

From Technical Roles to Enterprise Impact: Professional Directions in Enterprise Quality Management

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Abstract

Enterprise Quality Management [1] is an emerging lens through which software quality can be understood more holistically. By extending beyond product-level design, development, and testing to encompass enterprise-wide considerations, this perspective takes into account data, applications, infrastructure and related management considerations that support the entire enterprise and the community it serves. In this context, professionals in technical roles are well-positioned to expand their impact to create greater business value. This paper explores four job functions and related professional directions that are integral to Enterprise Quality Management: Business Analysis, Information Security, IT Operations Management, and Project/Program Management. These functions support traditional career advancement but include opportunities for both lateral moves and progression into leadership roles. They build on core strengths common among quality-focused professionals: analytical thinking, systems orientation, risk awareness, and a commitment to continuous improvement. Transitioning into broader roles often requires new technical proficiency through additional training and certifications, enhanced soft skills in communication and leadership, and a reframed professional identity situated around enterprise-wide considerations of quality and resilience.

Biography

Ying Ki Kwong is an independent consultant. In the public sector, his roles with the state of Oregon included: E-Government Program Manager, Statewide QA Program Manager, IT Investment Oversight Coordinator, and Project Office Manager of the Medicaid Management Information System. In the private sector, his roles included: CEO of a Hong Kong-based internet B2B portal for trading commodities futures and metals, program manager in the Video & Networking Division of Tektronix responsible for worldwide applications & channels marketing in the video server business, and research engineer in Tektronix Labs. In these roles, Dr. Kwong managed software-based business operations, systems, products, and business process improvements. He received the doctorate in applied physics from Cornell University and was adjunct faculty in the School of Business Administration at Portland State University. He holds certifications in project management (PMP), ITIL, and IT Service Management. He has served on the Board of PNSQC since 2021.

As a Principal at TEK, John Cvetko works with companies and government agencies to improve their organizations by helping them manage the IT challenges they face. He focuses on applying state of the art solutions that support business goals and objectives. For the last 12 years he has primarily worked with state governments assessing and modernizing large enterprise software systems. He has worked with the state governments of Washington, Oregon, Colorado, North Carolina, North Dakota, and Utah. He has consulted for firms such as Gartner, Boeing, and MAXIMUS, and earlier in his career he has held program and systems engineering management positions at Tektronix, PGE/Enron and ASCOM.

1. Introduction

In today's enterprise environments, software quality is no longer confined to verifying features and fixing bugs in a single product or project. Instead, quality must be understood as an enterprise-wide concern—one that spans data integrity, application resilience, infrastructure reliability, governance, and operational scalability. This broader view, which we refer to as Enterprise Quality Management, recognizes that quality outcomes are shaped not only by design and development practices but also by how an organization plans, acquires, manages, and operates its technology systems over time. In short, whereas traditional software QA focuses on functional correctness and defect detection at the project level, Enterprise Quality Management encompasses system trustworthiness, service continuity, compliance alignment, and user experience across the full system development and operational lifecycle.

Many professionals working in technical roles—such as test engineers, automation specialists, software developers, and information systems analysts—already contribute significantly to software quality. The shift toward enterprise-wide digital transformation presents both a challenge and an opportunity: How can software QA professionals expand their impact beyond project-level QA and into broader functions that shape the resilience, performance, and trustworthiness of enterprise IT systems?

This paper explores how quality-minded professionals can increase their influence and effectiveness by understanding and engaging with the broader enterprise context in which their work exists. We will examine four functions that are integral to realizing Enterprise Quality Management at scale: Business Analysis, Information Security, IT Operations Management, and Project/Program Management.

In the spirit of knowledge sharing encouraged by the Pacific Northwest Software Quality Conference (PNSQC), this paper draws on the authors' experience with large-scale IT projects and programs in public sector and large enterprise settings. We provide practical insights and guidance to help technical professionals navigate potential transitions—whether laterally into new functions or upward in the same functional domain.

2. Background and Motivation

The traditional scope of software quality assurance (QA) has focused on product-level verification & validation—ensuring that systems meet functional and non-functional requirements and perform reliably within defined test and operational environments. While such testing and related code review are vital, they alone do not assure quality at the enterprise level. Modern IT environments are characterized by distributed architectures, regulatory scrutiny, and ever-evolving security threats—all of which extend the quality conversation beyond what is typically measured in unit tests, integration tests, system tests, and even end-to-end tests.

