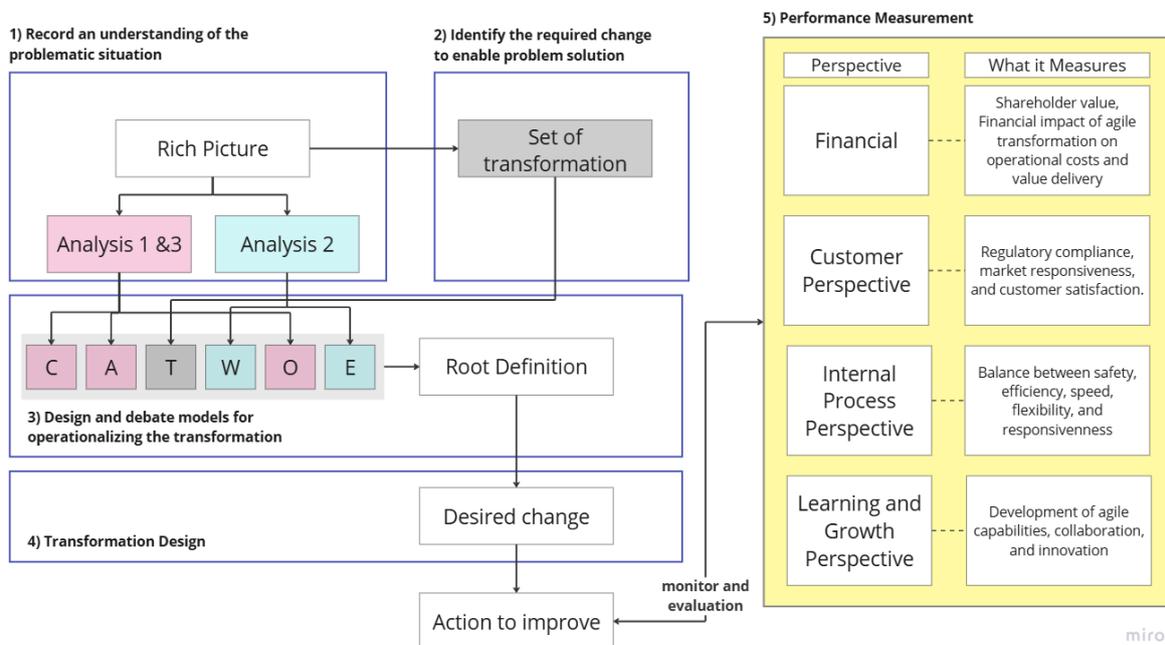


FIGURE 1. Integration of SSM and BSC.

Empirical research supports this integration across various industries. Kotiadis and Mingers [25] demonstrated how SSM helps organizations define transformation needs before applying BSC for aligned measurement design. Hanafizadeh and Moayer [34] showed that SSM improves stakeholder engagement, while BSC ensures structured implementation. Similarly, Molina-Azorin et al. [35] applied this approach to environmental management, and Fernandez-Gonzalez et al. [31] explored its role in oil and gas sustainability performance. As depicted in Figure 1, SSM's systemic inquiry informs transformation design, which is then monitored through BSC's four performance perspectives: financial impact, customer responsiveness, process efficiency, and learning capabilities. Despite its benefits, challenges remain, including methodological alignment, organizational constraints, and the need for practitioners skilled in both approaches [19, 36]. Addressing these challenges requires flexibility in implementation and a pragmatic, context-driven methodology selection to optimize performance measurement in agile transformations.

III. MATERIAL AND METHOD

This study employs an integrated SSM-BSC methodology, combining two complementary approaches to address both the complexity of agile transformation and the need for measurable performance outcomes. SSM was selected for its established capacity to structure "wicked problems" characterized by multiple stakeholder perspectives, ambiguous objectives, and interconnected challenges [18] precisely the conditions observed in agile transformation initiatives. However, SSM alone has been criticized for difficulty in translating insights into concrete, measurable actions [20]. BSC addresses this limitation by providing a structured framework for translating strategic objectives into quantifiable indicators across multiple organizational perspectives [26]. The integration of these methodologies follows the multimethodology principles advocated by Mingers and Brocklesby [20], who argue that combining interpretive approaches (SSM) with functionalist tools (BSC) yields more robust outcomes than either approach alone. This combination has been successfully applied in prior organizational studies [25, 34], though not previously in the context of agile transformation in high-hazard industries.

This study employs a multi-method data collection approach aligned with the integrated SSM-BSC framework, utilizing semi-structured interviews, focus group discussions (FGDs), and document analysis to gather comprehensive insights across all framework stages. Participants were selected through purposive sampling based on three criteria: (1) direct involvement in agile transformation initiatives for a minimum of two years, (2) decision-making authority over performance measurement systems, and (3) representation across both strategic and operational organizational levels [37]. Nine semi-structured interviews were conducted with five Vice Presidents (representing regional president, production, subsurface, wells, and global transformation implementation) and four transformation leaders (including the Agile & Lean Coach Lead and Transformation Lead). This executive-level sample was deliberately chosen to capture strategic perspectives on performance measurement alignment with organizational objectives. To complement these strategic insights with operational perspectives, two focus group discussions (FGDs) were conducted with thirteen participants, including squad leaders and discipline leaders who directly implement agile practices. This dual-level sampling strategy ensures that the developed framework reflects both top-down strategic requirements and bottom-up operational realities [38, 39].

Document analysis of policy documents, transformation roadmaps, performance dashboards, and industry reports established baseline understanding and validated insights gathered through interviews and FGDs [40]. The sequential data collection process was designed to build understanding progressively while enabling iterative refinement. Initial document review of policy documents, transformation roadmaps, and performance dashboards established baseline understanding of formal organizational structures and stated transformation objectives. Leadership interviews followed, capturing strategic perspectives and surfacing discrepancies between documented policies and perceived realities. Operational FGDs were conducted after interviews to explore themes identified by leadership at the implementation level, enabling triangulation of strategic and operational viewpoints. This sequencing follows Yin's [41] recommendation for case study research, where document analysis provides context for interviews, and subsequent data collection tests and refines emerging interpretations. Supplementary document analysis occurred throughout to validate and contextualize interview and FGD findings.

Collected data was analysed using thematic analysis with coding frameworks aligned to the SSM-BSC integration model, identifying patterns in how stakeholders conceptualized performance in agile environments while mapping challenges to systemic structures and evaluating alignment between current measures and agile principles. This methodological triangulation enhances the study's rigor, ensuring robust conclusions that address both systemic complexity and strategic alignment in performance measurement design (Table 1).

Table 1. Research design.

