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Transforming Product Engineering through QE Coaching Lens and AI Tooling:

A Framework for Assessing Complex Organizations Across Design, Development, and Delivery

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Abstract - **This paper examines how organizations can elevate product engineering performance by integrating Quality Engineering (QE) coaching with Artificial Intelligence (AI)–enabled tooling. It presents a structured methodology for assessing complex enterprises across design, development, and delivery functions. Drawing on established frameworks—including McKinsey's 7-S model, the ADKAR change framework, and QE maturity models—the paper proposes actionable strategies to strengthen organizational capability, improve quality outcomes, and support continuous improvement.**

INTRODUCTION

Modern enterprises operate within an increasingly complex product engineering landscape—characterized by distributed teams, multi-layered architectures, accelerated release cycles, and heightened customer expectations. Traditional Quality Assurance approaches, often reactive and siloed, struggle to keep pace, resulting in inefficiencies and delayed defect detection. In contrast, a combined approach that integrates QE coaching with AI-driven tooling enables proactive quality management, predictive analytics, and continuous feedback loops. This paper outlines assessment methods and practical strategies organizations can adopt to drive meaningful transformation and reinforce engineering excellence.

LITERATURE REVIEW

A range of organizational and quality-focused models guide for managing transformational change. Lewin's Change Model outlines the process of unfreezing, changing, and refreezing organizational behaviors. Kotter's 8-Step Model emphasizes urgency, vision building, and coalition alignment. The ADKAR framework focuses on the individual's change journey—Awareness, Desire, Knowledge, Ability, and Reinforcement—highlighting the importance of human adoption. McKinsey's 7-S framework evaluates alignment across strategy, structure, systems, skills, staff, style, and shared values, offering a holistic organizational lens. When combined with QE maturity assessments, these frameworks create a multidimensional understanding of readiness, capability, and cultural fit.

METHODOLOGY AND FRAMEWORKS

To evaluate complex engineering organizations, this paper recommends a multi-dimensional assessment approach that integrates:

1. **McKinsey 7-S Model** – to analyze structural, cultural, and operational alignment.
2. **ADKAR Framework** – to assess individual readiness and adoption barriers.
3. **QE Maturity Model** – to benchmark engineering, testing, and delivery practices.
4. **AI Readiness Assessment** – to evaluate infrastructure, data governance, and organizational preparedness for AI integration.

This combined framework ensures that both organizational and technical capabilities are fully examined before transformation initiatives are executed.

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Analysis

Many organizations exhibit uneven adoption of QE practices, often due to fragmented communication, unclear expectations, skill gaps, and limited leadership sponsorship. The introduction of AI tooling adds further complexity, raising considerations such as responsible data use, model transparency, ethical compliance, and workforce readiness. A phased approach—beginning with pilot squads, gradually introducing self-healing automation, and establishing a clear AI governance structure—can mitigate risk while accelerating transformation. Ultimately, for enterprises striving to meet modern customer expectations, continuous transformation becomes imperative. Sustainable success will rely on systems, teams, and technologies that are efficient, accurate, adaptive, and fast.

Purpose and Vision

Transforming product engineering excellence begins with acknowledging the persistent challenges in delivering high-quality software at scale. This awareness sets the foundation for meaningful change. The next step is a comprehensive assessment designed to elevate product quality, embed quality ownership directly within engineering, and establish a scalable QE Coaching model that supports all cross-engineering teams.

The organization's vision is to **empower engineering to lead quality**, strengthen squad-level maturity in story creation, testing practices, and delivery readiness, and build a sustainable coaching framework that reinforces quality behaviors across domains. This long-term model ensures teams not only adopt but also continuously evolve the practices that drive consistent, reliable, and high-impact product delivery.

Approach

The coaching initiative should be grounded in a disciplined and structured methodology designed to uplift quality practices across engineering teams.