Organizations now face challenges like ensuring data lineage across integrated systems, safeguarding against supply chain vulnerabilities, and sustaining uptime in globally accessed services, often

involving third-party services in the cloud with stated or contractually binding service level agreements (SLAs). As enterprises increasingly adopt cloud-native platforms, microservices, and AI-based functionalities, the definition of quality evolves to encompass resilience, observability, and governance. This shift presents both career challenges and opportunities for professionals in traditional software QA, engineering, and related technically focused roles.

There is growing demand for technologists who are not only skillful with code-level quality but who also understand how quality manifests in enterprise architecture, cross-functional workflows, and governance models. Without this broader awareness, organizations risk making siloed solutions that can undermine overall quality outcomes, increase technical debt, or create barriers to scalability and regulatory compliance.

3. Enterprise Quality as a Career and Capability Framework

Enterprise Quality Management can be viewed as a strategic capability that spans technical execution, risk mitigation, data governance, and operational effectiveness. As defined in the PNSQC brief [1], it integrates concerns across data, applications, infrastructure, and management systems, providing a framework for sustainable, high-quality IT operations.

This framework acknowledges that quality is not the exclusive domain of QA teams or testers. Instead, it is embedded into how requirements are captured, systems are architected, infrastructure is monitored, and data is governed. Each of these functions can be an avenue for quality professionals to extend their impact, particularly when these domains are aligned through governance structures such as enterprise architecture or IT service management (ITSM) models.

Professionals with QA backgrounds are often fluent in identifying inconsistencies, interpreting complex logic, and applying systematic analysis—skills that translate well into broader enterprise roles. By reframing their identity from “testers” to “quality advocates,” they can potentially participate in decision-making processes that shape strategic IT investments, compliance measures, and service reliability goals and objectives.

To succeed in this expanded capacity, QA professionals must understand enterprise risk, regulatory drivers, service-level expectations, and cross-functional dependencies. They must also embrace the language and tools of the enterprise—such as ITIL [8], risk registers, and maturity assessments—which are commonly used by business analysts, information security professionals, IT operations engineers, project and program managers, and executive management.

We believe the four functions covered in this paper contribute to Enterprise IT Quality and are accessible to QA professionals with the appropriate awareness, cross training, and mental preparation. One of our peer reviewers pointed out that Product Owner would be a valuable function to discuss here as well. Although both authors of this paper have substantial professional experience as Product Owner in their respective careers, time constraint prevents us from covering this and possibly other relevant functions in this paper.

4. Four Directions Within Enterprise Quality Management

4.1 Business Analysis

Business Analysts (BAs) serve as a bridge between business stakeholders and technical teams, translating needs into requirements that guide software development and enhancement. In the context of Enterprise Quality Management, BAs play a critical role in ensuring that quality considerations are embedded early in the planning and requirements phases. Their work supports organizational alignment, clarity of scope, and traceability across the lifecycle.

For professionals in QA or software development, transitioning into a BA role can be a natural extension. Their familiarity with test cases, user stories, and edge conditions equips them with a sharp eye for ambiguity, missing requirements, and logical inconsistencies—key strengths for effective analysis.

To move into this function, professionals typically acquire skills in stakeholder engagement, business case development, and business process modeling; typically using standard graphical approaches like Business Process Model and Notation (BPMN) or to a lesser extent Unified Modeling Language (UML). Common certifications include the Certified Business Analysis Professional (CBAP) and PMI Professional in Business Analysis (PMI-PBA). [2][3]

Career progression may begin with junior BA roles on project teams and extend into enterprise analysis, product management support, or strategic portfolio planning and monitoring – particularly in organizations with mature IT governance structures.

4.2 Information Security

Information Security (InfoSec) professionals safeguard systems and data from unauthorized access, disruption, or alteration. They are instrumental in designing secure architectures, managing risk, and ensuring compliance with policies and regulations such as ISO 27001, NIST 800-53, or HIPAA.

Quality professionals with a background in testing or automation already have strong analytical skills and a mindset attuned to edge cases and system failure modes—traits that align well with security testing, threat modeling, and vulnerability analysis.

Transitioning into InfoSec may require up-skilling in areas such as cryptography, access control, secure coding practices, and incident response management [4].

Popular certifications include Certified Information Systems Security Professional (CISSP) [5], CompTIA Security+ [6], and Certified SRE Professional [7].

Roles in this domain can range from security analyst to penetration tester to security architect. With experience, professionals may move into roles such as Information Security Manager / Director, Chief Information Security Officer (CISO), or other executive positions.

4.3 IT Operations Management

IT Operations Management (ITOM) focuses on the delivery and support of IT services that meet enterprise needs for availability, performance, and reliability. This includes managing infrastructure,

monitoring service levels, and ensuring uptime through effective incident, change, and problem management.