Stage and Steps	Tools/Techniques	Outputs
Stage 1: Situation Analysis (SSM)		
Step 1.1: Express the problematic situation	Rich Pictures, Interviews, FGDs	Visual representation of system complexity
Step 1.2: Identify stakeholders and their concerns	Stakeholder Analysis, CATWOE	Stakeholder map with interests and influences
Step 1.3: Analyse structural and process conflicts	Conflict Document Review	Systemic barriers and enablers

Stage and Steps	Tools/Techniques	Outputs
Step 1.4: Develop holistic understanding of agile implementation	Systems Map, Causal Loop Diagrams	Interconnected view of transformation challenges
Stage 2: Conceptual Modelling (SSM)		
Step 2.1: Formulate root definitions of relevant systems	CATWOE Analysis	Precise definitions of transformation purpose
Step 2.2: Develop conceptual models of desired systems	Conceptual Modelling	Activity models for ideal performance system
Step 2.3: Compare models with current reality	Gap Analysis	Areas requiring intervention
Step 2.4: Identify systemically desirable changes	Feasibility Assessment	Prioritized improvement opportunities
Stage 3: Strategic Alignment (BSC)		
Step 3.1: Clarify organizational vision and strategy	Vision Workshop, Strategy Review	Clearly articulated strategic objectives
Step 3.2: Develop strategic themes for transformation	Strategy Mapping	Key strategic themes for agile adoption
Step 3.3: Define strategic objectives across perspectives	Strategy Workshop	Balanced set of objectives across BSC perspectives
Step 3.4: Create strategy map with cause-effect linkages	Strategy Mapping Workshop	Visual representation of strategic interdependencies
Stage 4: Performance Indicator Development (BSC)		
Step 4.1: Define key performance indicators for each objective	KPI Development Workshop	Set of balanced indicators across perspectives
Step 4.2: Establish targets and thresholds	Benchmarking, Historical Analysis	Performance targets with thresholds
Step 4.3: Align measures with agile principles	Agile Values Assessment	Indicators supporting agile behaviours

1. SAMPLE SIZE CONSIDERATIONS AND LIMITATIONS

The sample size of nine interviews and two FGDs with thirteen participants reflects the purposive sampling strategy appropriate for qualitative research aimed at theoretical development rather than statistical generalization [37]. Guest et al. argue that data saturation in qualitative studies typically occurs between six and twelve interviews when participants share similar expertise and organizational context. In this study, thematic saturation was observed after the seventh interview, with subsequent interviews confirming rather than introducing new themes. However, this sample represents a single multinational company, which limits the generalizability of findings to other organizational contexts. The framework's applicability to smaller companies, national oil companies, or organizations at different stages of agile maturity requires further validation, as discussed in the limitations section.

2. THEMATIC ANALYSIS PROCEDURES

Collected data was analysed using thematic analysis following Braun and Clarke's six-phase approach. Initial coding was conducted by the first author, generating 127 initial codes from interview transcripts and FGD recordings. These codes were reviewed and refined through discussion with the research team, resulting in 43 consolidated codes organized into 12 preliminary themes. Final themes were mapped to the SSM-BSC integration model, identifying patterns in stakeholder conceptualization of performance, systemic barriers, and alignment between current measures and agile principles.

3. ETHICAL CONSIDERATIONS

This research received ethical approval from Institut Teknologi Bandung's institutional review board (05/DIS/DSM/VI/2022). All participants provided written informed consent prior to participation, with clear explanation of the study's purpose, voluntary nature of participation, and right to withdraw at any time without consequence. Given the organizational context, additional measures were implemented to protect participant confidentiality. The company is anonymized as "Company XYZ" throughout this manuscript, and individual participants are identified only by role (e.g., "Vice President Subsurface," "Agile & Lean Coach Lead") rather than

name. Interview recordings and transcripts are stored on encrypted, password-protected devices accessible only to the research team. Participants were offered the opportunity to review and approve direct quotations attributed to their roles before publication. These measures ensure that candid discussion of organizational challenges does not create professional risk for participants.

To further protect organizational confidentiality, specific operational details that could identify the company such as exact production volumes, specific geographic locations of operations, and proprietary process names have been generalized or omitted. Financial targets and performance thresholds presented in the framework represent industry-appropriate benchmarks rather than the company's actual confidential targets.

IV. RESULT

1. STAGE 1: SITUATION ANALYSIS

Applying Soft Systems Methodology (SSM) through interviews, FGDs, and document analysis revealed multiple systemic challenges hindering agile transformation within the organization [18, 41]. Stakeholder analysis identified three primary barriers, ranked by frequency of mention across all data sources:

First, organizational fragmentation emerged as the most prevalent barrier, cited in all nine interviews (100%) and both FGDs. This manifests as rigid structures in logistics, procurement, finance, and corporate communications that limit cross-functional collaboration. As one Vice President noted, "Each function optimizes for its own KPIs without considering the end-to-end value stream." Second, inconsistent strategic alignment was identified in seven interviews (78%) and both FGDs. The absence of an enterprise-wide agile strategy creates competing priorities, with senior leadership focused on maintaining operational integrity while middle management struggles to balance traditional metrics with agile outcomes. Third, cultural resistance appeared in six interviews (67%) and both FGDs, characterized by hierarchical rigidity and an overemphasis on implementing agile tools rather than fostering fundamental cultural transformation. This creates what one transformation leader described as "agile theater" the appearance of agility without substantive behavioural change. This structural rigidity has limited cross-functional collaboration, resulting in siloed operations that reinforce inefficiencies. Stakeholders across organizational levels expressed varying concerns, with senior leadership focused on maintaining operational integrity while increasing adaptability, middle management struggling to balance traditional metrics with agile outcomes, and operational teams reporting frustration with competing priorities. Ineffective value prioritization, where excessive planning and the inability to cancel low-value tasks, has created unsustainable workloads [10, 42], while inconsistent servant leadership prevents teams from developing true agility as hierarchical rigidity slows adaptation [43].

Rich pictures (Figure 2) were developed to visualize the complex interdependencies between stakeholder perspectives, systemic barriers, and organizational processes affecting the transformation. These visual representations illustrated how fragmentation impacts decision-making, resource allocation, and leadership effectiveness, providing a structured view of how traditional hierarchical structures conflict with agile principles of self-organization. The analysis also revealed an overemphasis on implementing agile tools and frameworks rather than fostering fundamental cultural transformation, creating a false sense of progress while leaving deeper organizational patterns unchanged [44]. Figure 2 presents a comprehensive rich picture capturing these primary systemic barriers, highlighting areas where interventions are needed to enable effective agile adoption. This visual approach enabled a holistic analysis of the problem situation, revealing both visible symptoms and underlying systemic structures that formed the foundation for developing root definitions and conceptual models in subsequent stages of the integrated SSM-BSC framework.

