Transforming Teams and Chief Technology Officers (CTOs) Through a Quality Engineering Mindset

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Abstract

Over the past decade I have led Quality Engineering (QE) transformations in three tier-one banks across Asia-Pacific and North America. This paper describes the patterns I used to shift organisational mindsets—from siloed "test-last" thinking to outcome-driven, quality-first delivery. It details how I influenced CTOs (Chief Technology Officers) to champion QE, embedded automation and shift-left practices in highly regulated environments, and scaled a culture of trust and innovation across 100+ delivery teams. Quantitative outcomes include a 30% reduction in defect leakage, 40% shorter release cycles, and an 88% rise in team-satisfaction scores.

What sets this work apart is the introduction of mechanisms such as a weekly "quality pulse" dashboard for leadership, automated audit-evidence capture in compliance pipelines, and a dynamic experimentation budget tied directly to quality KPIs. The lessons are broadly applicable to any sector where resilience, compliance, and speed must coexist.

Author Bio

Millan Kaul is a Quality Engineering (QE) leader with hands-on experience of working with enterprise, mid-scale and start-ups across the globe. He has driven QE initiatives in multiple domains such as banking, IoT, fuel analytics and payments, with a persistent focus on accessibility, scalability and engineering excellence. Millan publishes his learnings in the form of easy to understand blogs at https://qualitywithmillan.github.io, he has also published Fitbit (now Google) smartwatch apps, created his own VS Code extension "Quality-with-Millan" as well as a npm package named allure-tldr. He is passionate about empowering teams through clarity, context and care.

1 Introduction

Quality Engineering has evolved from after-the-fact testing to a cross-functional discipline that accelerates innovation and customer trust. Yet many organisations still treat quality as a reactive function. This paper makes the case for systemic change at both leadership and team levels, offering actionable insights for initiating, scaling, and sustaining a quality-first culture.

2 Problem Statement

Despite heavy investment in automation and agile methods, quality outcomes remain inconsistent. Root causes include fragmented ownership, lack of leadership alignment, and legacy organisational patterns. In regulated industries like banking, these gaps magnify compliance risks and delivery delays.

3 Methodology & Approach

The transformation approach is built on five pillars:

1. **Leadership Buy-In** – weekly “quality pulse” dashboards for the CTO and C-suite.
2. **Pattern Shifts** – replacing component-centric testing with end-to-end journey validation.
3. **Team Empowerment** – QE champions, outcome-oriented KPIs, and psychological safety.
4. **Innovation Embedding** – experimentation budgets linked to defect-prevention ROI.
5. **Scalability Frameworks** – governance that satisfies auditors without slowing delivery.

Above pillars can be implemented in various ways defending upon the organization structure and delivery stream, below is the table with most commonly used metrics with tracking mechanism.

Metric/Field	Status	Current Value	Threshold	Owner	Action Required
Sev1 Defects (Open)	☑	0	0	QE Lead	None
Test Automation Coverage	☑	85%	>80%	QE Lead	Continue automation
Compliance Pass Rate	⚠	99%	100%	Governance team	Review
Customer NPS (Quarterly)	☑	72	>70	Product Owner	Monitor feedback

Release Cycle Time (weeks)	☑	2.7	<3	Release Mgmt	On track
Defect Leakage (%)	✕	8.4	<5	QE Lead	Review trends
Experiment Implementation		2 / project	≥2	QE Lead	Document learnings
Audit Evidence Ready	☑	Yes	Yes	Governance	Pre-audit verification
Team Satisfaction (%)	☑	88	>80	Delivery Mgmt	Celebrate wins

Dashboard Legend:

☑Good / Complete (Green), □ At Risk (Yellow), ✕Critical (Red)**Table 1:** CTO Quality Health Scorecard — Dashboard Mock

4 Embedding Quality Engineering Principles

- Shift-left automation integrated into CI/CD pipelines.
- Virtualized test data enabled early validation using masked production data sourced nightly and provisioned within 10 minutes per environment. This allowed isolated, parallel testing free from external dependencies.
- Automated traceability matrices linked business requirements, test cases, defects and releases in real-time, generating audit-ready reports that eliminated manual preparation and ensured compliance. One example would be to add “@audit” tags to your tests and run them and auto generate detailed HTML reports.