QA professionals, particularly those involved in systems integration or DevOps pipelines, often possess practical skills relevant to ITOM; such as environment management, automation, and root-cause analysis.

To move into ITOM, professionals benefit from exposure to frameworks such as ITIL, site reliability engineering (SRE), and observability tools (e.g., metrics, logs, and distributed tracing tools for real-time performance monitoring). These frameworks often refer to operational systems that aggregate logs, metrics, and traces to provide real-time visibility into system behaviors, helping teams detect and diagnose issues, especially recurring issues, proactively.

Certifications like ITIL Foundation [8], Microsoft or Google training and certifications, and information technology service management (ITSM) training and certification can strengthen credentials.

Career paths may go from system or service analyst that supports incidents response or infrastructure change to roles in enterprise operations centers, platform engineering, or infrastructure governance, with further opportunities in IT service management leadership.

4.4 Project and Program Management

Project and Program Managers (PMs) coordinate resources, timelines, and teams to deliver IT initiatives that align with enterprise goals and objectives. In the context of Enterprise Quality Management, PMs are responsible for integrating quality metrics, risk mitigation strategies, and stakeholder communications into planning, execution, operational support & maintenance, and ultimately sunset of enterprise systems.

Professionals with QA experience often have an eye for dependencies, risk flags, and process integrity, which translates well into managing complex initiatives and the production use of complex systems and processes. Many also possess cross-functional exposure that supports holistic planning and coordination.

Moving into this field may involve mastering project planning tools, stakeholder management, and agile frameworks. Communication skills and related soft skills are extremely important.

Key certifications include Project Management Professional (PMP) [9], PMI Agile Certified Practitioner (PMI-ACP) or other Agile certifications, and SAFe Program Consultant (SPC) [10].

Career progression can lead from team-level coordination roles to enterprise portfolio management, IT governance boards, or transformation programs that shape the future direction of an enterprises with large stakeholder communities, both inside and outside the enterprise.[11][12]

5. Implications of AI Adoption

The introduction of artificial intelligence (AI) technologies—such as generative AI, machine learning (ML), large language model (LLM), and automation based on artificial neural nets—has created new vectors for career growth and lateral movement across the enterprise. As AI becomes integrated in everyday business operations, new responsibilities and hybrid roles are emerging within every functional domain of Enterprise Quality Management. This relatively recent development gives professionals and managers, particularly those with QA backgrounds, the opportunity to evolve their careers in alignment with the rapid adoption of AI worldwide.

Below are examples of how AI adoption is transforming the four functional areas of this paper.

5.1 Business Analysis

- **Emerging Roles:** Business Analysts (BA) are increasingly asked to define requirements for AI-enabled systems, including how models behave under different data conditions, how transparency is handled, and what acceptable business outcomes look like.
- **Career Opportunities:** QA professionals can leverage their testing experience to support verification & validation of AI-generated recommendations, analyze edge-case behaviors, helping BAs define testable, and ethical acceptance criteria for AI based features.

5.2 Information Security

- **Emerging Roles:** Information Security teams now assess AI-specific risks; including model poisoning, adversarial inputs, or leakage of confidential or proprietary data through model outputs.
- **Career Opportunities:** QA professionals with a security testing mindset may transition into AI threat modeling, privacy impact analysis, or prompt injection testing for systems based on generative AI technologies.

5.3 IT Operations Management

- **Emerging Roles:** AI models must be monitored in production for performance drift, data quality issues, and ethical violations.
- **Career Opportunities:** QA professionals are well qualified to take on incident management, root cause analysis, and problem resolution incidents that relate to AI based features. Also, QA professionals in DevOps or infrastructure testing can move into supporting AI model deployment pipelines, managing automated retraining, or monitoring model output stability.

5.4 Project and Program Management

- **Emerging Roles:** Project Managers increasingly oversee AI solution delivery with heightened emphasis on governance frameworks, transparency, and responsible deployment practices.

- Career Opportunities: QA professionals can evolve into project / program coordinators or managers of AI-intensive subsystems / systems and their production use; especially when their teams are already involved in verifying & validating AI components and their integration into enterprise applications.

Table 1 below gives more details.