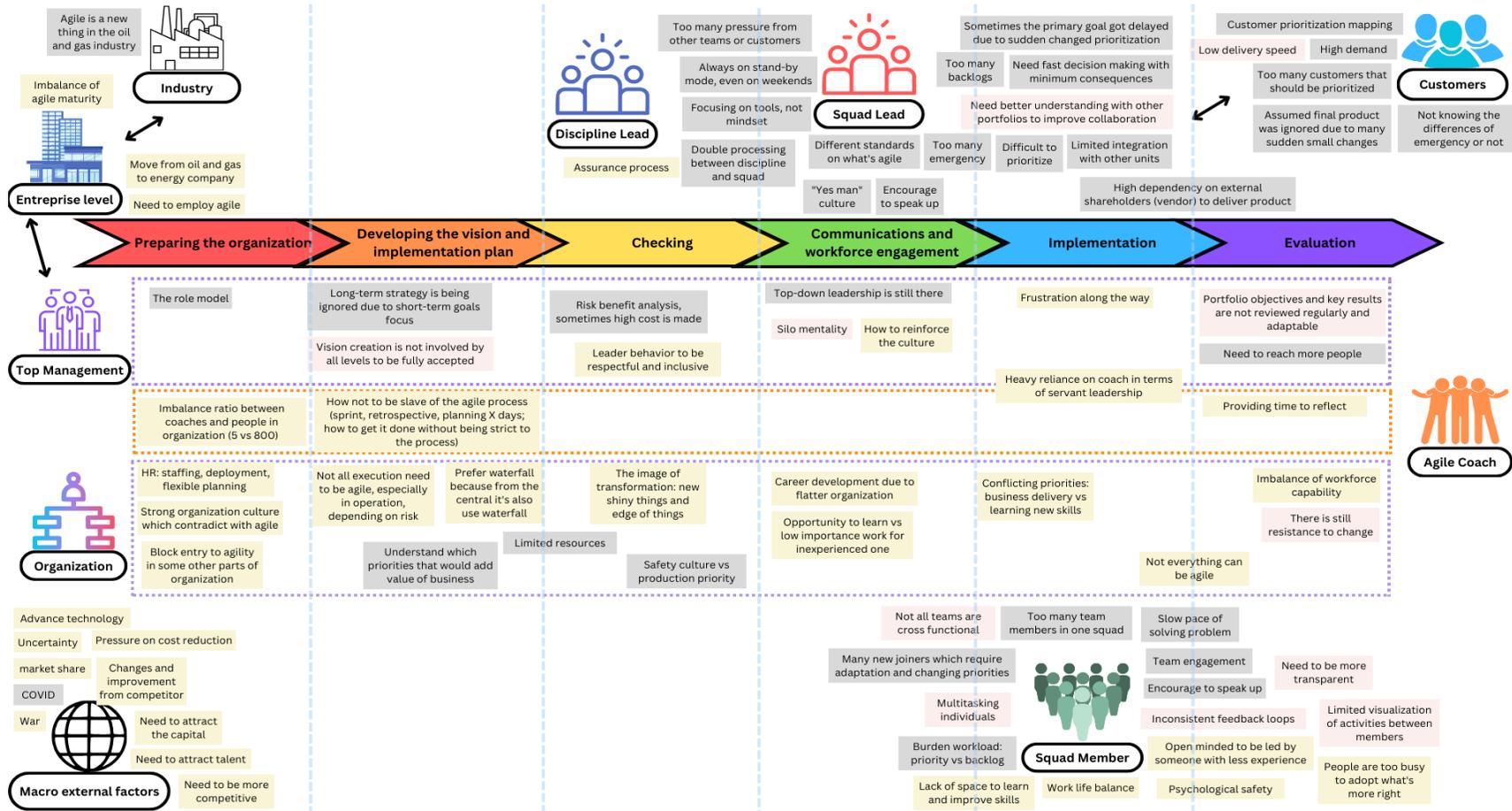


FIGURE 2. Rich picture.

The challenges in agile transformation are interconnected, with fragmentation and strategic misalignment acting as a root cause that reinforces silos and weakens cross-functional collaboration (Figure 3). According to Checkland [18], effective organizational transformation requires systemic alignment across all business units, yet existing rigid structures and regulatory constraints hinder this integration. This misalignment leads to ineffective value prioritization, where decision-making is often based on hierarchical ranking rather than business value [10]. Consequently, teams experience resource misallocation and excessive planning, creating unsustainable workloads and delays in delivering high-priority initiatives. Leadership plays a crucial role in breaking these barriers, but inconsistent servant leadership further exacerbates the issue by reinforcing traditional hierarchical control rather than empowering teams [43].

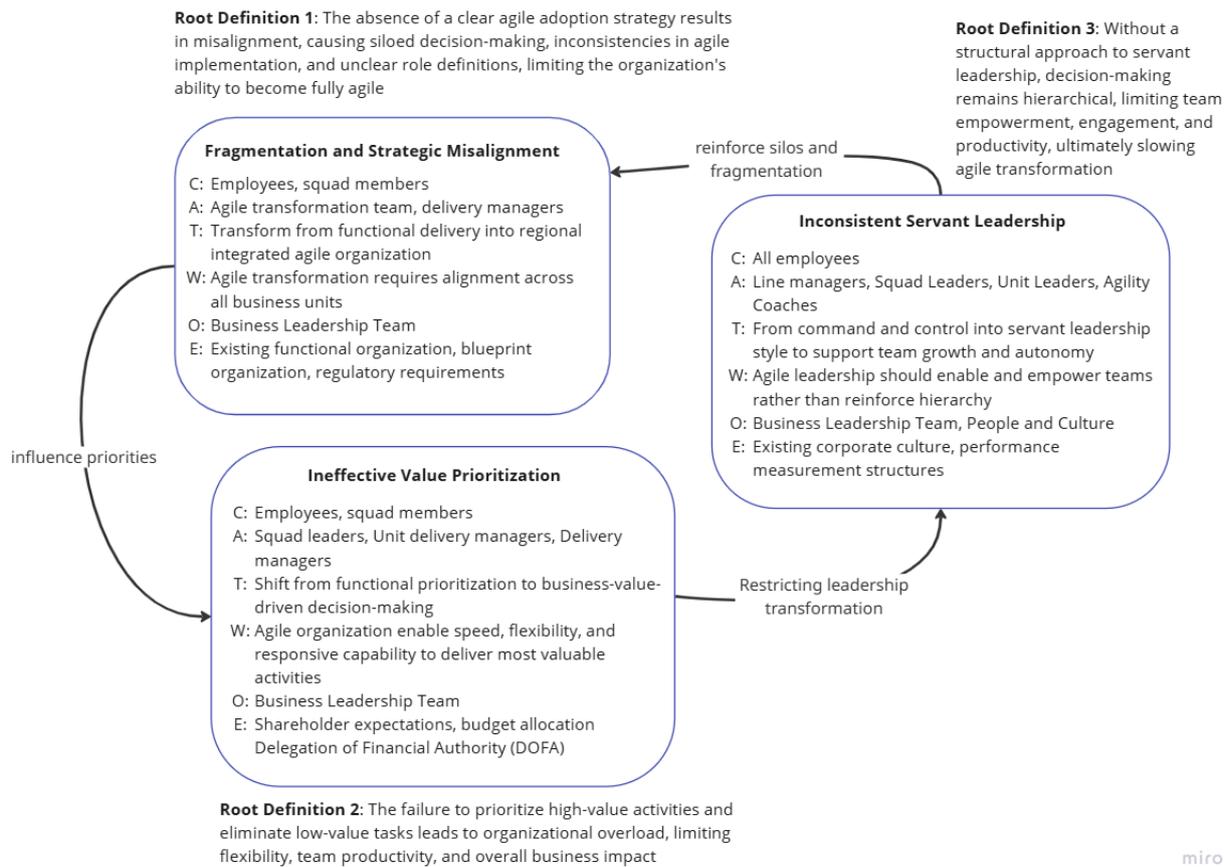


FIGURE 3. CATWOE analysis.

Without a unified strategic direction and leadership adaptation, agile transformation remains fragmented, making prioritization efforts ineffective and restricting leadership evolution (Figure 3). The absence of a structured leadership framework that fosters team autonomy causes delays in decision-making, reducing responsiveness and agility [43].

The systemic barriers identified in Stage 1 organizational fragmentation, strategic misalignment, and cultural resistance form the foundation for conceptual model development in Stage 2. Following SSM principles [18], root definitions were formulated to articulate purposeful activity systems that could address each identified barrier. For organizational fragmentation, the root definition specifies a system for establishing cross-functional coordination mechanisms. For strategic misalignment, the root definition articulates a system for cascading agile principles into enterprise-wide performance objectives. For cultural resistance, the root definition describes a system for developing servant leadership capabilities and growth mindsets. These root definitions guided the

development of the conceptual model's four interconnected subsystems, ensuring that the model directly addresses empirically identified challenges rather than representing abstract theoretical constructs.

