Transforming QA to Enable Digital Success

Focus on the customer, the business, and the user experience, not just on the defects.
Executive Summary

Digitization is the use of information technology - in particular mobile, social, analytics and cloud - to deliver new, compelling value to customers and organizations. By analyzing and acting on the Code Halos1 generated by people, processes and devices, digital organizations can create and dominate entire new markets, such as Uber has done in ride sharing, Airbnb in lodging and Google in advertising.

As the word implies, digital is all about code - application code, business logic, customer data and user interfaces. While every disruptive digital business relies on back-office transactional and analytics systems, the public face of these companies is code in the form of websites, social media posts and mobile applications. This is why many legacy companies are hiring more designers, or even acquiring design firms, to ensure a reliable, easy and even delightful user experience.

The New Digital World

To enable organizations to seize first-mover advantage in this emerging digital age, quality engineering and assurance (QE&A) organizations must meet five pressing challenges. They are:

- True partnering with the business.
- Shifting from defect tracking to assuring a superior experience, as defined by the user.
- Speeding the development and test process.
- Preventing rather than merely detecting defects.
- Minimizing costs.

These were the major insights from the more than 150 IT and business assurance leaders at our recent QE&A summits in Boston and London.

Their message: QE&A must fundamentally change to reflect today’s mobile, digital and cross-channel demands. It must not just track defects but provide business assurance in the form of software that not only meets formal requirements but the actual needs of customers, employees and business partners. Business managers must be involved in (and provide appropriate funding for) QE&A at every step of the development and testing process. Moreover, QE&A must be as focused on the quality of the user experience as on traditional measures such as functionality, speed, reliability or security.

QE&A in the Digital Age

Testing has only become a discrete discipline in the last 15 to 20 years, as customers realized the value of the outside perspective and specialized skills of a dedicated testing organization. Typically, these standalone units begin testing only after code has left the development process and been deployed in a test environment. Organizations typically saw these test organizations as gatekeepers that determined when code could move into the final steps of user acceptance testing and production. When business leaders thought about testing at all, it was usually about how to reduce its cost through automation, shared services and global services.

The leaders at our summits are driving toward a different approach. They are pushing their QE&A professionals to think like end users by training them in the business processes their code must support and the industry in which it will operate. This business awareness means testers are far more likely to find real world defects, such as the security risks when data is shared among systems in a digital world, rather than focusing only on the security requirements of standalone applications.

They are implementing new tools and processes that embed QE&A much earlier in the development lifecycle, such as when requirements are developed or developers build their code. This shift left allows developers to fix defects more quickly and at much lower cost, speeding time to market and increasing customer satisfaction.

At the summits, our QE&A leaders defined five essential changes for QE&A in the digital age and the challenges involved in making these changes.

1. True partnering with the business.
2. Switching from defect tracking to assuring superior customer experiences.
3. Speeding the development and test process.
4. Preventing, not just detecting defects.
5. Minimizing costs.

Figure 1: QA in the Digital Age

Quick Take
The New Face of QA: Financial Services

For a US-based financial services provider, we not only slashed testing costs by more than $13 million over three years, but leveraged a testing center of excellence across both waterfall and Agile projects to deliver defect prevention and quality assurance for non-functional as well as functional areas.
True Partnering with the Business

Business and IT users, and the service providers that help meet their needs, must work together more closely than ever in an ongoing, iterative process. With today’s pace of change, there are no perfect requirements, so constant iteration is required to understand an application’s requirements and the tests required to meet those needs. The days of separate, standalone testing must end, and stakeholders from both IT and the business must be involved at all stages. Developers must work not only with businesspeople, but with testers to build in quality (and security) from the start of the development lifecycle.

Among the challenges:

- Reaching consensus on the desired business outcomes, i.e., the number of application downloads, the number of site visits, average time spent on the site, the percent of abandoned shopping carts, etc.
- How to train staff to understand both business needs and testing practices.
- Which metrics to provide, and in what form, for different stakeholders such as developers, QA, security and business heads.

Switching from Defect Tracking to Assuring Superior Customer Experiences

In the digital age, the user experience your applications provide is a matter of C-level importance. They must not only deliver the required functionality, but be as easy, and even delightful, to use as the latest ride sharing, restaurant-finding or fitness tracking app on a user’s smartphone or smart watch. The final arbiter of the quality of this experience must be the user themselves, which makes the collection, analysis and sharing of their usage data and other feedback essential.

Among the challenges:

- How to identify the appropriate user stories and test cases early in the development process and quickly feed them back into the development process.
- How to best perform A/B and multivariate testing.
- How to test across a massive and ever-changing range of mobile devices.
- How to perform outside in testing; with real customers testing applications in real-world conditions, and quickly delivering their feedback to developers.
- How to compare your organization’s application performance and ratings with those of its peers and competitors.