Enterprise Quality Management Functional Area	Emerging AI-Driven Role	Example Responsibilities	Entry Path for QA Professionals
Business Analysis	AI-enhanced requirements	Define acceptance criteria for AI systems, model behavior expectations, assess transparency and fairness requirements	Translate edge-case knowledge into requirements clarity
Information Security	AI-specific risks, model poisoning	Analyze model vulnerabilities (e.g., adversarial prompts), ensure privacy and regulatory compliance, monitor ethical AI use	Leverage security testing mindset for model risk evaluations
IT Operations Management	AI-specific incident management and problem resolution	Monitor AI models in production, manage drift detection, automate retraining, integrate observability into infrastructure	Extend DevOps/test automation into ML pipeline management
Project/Program Management	AI-intensive project/ program management	Deliver AI-driven projects, align AI with enterprise goals, manage stakeholder concerns over ethics and impact	Transition from test lead or release manager into program delivery

Table 1. Emerging AI-driven roles in the four functions of Enterprise Quality Management of this paper.

6. Recommendations and Transitioning Strategies

Professionals seeking to move into Enterprise Quality Management roles can benefit from structured strategies that include skills assessment, education, networking, and professional identity development. A key first step is to conduct a gap analysis: reviewing one's current technical and soft skills against the expectations of a target new role.

From a technical skills perspective, this might include learning new tools or industry standards; such as process modeling techniques, security frameworks, ITSM systems including monitoring systems, or project management software. From a soft skills perspective, developing skills in public speaking, negotiation, facilitation, and leadership would be very important.

Certifications play a dual role in validating competencies and boosting visibility within hiring and internal promotion processes. Equally important are informal pathways: mentorship from leaders in the target domain, volunteering for cross-functional initiatives and doing a good job, and participating in internal communities of practice or workgroups with peers and leadership.

Ultimately, success in transitioning roles involves not just new knowledge, but a shift in how professionals see themselves. Reframing one's narrative to align with enterprise priorities is necessary

when communicating with hiring managers or executive managers; especially along the lines of organizational resilience, customer trust, and quality business outcome. It is this understanding that signals readiness for broader or higher responsibilities in an enterprise.

QA professionals interested in broader career options should be aware of the following:

- Enterprise awareness matters – Understanding how systems interact and impact the business is crucial, even for those who remain in primarily technical roles.
- Start where you are and do a good job – Taking ownership of cross-functional tasks or initiating small process improvements can create visibility and build momentum. Some amount of risk taking is, of course, necessary.
- Continuous learning is critical – The tools, frameworks, and expectations in enterprise IT evolve rapidly. Staying current signals commitment.
- Mentors and allies help – Formal and informal guidance from those already working at the enterprise level can open doors, validate progress, and give useful comments and feedback on necessary improvements.

For concreteness, a schematic roadmap for a QA professional transitioning to, say, IT project coordinator or IT project manager may have steps like those depicted in Table 2.

Step	Action	Approximate Timeframe	Rationale
1	Conduct self-assessment of current QA competencies and exposure to project management tasks	Week 1	Establish baseline and identify relevant strengths
2	Take introductory workshops or courses in the project management domain	2–4 weeks	Gain foundational vocabulary and methods
3	Volunteer for internal governance or planning workgroups	1–3 months	Build visibility and learn project language
4	Support or lead efforts of monitoring of IT project or projects, especially in managing project quality issues and risks	2–6 months	Apply analytical skills in project context
5	Support or shadow a project manager or apply for a role as a project coordinator or project manager of a small or medium size project	6–9 months	Learn stakeholder management and planning skills and related tools
6	Earn certification and lead a pilot initiative or an IT project	9–12 months and ongoing	Demonstrate competence and readiness for PM roles

Table 2. Sample roadmap for a QA professional transitioning to IT Project Management.

7. Conclusion and Future Directions

As a unifying concept, Enterprise Quality Management offers a common language and shared intent that links diverse IT roles and functions—from testing and analysis to operations and governance—in service of trusted, resilient, and high-value systems. It also offers a meaningful framework for both

organizational success and individual career growth. For professionals grounded in software QA, test engineering, or software engineering, the broader context of Enterprise Quality Management offers new challenges, opportunities, and career mobility.

By understanding the intersections between technical skill sets and enterprise functions - such as business analysis, information security, operations management, and project / program management - individuals can navigate rewarding career transitions while adding strategic and tactical value to their organizations.

Hiring organizations, too, can benefit by recognizing the potential in their own technical talent pool or potential new hires. Encouraging lateral mobility, supporting training, and enabling career advancement are tangible ways to build or expand Enterprise Quality Management capacity.

As all vertical industries continue to evolve with rapid adoption of AI and cloud technologies, more awareness of how AI is applied in all facets of Enterprise Quality Management will be important to the career development of individuals and the well being of enterprises of any size.

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