2. STAGE 2: CONCEPTUAL MODELING

The conceptual model in Figure 4 illustrates four interdependent subsystems driving agile transformation, with interactions justified by both SSM analysis and supporting literature. Strategic Alignment & Leadership (Subsystem 1) serves as the foundation, addressing the organizational fragmentation barrier by establishing unified direction and accountability structures. This subsystem influences Resource Prioritization and Value Delivery (Subsystem 2), which addresses the ineffective prioritization identified in Stage 1 by creating mechanisms for value-based decision-making. The relationship between these subsystems reflects Dikert et al.'s [10] finding that strategic clarity is a prerequisite for effective prioritization in large-scale agile transformations.

Cultural Transformation and Capability Building (Subsystem 3) address the cultural resistance barrier through servant leadership development and continuous learning infrastructure. This subsystem both enables and is enabled by Subsystems 1 and 2 leadership commitment (Subsystem 1) creates conditions for cultural change, while value delivery success (Subsystem 2) reinforces new behaviours [43]. Governance & Performance Measurement (Subsystem 4) provides feedback loops connecting all subsystems, ensuring that transformation progress is monitored and adjusted iteratively. This governance function operationalizes Meadows' [53] principle that effective system intervention requires feedback mechanisms to detect and correct deviations from intended trajectories.

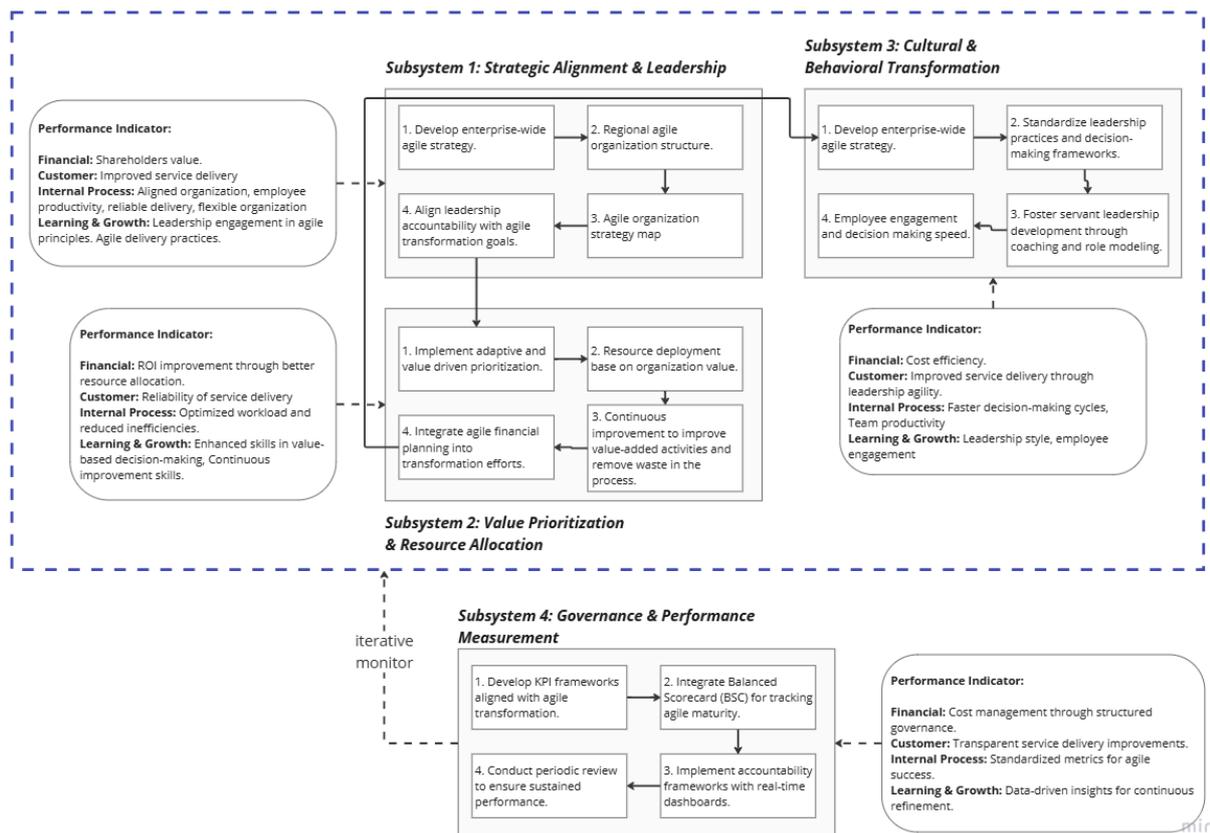


FIGURE 4. Conceptual model.

While SSM has been applied to performance measurement system design in prior studies [24, 25], this conceptual model extends existing approaches in three ways. First, it explicitly integrates safety-critical considerations into the transformation framework a dimension absent in prior SSM applications to organizational change, which have predominantly focused on healthcare [21] or information systems [18] contexts. Second, the model incorporates agile-specific constructs (sprint-based delivery, servant leadership,

continuous improvement ceremonies) that were not addressed in earlier SSM-BSC integrations [34, 35]. Third, the feedback loops between subsystems are operationalized through specific performance indicators (detailed in Stage 4), providing measurable connections between systemic elements that prior conceptual models described only qualitatively. This operationalization addresses Checkland's [18] acknowledgment that SSM's limitation lies in translating conceptual understanding into concrete action a gap this research bridges through BSC integration.

3. STAGE 3: STRATEGIC ALIGNMENT (BSC)

The integration of Soft Systems Methodology (SSM) and Balanced Scorecard (BSC) provides a structured approach to ensuring that agile transformation aligns with strategic objectives and performance measurement. Unlike traditional frameworks that focus solely on financial outcomes, BSC offers a multi-perspective evaluation that incorporates learning and growth, internal processes, customer responsiveness, and financial performance [26]. This enables organizations to establish a cause-and-effect relationship between capability development, process improvements, customer satisfaction, and financial sustainability. Ensuring that agility-driven changes translate into measurable business impact allows organizations to maintain adaptability while achieving long-term strategic goals [45].