Discovery and Assessment

The process kicks off with an in-depth examination of current ways of working, including observation of ceremonies, backlog and artifact reviews, stakeholder interviews, and a maturity assessment of quality practices. This would help surface gaps, patterns, and systemic opportunities for improvement.

Coaching and Collaboration

Coaches then proceed to embed directly with product managers, tech leads, and squads to provide hands-on guidance. This collaborative model strengthens alignment, reinforces quality ownership within engineering, and supports teams in refining story creation, testing behaviors, and delivery readiness.

Program Definition

The final phase translates insights into a sustainable operating model. This included developing playbooks, templates, reference examples, tool enhancements, and a recommended roadmap to scale quality engineering practices across domains.

Key Findings

Product Challenges

The assessment could reveal several foundational gaps in product definition and documentation. Epics and user stories are often inconsistently structured or lack the clarity needed to guide development effectively. Behavior-driven acceptance criteria are frequently missing, and in many cases, acceptance criteria are blended with Definition of Done tasks, creating confusion around expected behaviors versus completion requirements. Teams also use Jira issue types inconsistently, making it difficult to maintain alignment and traceability across products. As a result, downstream partners—such as Global Product Testing teams and market stakeholders—had limited visibility into context, intent, and product expectations, impacting planning and integration readiness.

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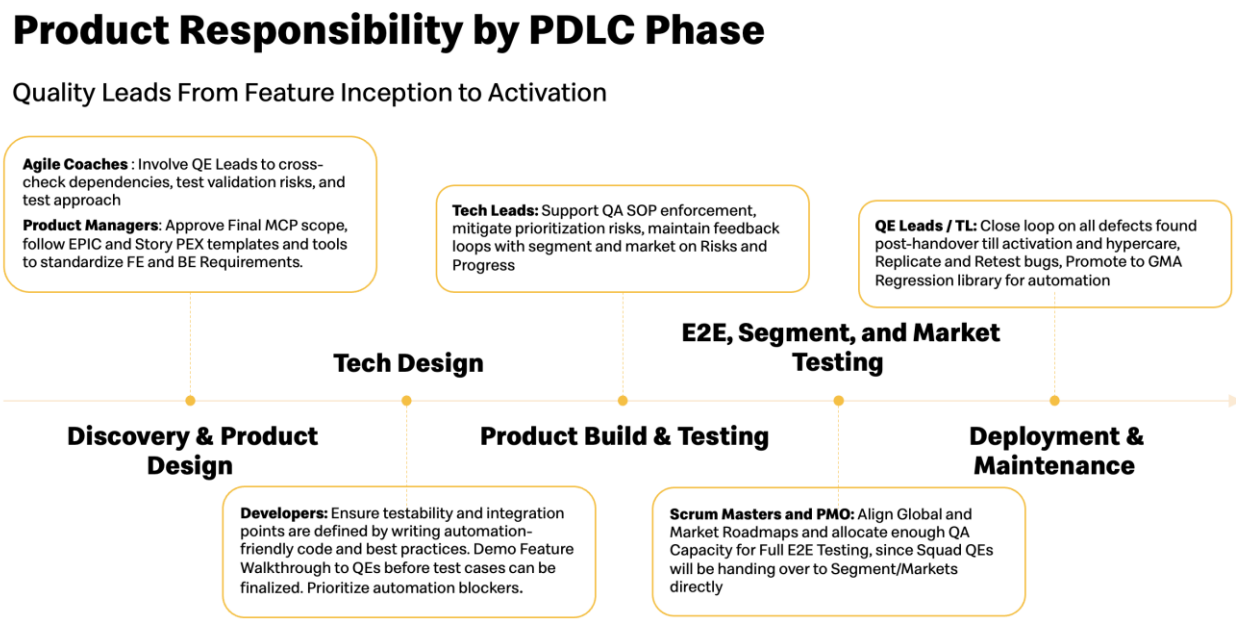
Quality Challenges