5 Empowering High-Performing Teams

Teams moved from counting test cases to measuring business impact. Key enablers were:

- Psychological safety for experimentation.
- Outcome metrics such as defect-escape rate, Mean Time to Recovery (MTTR) and customer NPS (Net promoter score).
- Visible alignment between team goals and executive quality objectives.

6 Quality Engineering as the Organizational Nexus

In my experience, Quality Engineering (QE) functions operate at the organizational nexus — acting as both custodians of legacy knowledge and catalysts for future innovation. By design, QE teams engage across all value streams, interfacing with product owners, architects, developers, security experts, and operational stakeholders. This central positioning allows QE to translate business objectives into measurable quality criteria, while ensuring that lessons from past systems ("holders of the old") inform the design of emerging platforms ("holders of the new"). This duality enables QE to bridge strategy and execution, reinforcing trust in delivery pipelines and accelerating transformation across the enterprise.

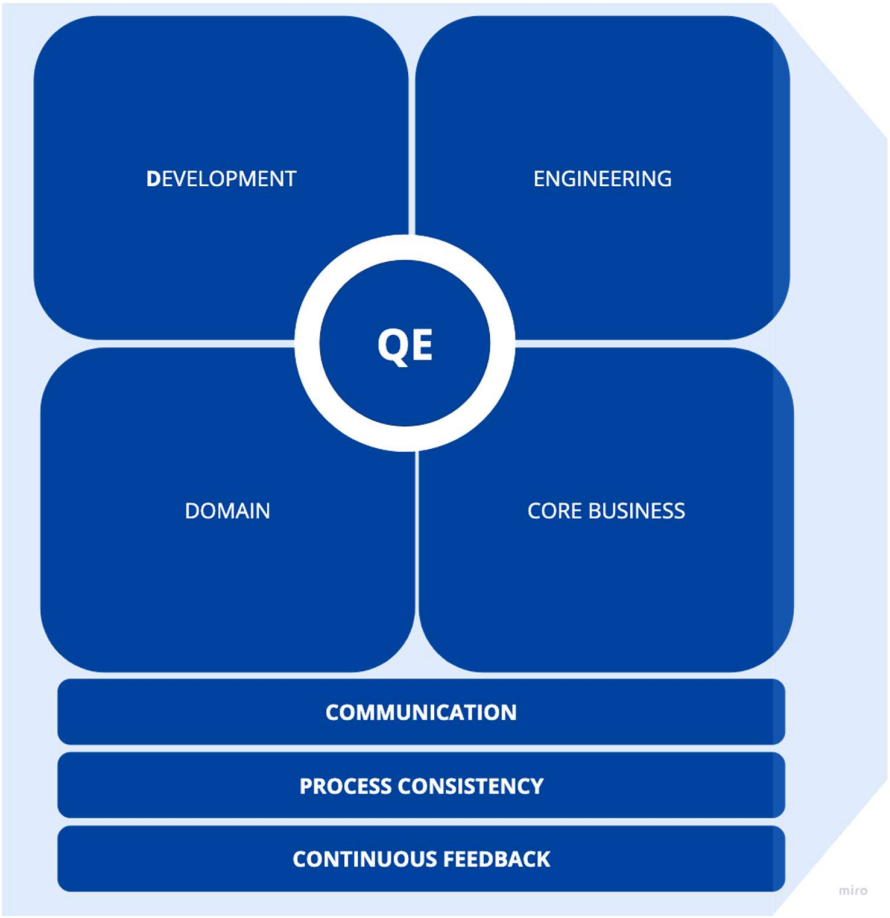

Figure 1. Quality Engineering (QE) teams positioned at the organizational core and top, unify stakeholders, preserve institutional knowledge, and enable innovation to deliver sustainable transformation

7 Scaling in Regulated Environments

A multi-year banking programme illustrates how QE frameworks can meet both agility and compliance. Quality gates were enriched with regulatory rule-sets, and robotic process automation captured evidence for audits automatically.