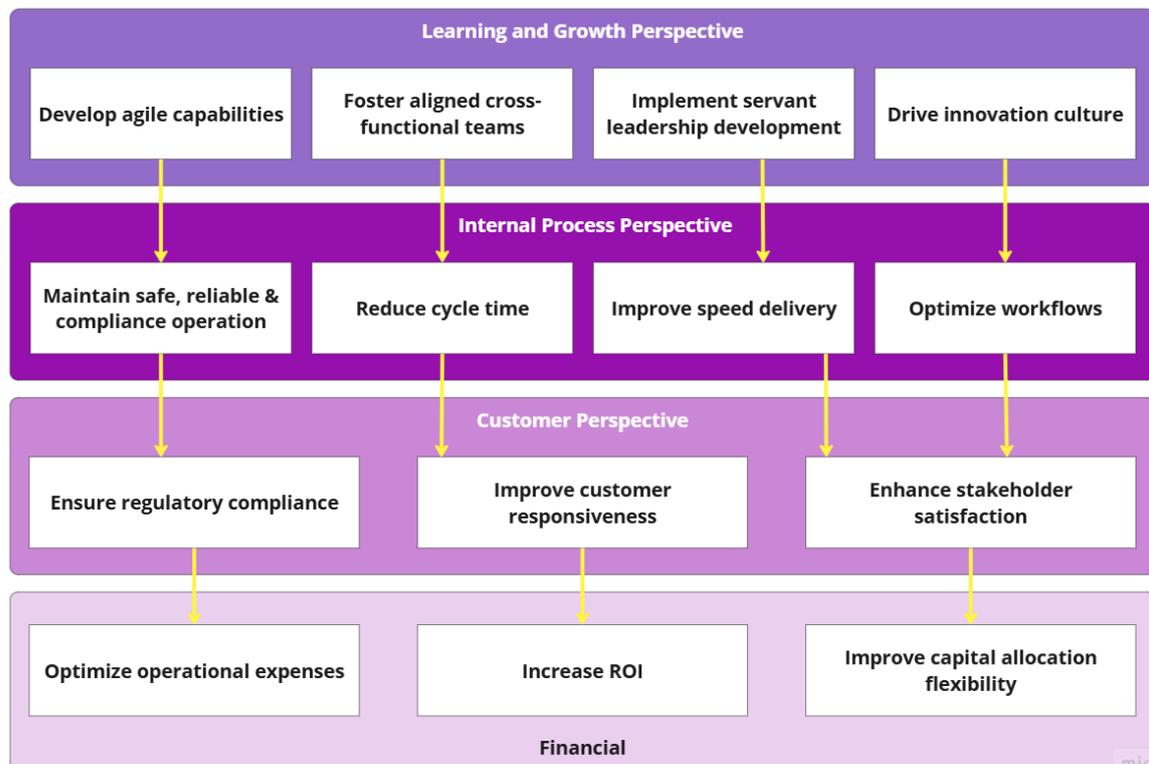


FIGURE 5. Strategic alignment.

As illustrated in Figure 5, the Learning and Growth Perspective serve as the foundation by fostering agile capabilities, cross-functional collaboration, and innovation-driven leadership [46]. These foundational capabilities influence the Internal Process Perspective, where workflow optimization, cycle time reduction, and safety compliance are key to operational efficiency [47]. Process improvements then strengthen the Customer Perspective, ensuring market responsiveness, regulatory compliance, and stakeholder satisfaction [48]. Ultimately, these enhancements drive financial outcomes under the Financial Perspective, optimizing operational expenses, increasing return on investment, and improving capital allocation flexibility [49]. Establishing these cause-and-effect linkages enables organizations to track transformation progress, refine strategic priorities, and sustain agility in a structured and data-driven manner [27].

The selection of these four perspectives within BSC is justified by their relevance in balancing agility, operational stability, and strategic growth. The Learning and Growth Perspective is prioritized as agility requires

a strong foundation in leadership adaptability, cross-functional collaboration, and a culture of continuous learning [50]. Without these elements, transformation efforts risk stagnation due to rigid mindsets and resistance to change. The Internal Process Perspective ensures that agile principles translate into tangible operational improvements, balancing speed with compliance and efficiency [51]. The Customer Perspective is crucial in measuring how agility enhances market responsiveness, customer engagement, and regulatory alignment, ensuring that operational changes drive external value [52]. Finally, the Financial Perspective validates the sustainability of agile transformation by assessing cost efficiency, ROI, and capital flexibility, ensuring that agility contributes to long-term business viability [27].

4. *STAGE 4: PERFORMANCE INDICATOR DEVELOPMENT (BSC)*

To translate strategic alignment into measurable transformation outcomes, organizations require a performance measurement system that reflects both agile principles and BSC's multi-dimensional framework. This study focuses on identifying performance indicators that align agile transformation goals with financial stability, customer engagement, internal process efficiency, and workforce development [26]. Unlike static performance models, agile environments necessitate dynamic and iterative performance measurement to ensure that transformation remains adaptive and responsive to organizational needs [53].

The Financial Perspective measures the economic impact of agility on cost optimization, return on investment, and financial sustainability. The Customer Perspective evaluates improvements in regulatory compliance, responsiveness, and stakeholder satisfaction. The Internal Process Perspective ensures that agility enhances operational efficiency, cycle time, and safety standards, while the Learning and Growth Perspective tracks workforce agility, leadership development, and innovation culture [26]. By aligning these perspectives with agile principles, organizations can continuously monitor and refine transformation initiatives, ensuring that agility becomes an embedded and sustainable capability rather than a temporary intervention [45].

5. *FINANCIAL PERSPECTIVE*

The financial perspective evaluates the organization's ability to maintain profitability, optimize cost efficiency, and generate financial returns in an agile environment. Agile transformation is expected to enhance financial performance by improving operational efficiency, fostering innovation, and enabling adaptive cost structures [45]. As shown in Table 2, key financial indicators include Return on Investment (ROI) to assess the profitability of agile initiatives, EBITDA margin to measure operational efficiency, and the cost-to-revenue ratio to evaluate cost optimization in revenue generation. Additionally, Operating Cash Flow reflects the company's ability to sustain liquidity, while the Debt-to-Equity Ratio ensures financial stability and risk management [49]. These indicators provide a structured financial assessment, ensuring that agility-driven improvements contribute to long-term financial sustainability while maintaining investor confidence.

Table 2. Performance indicators in financial perspective.

Indicators	Description	Objectives	Unit	Performance Measure	Reference
Revenue from Innovation	Share of revenue generated from new products or services.	To enhance financial performance through innovation.	Mio USD	Generate revenue and or cost optimization annually from innovation efforts.	[26]
Debt-to-Equity Ratio	Indicates the company's financial leverage and risk management.	To ensure financial stability and investor confidence.	%	Maintain cost-to-revenue ratio \leq 60%.	[49]
Return on Investment (ROI)	Measures the profitability and efficiency of investment returns.	To meet shareholder expectations and enhance financial performance.	%	Achieve ROI \geq 15% annually	[45]

Indicators	Description	Objectives	Unit	Performance Measure	Reference
Operating Cash Flow	Tracks the liquidity generated by core business activities.	To ensure strong operational financial health.	Mio USD	Generate annual operating cash flow	[54]
EBITDA	Measures operational efficiency before taxes and depreciation.	Enhance profitability and align performance with shareholder expectations.	Mio USD	Achieve EBITDA growth annually	[55]
Cost-to-Revenue Ratio	Assesses the efficiency of cost management in generating revenue.	Optimize operational cost efficiency to support profitability and financial sustainability.	%	Maintain cost-to-revenue ratio \leq 60%.	[56]

Rather than relying solely on traditional financial metrics, this perspective incorporates established financial theories to ensure agile transformation aligns with organizational growth. Revenue from innovation highlights how agility supports market differentiation and business expansion [26]. Meanwhile, maintaining a healthy debt structure strengthens financial stability, reassuring stakeholders about long-term viability [55]. Cost efficiency, measured through the cost-to-revenue ratio, ensures that agile adoption optimizes resource allocation without eroding profitability [56]. By integrating these financial performance indicators, organizations can balance agility with financial resilience, ensuring adaptability in dynamic market conditions while sustaining competitive advantage and shareholder value.