Significant quality-related challenges will be unveiled. Testing scope across levels—unit, integration, system, and end-to-end—is often unclear, leading to gaps in coverage and unpredictable quality outcomes. Weak validation across teams and domains further strained delivery confidence, particularly in complex, interconnected systems. Front-end automation remained insufficient, driving an unhealthy reliance on E2E testing, which slowed feedback loops and increased fragility. Ownership of back-end integration testing lacked clarity, resulting in inconsistent accountability. Additionally, quality representation is largely absent during early PI planning, limiting the organization's ability to surface risks, align expectations, and prepare for cross-team dependencies from the outset

Major Recommendations

Product Recommendations

To strengthen product clarity and alignment, the organization should adopt a more consistent and structured approach to defining work. Standardizing Epic structure, Definition of Ready (DoR), and ownership expectations will create a uniform foundation for planning and execution. Improving story quality and ensuring traceability to end-to-end user flows will support better alignment across engineering, product, and downstream teams. Writing clear, behavior-driven acceptance criteria with well-defined scenarios will reduce ambiguity and improve testability. Additionally, clarifying Jira usage—particularly the distinction between Bugs, Tasks, and Stories—will enhance consistency and reporting. Finally, downstream communication should be improved through journey documents, contextual product artifacts, and shared test scenarios to ensure teams such as SLT and market partners have the visibility they need for successful integration and activation.



Quality Recommendations

Elevating quality requires clear accountability and improved engineering discipline across the testing lifecycle. Defining testing responsibilities at each level—unit, integration, functional, and end-to-end—will provide structure and reduce overlap or gaps. Reinforcing cross-domain validation at the Epic level will strengthen alignment in complex, interconnected areas. Front-end automation should be expanded beyond E2E by introducing stronger unit and component testing layers to create faster, more reliable feedback loops. Back-end integration testing and supporting pipelines must be improved to ensure consistency and ownership. Lastly, quality and non-functional requirements (NFRs) should be treated as explicit dependencies during PI planning to ensure they are accounted for early, rather than discovered late in the delivery cycle.

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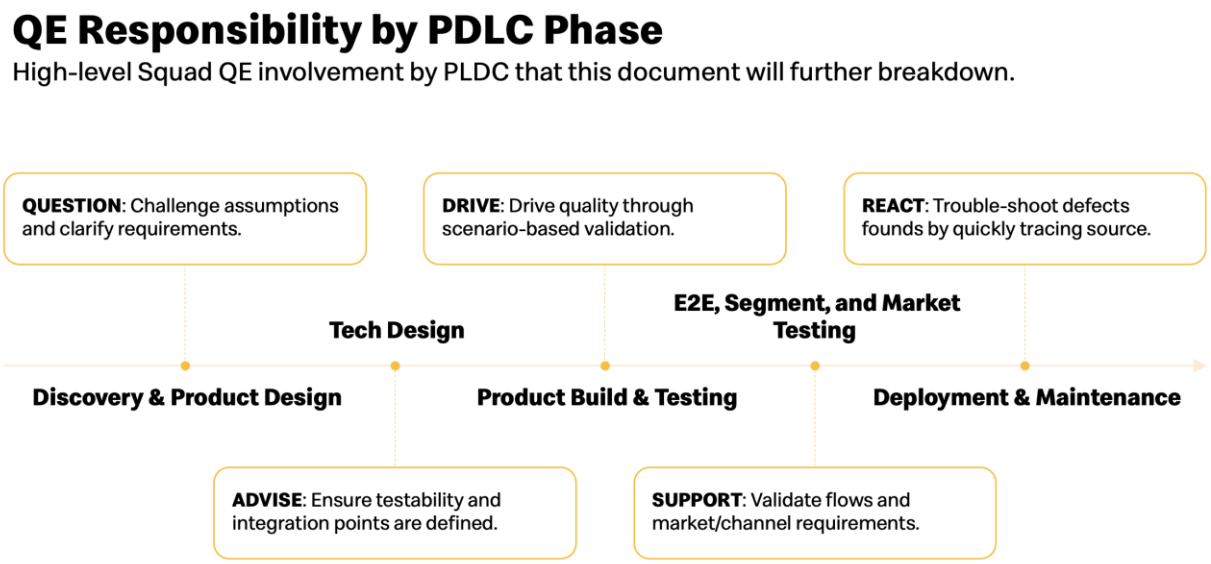