Attribute	Traditional QA	Quality Engineering
Quality Ownership	QA team	Every role
Validation Timing	Late-stage	Continuous, integrated
Testing Approach	Manual-heavy	Automation-first
Issue Management	Reactive fixes	Proactive prevention
Reporting	Siloed	Shared, outcome-driven KPIs

Table 2: Table comparing Traditional QA with Quality Engineering on 5 attributes

8 Results and Impact

Metric	Before QE	After QE	Improvement	Calculation method
Time to Release (weeks)	4.0	2.4	40% shorter	Median weeks per release cycle.
Defect Escape Rate (month)	12	8.4*	30% reduction	Avg. monthly defects found post-release (12-month)
Customer NPS (points)	55	72	+17 points	Quarterly avg. survey score (n = 150–300)
Team Satisfaction (%)	61	88	44 percentage points	Quarterly avg. team survey score (n = 150–300)

Table 3: Before-and-After QE Impact — Results & Improvements (calculated method)

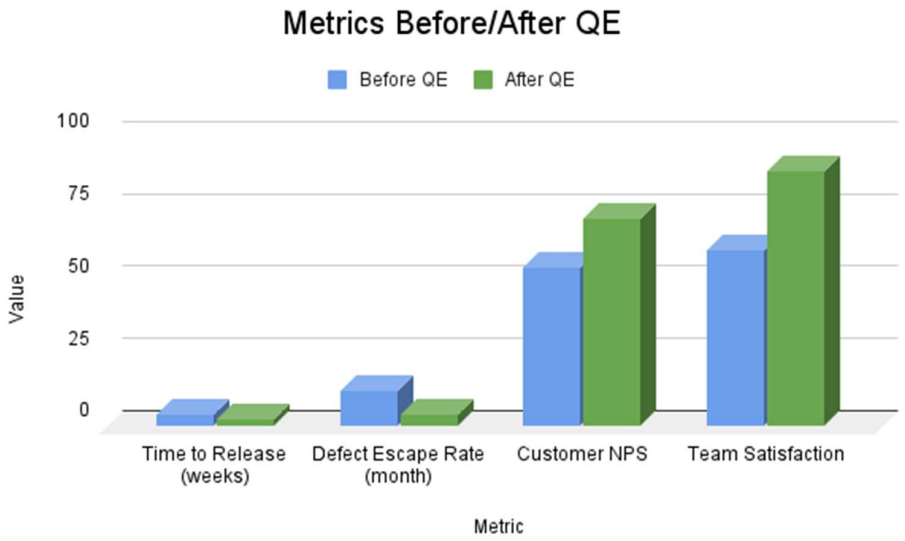

Figure 2. Charts visualizing QE impact metrics improvements and comparing Traditional QA vs Quality Engineering models

9 Discussion

Although focused on financial services, the practices scale to telecom, health-tech, and SaaS. The largest barriers are legacy mindsets and cultural inertia; success depends on “thin-slice” wins, storytelling to executives, and relentless measurement.

10 Conclusion

Public accountability for quality metrics, enabled by leadership dashboards, transforms quality from a peripheral concern to a strategic priority. Transparent reporting increases ownership, aligns teams, and drives improvement because “you can’t fix what you can’t see.” For CTOs, this visibility is not about exposing shortcomings, but about creating a compelling, data-driven case for targeted investment, continuous innovation, and organizational advancement. When leaders champion these metrics, their teams are empowered and motivated to deliver measurable, sustained progress.

11 Disclosure & Acknowledgement

No generative-AI tools were used to create conceptual content, conclusions, or best-practice recommendations in this paper. Limited AI assistance (grammar refinement) was applied under full

author oversight, in compliance with the PNSQC Generative AI Policy v1.1. All data and anecdotes originate from the author's professional work; any third-party sources are cited below.

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