6. CUSTOMER PERSPECTIVE

The customer perspective in the Balanced Scorecard (BSC) framework evaluates how effectively the organization meets customer expectations in terms of service quality, responsiveness, and reliability. In an agile transformation, customer-centric metrics are crucial to ensure that process improvements translate into higher customer satisfaction and loyalty [26]. A key metric, Net Promoter Score (NPS), measures customer advocacy and long-term engagement, which are vital in businesses undergoing continuous iteration cycles [52]. Unlike conventional satisfaction surveys, NPS captures the depth of customer trust and willingness to recommend services, offering a broader indicator of sustained competitive advantage. Additionally, on-time delivery rates and customer response times serve as operational benchmarks to gauge service reliability, ensuring that agile methodologies enhance real-world customer benefits [13].

Table 3. Performance indicators in customer perspective.

Indicators	Description	Objectives	Unit	Performance Measure	Reference
Customer Satisfaction Index	Measures the level of customer satisfaction through surveys and feedback.	To align organizational goals with customer needs.	%	Achieve a satisfaction score \geq 90%	[48]
Net Promoter Score (NPS)	Tracks the likelihood of customers recommending the company.	To measure customer loyalty and satisfaction.	%	Improve NPS score \geq 50%	[52]
On-Time Delivery Rate	Percentage of deliveries made on or before the promised date.	To improve customer trust and operational reliability.	%	Achieve a 98% on-time delivery rate	[57]

Indicators	Description	Objectives	Unit	Performance Measure	Reference
LNG Product quality	Meeting quality expectations as per contract.	To meet customer expectations and promise delivery from the company	%	Achieve 100% as per contract	
Customer Response Time	Measures the speed of responses to customer inquiries or issues.	To improve customer experience and responsiveness.	Hours	Resolve 90% of customer issues within 48 hours	[13]
Employee Engagement	Measurement of employee satisfaction and alignment with goals.	To foster a customer-centric workforce aligned with company objectives.	%	Achieve $\geq 85\%$ employee engagement in customer-facing roles	[58]

The NPS target of $\geq 50\%$ reflects industry benchmarking specific to B2B energy sector relationships rather than consumer-facing benchmarks. In B2B contexts characterized by long-term contractual relationships and high switching costs typical of LNG supply agreements NPS scores tend to be higher than consumer markets [52]. Company benchmarking the LNG industry shows a 40% NPS score, making 50% an intermediate target to improve measures of customer advocacy and long-term engagement. The 98% on-time delivery rate target aligns with industry standards for LNG cargo delivery, where contractual penalties for late delivery create strong incentives for reliability. These targets were validated through benchmarking against industry reports [57] and refined through stakeholder feedback during framework validation workshops.

Rather than focusing solely on external customer metrics, employee engagement is also integrated into the customer perspective, as a highly engaged workforce fosters a customer-centric culture [58]. Research suggests that organizations with strong workforce engagement exhibit faster response times, higher service reliability, and stronger brand loyalty [48]. Table 3 outlines the key performance indicators used to measure customer satisfaction and operational agility, demonstrating that improved service delivery directly correlates with agile-driven enhancements in leadership and workforce engagement [57]. By aligning agile management strategies with customer-focused goals, organizations can sustain long-term business success, foster brand trust, and maintain adaptability in an evolving market.

7. INTERNAL PROCESS

The internal process perspective in the Balanced Scorecard (BSC) framework is critical for evaluating how well an organization enhances operational efficiency, safety, and regulatory compliance while undergoing agile transformation. Ensuring streamlined workflows and structured risk management is essential to maintaining high-quality service delivery [26]. Key performance indicators such as Process Cycle Efficiency and Process Improvement Rate assess how effectively agile-driven changes eliminate inefficiencies and optimize throughput [47, 51]. Additionally, Defect Rate and Risk Mitigation Effectiveness safeguard against unintended quality issues, ensuring that agility is implemented without compromising reliability [59]. By integrating these metrics, organizations reinforce continuous improvement, making agility a driver of sustainable operational excellence rather than a disruptive force.

Table 4. Performance Indicators in Internal Process Perspective.

Indicators	Description	Unit	Performance Measure	Reference
Process Cycle Efficiency	Ratio of value-added time to total process cycle time	%	$\geq 85\%$	[47]
Process Improvement Rate	Percentage of successfully implemented process improvements	%	$\geq 95\%$ annually	[51]

Risk Mitigation Effectiveness	Composite index of safety performance across asset integrity, process safety, and management systems (see Table 5 for detailed variables)	Index	Meet threshold for all Tier 1 variables	[26, 15]
Resource Allocation Efficiency	Alignment of resources with strategic priorities	%	≥ 90%	[60]
Operational Agility Index	Ability to adapt internal processes to changing conditions	Index	≥ 80%	[61]
Employee Productivity	Team performance and efficiency improvement	%	≥ 15% improvement annually	[62]
Emergent Work Completion	Capacity to handle unplanned work within sprint cycles	%	≥ 80% completion	[63]
CI Completion	Completion rate of continuous improvement initiatives	%	≥ 80%	[64]

The Internal Process Perspective integrates safety indicators directly into operational metrics rather than treating safety as a separate dimension [15]. Table 4 presents the Risk Mitigation Effectiveness indicator, which encompasses 21 specific safety variables organized into three categories: asset integrity metrics (active leaks, corrosion metrics, piping remaining life), process safety metrics (SOL/SDL excursions, LOPC events, barrier status), and management system metrics (overdue MOCs, HAZOP actions, emergency response actions).

Beyond safety metrics, agility-focused indicators assess how effectively teams respond to operational demands. The Operational Agility Index measures responsiveness to changing conditions, while Emergent Work Completion tracks capacity to handle unplanned tasks without disrupting workflows [61, 63]. Employee productivity and continuous improvement completion rates further reflect the integration of agile practices into daily operations [62, 64]. As detailed in Table 4, target thresholds include ≥ 90% resource alignment with high-priority goals and ≥ 80% completion rate for continuous improvement initiatives.

The integration of safety and agility indicators within a single perspective establishes direct linkages across the BSC framework. Improved safety performance reduces incident-related costs (Financial Perspective), enhances regulatory compliance (Customer Perspective), and reflects workforce competence development (Learning and Growth Perspective) [45].

8. LEARNING AND GROWTH

The learning and growth perspective of the Balanced Scorecard (BSC) emphasizes the development of a workforce that can sustain agile transformation through leadership adaptability, continuous learning, and employee engagement. As organizations navigate complex environments, leadership agility becomes a critical factor in ensuring smooth transitions, fostering innovation, and promoting an adaptive corporate culture [46]. The Leadership Agility Index assesses how well leaders navigate uncertainty and drive transformation, ensuring strategic alignment across business units. Additionally, metrics such as Employee Training Hours and the Innovation Capability Index evaluate the organization's commitment to ongoing skill development and innovation-driven mindsets [65, 66]. By incorporating these indicators into performance evaluation, organizations embed agility into leadership structures and workforce development, reinforcing a culture of resilience and adaptability.

Table 5. Performance Indicators in Learning and Growth Perspective.