Coaching Impact by Squad

The coaching engagement delivered meaningful, squad-specific improvements across multiple product areas. Each team demonstrated measurable progress as targeted guidance translated into stronger quality practices and clearer delivery readiness.

🔍 Coaching efforts would help the squad sharpen Epic-level test scenario definition, enabling clearer alignment on expected behaviors and downstream validation needs. Additional refinement support strengthened story readiness and improved overall flow through the development cycle.

🧩The team benefits from structured guidance on strengthening acceptance criteria and refining story structure. A renewed emphasis on unit testing supported a healthier testing pyramid and improved engineering ownership of functional quality.

🤝 Early-stage quality discussions during pre-refinement help the squad gain clarity on scope, behaviors, and dependencies before work is entered into development. Example stories and patterns provided by coaches served as practical references for improving consistency and testability.

📘 Focused coaching for the product manager leads to more streamlined Epics and better alignment across the team. Adjustments to Jira issue types improved accuracy and traceability, helping the squad adopt clearer workflows and more reliable documentation practices.

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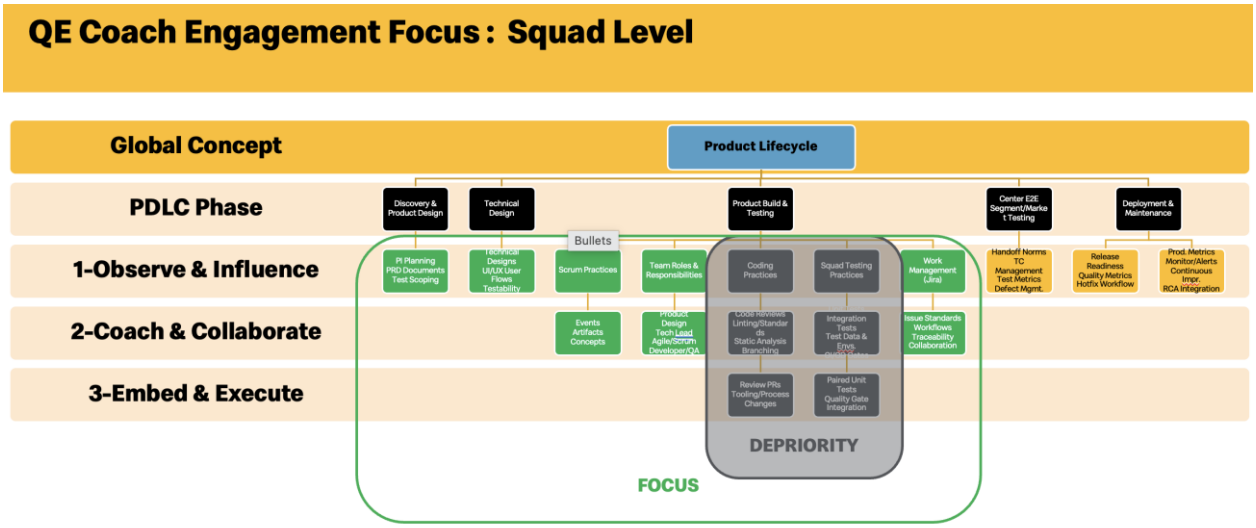

Artifacts Delivered

The engagement would produce a comprehensive set of assets designed to strengthen quality engineering capabilities and enable long-term scalability across squads and domains. These deliverables equip teams with practical guidance, clearer expectations, and improved tooling to support consistent, high-quality product development.