Indicators	Description	Objectives	Unit	Performance Measure	Reference
Leadership Agility Index	Measures the capability of leaders to adapt to change and foster transformation.	To strengthen leadership roles in agile transformation.	Index	Improve leadership agility index to ≥ 75%	[46]
Employee Training Hours	Tracks the average number of training hours per employee.	To ensure continuous learning	Hours	Ensure each employee completes ≥ 40	[65]

Indicators	Description	Objectives	Unit	Performance Measure	Reference
Innovation Capability Index	Assesses the organization's ability to foster and implement innovative ideas.	To build a culture of innovation and adaptability.	Index	Improve innovation capability index to $\geq 70\%$	[66]
Employee Engagement Score	Measures employee motivation and involvement in achieving organizational goals.	To improve workforce alignment and productivity.	%	Achieve engagement score $\geq 85\%$	[58]
Internal Promotion Rate	Percentage of leadership roles filled by internal candidates.	To foster employee development and career growth opportunities.	%	Fill $\geq 50\%$ of leadership roles with internal candidates annually	[67]
Agile Maturity Level	Measures the degree to which agile practices, culture, and structures are embedded across the organization.	To evaluate and advance the organization's adoption of agile principles, processes, and values systematically.			[68]

Beyond leadership capabilities, employee engagement and internal career growth serve as key enablers of long-term agile success. Engagement levels, measured by the Employee Engagement Score, reflect how motivated and aligned employees are in achieving organizational goals [58]. Meanwhile, Internal Promotion Rates indicate the organization's effectiveness in developing talent internally and fostering career progression [67]. A higher Agile Maturity Level, assessed through metrics such as cycle time improvement and retrospective completion, ensures that agility is not merely a framework but a deeply ingrained cultural transformation [68]. As outlined in Table 5, organizations that prioritize leadership agility, continuous learning, and internal mobility are better positioned to sustain agility beyond structural shifts, embedding it as a core organizational capability.

9. INTEGRATION WITH AGILE PRINCIPLES

Effective performance measurement is crucial for ensuring that agile transformation drives sustained improvements in organizational efficiency, competitiveness, and adaptability. The Balanced Scorecard (BSC) offers a structured framework that extends beyond traditional financial metrics by incorporating customer satisfaction, internal process efficiency, and workforce development [26]. However, in agile environments, organizations must shift from static performance indicators to dynamic, real-time measurement frameworks that reflect rapid market changes and operational shifts [53]. By integrating financial stability, customer engagement, operational agility, and learning capacity, companies can ensure that their transformation efforts translate into tangible, long-term benefits [45]. This adaptive approach enables organizations to respond swiftly to external pressures while fostering continuous improvement.

The interdependencies among financial, customer, internal process, and learning perspectives underscore the systemic nature of agile performance measurement. Financial growth is not solely dependent on revenue generation but is also influenced by customer satisfaction and operational efficiency [69]. A strong focus on responsiveness, measured through Net Promoter Scores (NPS) and on-time delivery rates, strengthens market positioning, while streamlined internal processes reduce inefficiencies and ensure regulatory compliance [47]. Additionally, leadership agility and workforce engagement play a pivotal role in driving continuous process improvements and fostering an innovation-driven culture [46]. By embedding Causal Loop Diagrams (CLD) into the BSC framework, organizations can ensure that performance indicators capture feedback loops, reinforcing

positive behaviours while mitigating bottlenecks in agile transformation efforts [53]. This strategic integration enhances decision-making processes, enabling organizations to sustain operational resilience and maintain competitive advantage in volatile industries such as oil and gas.

V. DISCUSSION

The integration of SSM and BSC provides a structured approach to agile transformation in high-hazard industries. Traditional measurement approaches often fail to balance operational stability, safety compliance, and agility, leading to fragmented transformation efforts [9]. The developed framework, illustrated in Figure 6, addresses these gaps by incorporating financial, customer, internal process, and learning & growth perspectives to ensure a holistic assessment. Unlike previous models that focus primarily on operational efficiency [27], this approach aligns agile capabilities with long-term business viability. By embedding governance mechanisms, real-time dashboards, and continuous feedback loops, organizations can dynamically adjust transformation strategies while maintaining regulatory and shareholder expectations. This adaptive measurement ensures that agility is not a one-time initiative but a sustained, iterative process.

A major challenge in high-hazard industries is balancing efficiency-driven performance metrics with agile adaptability. This research demonstrates that structured financial indicators, such as $ROI \geq 15\%$ and cost-to-revenue ratio $\leq 60\%$, validate business sustainability, while operational agility metrics ensure transformation does not compromise safety [16]. The integration of Agile Maturity Level and financial stability metrics addresses concerns that agility may lead to short-term inefficiencies or stakeholder resistance. Similarly, the customer and internal process perspectives extend beyond external satisfaction to include cross-functional collaboration and safety-critical performance [43]. By ensuring that agility enhances both responsiveness and operational integrity, the framework mitigates the risk of misalignment between strategic objectives and execution. This structured alignment, visualized in Figure 6, facilitates seamless coordination between leadership, operations, and transformation initiatives.

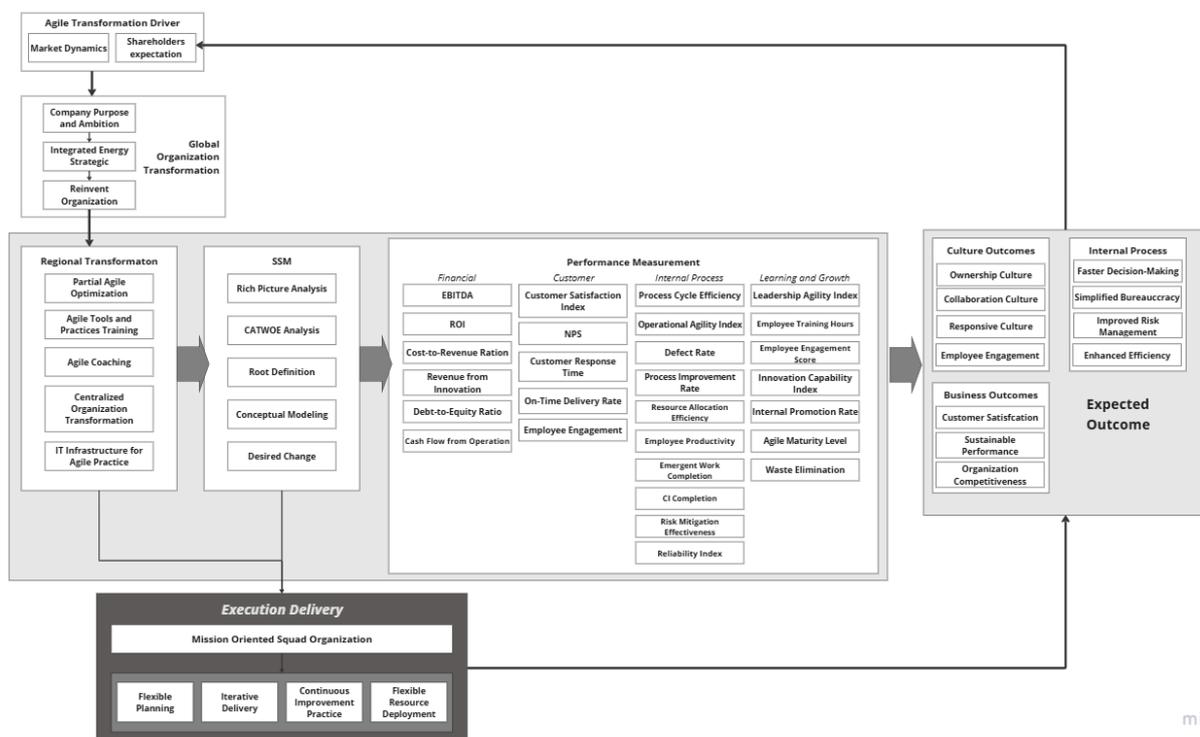


FIGURE 6. Integrated framework for agile transformation and performance measurement in high-hazard industries.