Training & Enablement Materials

A full suite of embedded QE training resources is developed to help teams understand quality engineering principles, adopt standardized practices, and improve day-to-day execution.

Product & Story Definition Examples

Refined Epic and Story examples are provided to demonstrate expected structure, clarity, and behavior-driven acceptance criteria—serving as reference models for stronger backlog quality.

Coaching Program Playbook

A formal playbook captures the coaching method, engagement model, templates, and best practices, enabling repeatable execution and easier onboarding of future coaches.

QE Coach Role Definition

A detailed job description clarified expectations for the QE Coach role, outlining responsibilities, competencies, and success indicators to help scale coaching across engineering.

AI-Tools

Build and Enhance to internal AI tools—including Epic Agent, Definition of Ready, and Done Agents using enterprise tools like Rovo in JIRA, and capabilities such as a Bug Agent —are introduced to accelerate product documentation, streamline quality steps, and reduce manual effort.

Squad Quality Scorecards

Each squad is evaluated on a 1–5 maturity scale every few sprints, revealing consistent gaps across discovery, technical design, coding practices, testing discipline, and day-to-day work management. These scorecards would highlight the need for stronger foundational quality behaviors, clearer accountability, and improved engineering ownership to raise overall product reliability and delivery confidence.

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Program Opportunities & Next Steps

The assessment surfaced several opportunities to further strengthen quality engineering practices and enhance collaboration across product and engineering teams. Addressing these areas will ensure greater consistency, clearer ownership, and improved readiness for scaled delivery.

First, closing the remaining **front-end, back-end, and E2E automation gaps** will be essential to building a more balanced and reliable testing strategy. Strengthening **Epic and Story definition templates** will help teams produce clearer, testable work items that support better alignment during refinement and planning. Improving the **quality of acceptance criteria** and ensuring early consideration of **non-functional requirements (NFRs)** will further reduce ambiguity and improve delivery predictability.

Additionally, there is a need to **clarify ownership for cross-team testing and backend story definition**, ensuring that integration points and shared responsibilities are well understood across domains. As the program evolves, aligning the **next phase of QE coaching** will be critical—focusing efforts on squads and practices that will yield the highest impact. Preparing these insights and recommendations for the upcoming **Senior Leadership review** will help guide strategic decision-making and reinforce the importance of scaling quality behaviors across the organization.

RECOMMENDATIONS

1. **Conduct a Capability Audit**
   Organizations should begin by assessing their current quality engineering (QE) practices and evaluating their readiness for AI-enabled processes. A structured capability audit will help identify gaps in tooling, skills, workflows, and governance, enabling leaders to prioritize the most impactful areas for improvement.
2. **Implement Targeted Training Programs**
   Building competency across design, development, and delivery teams is essential for sustainable transformation. Targeted training—focused on quality practices, modern engineering methods, and AI-assisted tooling—will strengthen engineering discipline and ensure teams can adopt new practices with confidence.
3. **Establish Clear Performance Metrics**
   Defining measurable KPIs such as defect leakage, mean time to resolution (MTTR), and release velocity will enable teams to monitor progress and validate the effectiveness of QE and AI-driven interventions. These metrics also create transparency and align teams around shared quality outcomes.
4. **Create an AI Governance Framework**
   As AI becomes more embedded in product development, organizations must implement a governance model that ensures responsible use. This includes guidelines for ethical compliance, bias mitigation, model transparency, data integrity, and continuous monitoring of AI-powered tools.

CONCLUSION

Transforming product engineering through QE coaching and AI-driven tooling represents an organizational evolution rather than a purely technological upgrade. By applying structured assessment frameworks, strengthening engineering capabilities, and integrating AI throughout the development lifecycle, enterprises can accelerate release cycles, elevate product quality, and foster sustained innovation. Future research should explore methods for quantifying the return on investment (ROI) of AI-enabled QE initiatives and establishing industry-wide maturity benchmarks to guide long-term improvement.

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