Compared to Six Sigma or ISO 9001, which emphasize compliance and defect reduction, the proposed framework enables continuous adaptation by embedding feedback loops into governance mechanisms [53]. This

allows for both compliance and agility to coexist, ensuring that performance indicators not only track progress but also drive improvement. The Leadership Agility Index ($\geq 75\%$) and Agile Maturity Level provide concrete benchmarks for cultural and behavioural transformation, addressing leadership challenges that often hinder agile adoption [42]. Additionally, safety metrics such as Risk Mitigation Effectiveness and Reliability Index ensure that transformation efforts do not compromise operational resilience. These indicators collectively reinforce that agility must be a structured, measurable, and strategically aligned initiative.

The practical implications extend beyond performance measurement to the implementation of sustainable transformation strategies. While previous research explored agility assessment in petroleum industries [70, 71], little guidance was provided on how to create measurement systems that reinforce transformation behaviors. By integrating governance structures with adaptive tracking, the developed framework ensures that organizations not only measure transformation effectiveness but also sustain it through continuous feedback mechanisms [47]. As illustrated in Figure 6, the interplay between strategic alignment, execution delivery, and performance measurement drives faster decision-making, enhanced efficiency, and long-term organizational competitiveness.

VI. CONCLUSION

The integration of Soft Systems Methodology (SSM) and Balanced Scorecard (BSC) provides a structured approach to measuring agile transformation in high-hazard industries. This research demonstrates that effective performance measurement must balance operational excellence, safety compliance, and agile adaptability by incorporating financial, customer, internal process, and learning & growth indicators. The developed framework ensures alignment between traditional and agile metrics, enabling organizations to sustain transformation without compromising stability or regulatory compliance. By embedding governance mechanisms, real-time dashboards, and continuous feedback loops, this approach supports dynamic adaptation while maintaining stakeholder confidence. The findings confirm that structured performance measurement systems not only track transformation progress but also drive sustainable behavioural changes that reinforce agility and resilience in complex operational environments.

VII. LIMITATION AND FUTURE RESEARCH

This research has several limitations that should be acknowledged. The framework was developed and validated within a single multinational oil and gas company, which may limit generalizability to smaller companies, national oil companies, or organizations at earlier stages of agile maturity. The sample size of nine interviews and thirteen FGD participants, while appropriate for qualitative research, does not support statistical generalization. Additionally, the twelve-month research period may not capture transformation outcomes that unfold over longer timeframes, and external factors such as oil price volatility and regulatory changes were not explicitly incorporated. The framework also focuses on organizational-level measurement without detailed guidance for team-level or individual-level metrics, and longitudinal assessment of its predictive validity remains for future research.

Future research should prioritize cross-industry validation in other high-hazard sectors including nuclear energy, pharmaceuticals, and aerospace, adapting indicators to sector-specific requirements while preserving the integrated SSM-BSC structure. Longitudinal studies tracking organizations over three to five years would clarify how measurement systems evolve and whether early indicator trends predict long-term success. Further investigation of AI-driven analytics could enhance predictive capabilities, while research on leadership agility and its translation into measurable outcomes would strengthen the framework's theoretical foundation. Adaptation for broader digital transformation contexts would also extend applicability beyond agile-specific initiatives.

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contributions

Sidik Darusulistyo: Conceptualization; Formal analysis; Investigation; Methodology; Validation; Writing – original draft. Dermawan Wibisono: Supervision; Validation; Methodology; Formal analysis. Harimukti Wandebori: Supervision; Validation; Investigation; Methodology. Santi Novani: Supervision; Validation; Formal analysis; Investigation. All authors made an equal contribution to the development and planning of the study.

Conflicts of Interest

The authors declare that they have no competing financial or non-financial interests that could have influenced the work presented in this study.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgment

Not applicable.

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APPENDIX

Perspective & Objective	Dimensions	Interview Transcript	Literature Reference
Financial: To achieve sustainable financial performance that fulfills shareholders' expectation	Ebitda – Earning Before Tax	"EBITDA is our primary measure of operational success" - Vice President Subsurface	[72-74]
	Depreciation and Appreciation	"We track EBITDA as our primary financial metric" - Engineering Discipline Manager	
	Return on Investment (ROI)	"Cost per barrel remains key indicator" - VP Production	
	Cost-to-Revenue Ratio	"Revenue growth from new products is promising" – Agility Coach	
	Revenue from Innovation	"Managing leverage helps stabilize financial health" – Regional President	
Customer: To deliver reliable LNG cargoes as expected, on time, and within quality specifications.	Debt-to-Equity Ratio	"Cash flow improvement shows transformation success" - Regional President	[75-78]
	Cash Flow from Operations	"Customer satisfaction drives our metrics" - Shipping Manager	
	Customer Satisfaction Index	"NPS helps us measure customer loyalty" - Agility Coach	
	Net Promoter Score (NPS)	"Meeting delivery schedules is critical" - Shipping Manager	
	Customer Response Time	"Timely delivery ensures customer satisfaction" - Transformation Leader	
Internal Process: To safely operate the plant, reliable, efficient, and compliant by reducing environmental impact.	On-Time Delivery Rate	"Delivering product within quality as per contract is essential"	[79, 80]
	LNG Production quality	"Engagement measures teamwork's impact on customers" - Area Production Manager	
	Employee Engagement	"Operational efficiency has improved significantly" - Operation Discipline Manager	
	Process Cycle Efficiency	"We adapt quickly to operational changes" - M&R Discipline manager	
	Operational Agility Index	"Continuous improvement drives our success" - Agility Coach	
	Defect Rate		
	Process Improvement Rate		

Perspective & Objective	Dimensions	Interview Transcript	Literature Reference
<p>Learning and Growth: To be an agile organization that is a flatter, leaner, faster, more flexible, and more responsive organization by providing fundamental agile development and management practice, embedding a growth mindset, and establishing continuous improvement infrastructure in the organization.</p>	Resource Allocation Efficiency	"Effective resource use aligns with goals" - Area Production Manager	
	Employee Productivity	"Productivity directly impacts operational outcomes" - Production Support Manager	
	Emergent Work Completion	"We adapt to unplanned demands seamlessly" - M&R Discipline Manager	
	CI Completion	"Initiatives are being completed successfully" - Transformation Leader	
	Risk Mitigation Effectiveness	"Our ability to manage and mitigate risks ensures stable operations" - Area Production Manager	
	Reliability Index	"We measure reliability to ensure reliable operational performance" - M&R Discipline Manager	
	Leadership Agility Index	"Leadership style transformation evident" - Transformation Leader	[16, 81, 17]
	Employee Training Hours	"Squad effectiveness shows maturity" - Production Support Manager	
	Employee Engagement Score	"Employee engagement scores rising" - VP Production	
	Innovation Capability Index	"Encouraging innovative ideas drives growth" - Agility Coach	
Internal Promotion Rate	"Promoting talent internally boosts morale" - VP Production		
Agile Maturity Level	"A mature agile management culture drives improvements in organizational agility and operational performance." - Transformation Lead		
Waste Elimination	"Efficiency is tied to reducing waste" - VP Wells		