Speeding the Development and Test Process

Your business model may come under attack any day from unknown competitors. These attacks may come from outside your industry, flying under the radar with crowd-sourced funding, some servers in the cloud and a few eager developers. When they surface, your organization needs to respond quickly, experimenting with new services and business models and adjusting them based on customer feedback more quickly than your competitors. In today’s fast-reaction world, QE&A must be automated and flexible, working at the speed of business and of the Agile and DevOps approaches used by more and more businesses.
Among the challenges:

- Choosing and deploying automated tools for continuous build, integration and deployment as developers commit new code to repositories.
- Using a model-based approach, simulations and reverse engineering to reduce the number of required test designs to ease automation.
- Adapting hiring and security processes to take greater advantage of crowd-sourcing and other new, more flexible and lower-cost staffing models.
- Building true private cloud infrastructures that allow rapid scaling of test infrastructure for continuous testing of new builds, and/or adapting corporate security policies to allow QE&A staff to rapidly provision such environments in the cloud.
- Automating all wait time activities, from requirements modeling and automation to non-GUI animation to service automation, test data, test design and regression automation and virtualization, as well as functions such as continuous build and integration to reduce costs and time to market.

Preventing, Not Just Detecting Defects

QE&A professionals must predict and prevent problems before they force users to jump to a competitor. This requires moving beyond conventional defect tracking to a more proactive, analytical, Artificial Intelligence and data-driven approach to predicting and preventing problems.

Among the challenges:

- Effectively using statistical process control to identify issues and solve problems earlier in the development cycle.
- Choosing the proper predictors of defects to track and analyze, such as product size, development and test process, team capability, size and capacity, and defect profiles (severity, occurrence, recurrence, etc.).
- How to best use autonomic computing and robotic process automation.
- Establishing the relationships, processes and knowledge-sharing tools to proactively work with business leaders and advocate for the customer.
- Evaluating and implementing emerging AI, deep learning and self-learning solutions and applying them to predictive QE&A.

Minimizing Costs

While software quality assurance has become a strategic differentiator in the digital age, and speed has risen near the top of organizations’ requirements, enterprises still require QE&A to be as cost-effective as possible. This is another area where automation can help, especially as it is applied to more industry-specific processes and to the testing of mobile and embedded devices.

Among the challenges:

- Efficiently coordinating the efforts of internal and external staffs and service providers.
- Cost-effectively assessing, employing and monitoring crowd-sourced resources.
- Mitigating security, quality or other issues associated with the use of offshore skills or infrastructure.
- Measuring and communicating the true business cost of defects, especially in the customer experience, to prove the value of preventing them and secure appropriate QE&A funding.

Quick Take

The New Face of QA: Healthcare

For a major pharmacy chain, we sped time to market by increasing automation and shifting QA efforts earlier in the development lifecycle to find defects earlier and speed time to market for new applications. Seeding user perspectives during requirements validation and model-based design helped build a perfect blend of performance and user experience.
QE&A professionals are meeting the challenges of the digital age with cutting-edge automation, new organizational structures and the use of big data techniques such as statistical process control. In the future, they expect to use emerging technologies such as 'Artificial Intelligence' to predict, rather than just detect defects and use crowdsourcing to tap high volumes of QE&A specialists around the world to meet changing needs. Even the leaders at our summits acknowledge they can’t predict what the QE&A organization of the future will look like. But here are seven preparatory steps they recommend taking now.

- Define a QE&A vision your organization can fulfill within six to nine months, based on your business and industry-specific needs. Begin sharing and discussing it to get feedback and support from business partners, and to build the case for funding.

- Retrain your staff to ask questions and develop quality metrics around the user experience, not just the number of defects found. Some leading edge companies have created a new role of business analyst/quality analyst, often a tester who has been trained to also understand the business processes and industry an application must support.

- Look to mine the skills, practices and processes in your existing centers of excellence to develop more business-unit focused competency centers. These competency centers usually exist within, and report to business units rather than IT, and may include on-call staff that can be repurposed quickly as needed. Note that these complement, rather than replace, testing centers of excellence, which are still needed to set enterprise-wide test standards and evaluate test tools and processes.

- Examine how you will develop new metrics that look beyond the cost of QA to the value of QA, noting that the risk of defects now encompasses the reputation of the enterprise and its brand as well as financial losses. Work closely with business leaders to make sure you are delivering the right metrics, in the right form, so they can understand the business value of QE&A and will support appropriate funding for it.

- Automate, automate, automate. This is the only cost-effective way to meet the demands of today's market for continuous, high-quality application updates. Make testing as easy as possible by creating plug-ins and test utilities that help developers improve the quality of their code and makes them easier to test.

- Look for partners that can help you reach all these goals not just internally, but across your entire business ecosystem.

- Create a plan to retrain your staff to tackle more user experience-oriented testing needs to evaluate new testing tools and processes and other higher-value tasks as more routine work is automated.

### It’s All About the User

The digital revolution empowers tiny startups to overtake established players, unless those legacy players can embrace the power of code to create new products, markets and business models first. If their software doesn’t deliver world-class reliability, security and usability out of the gate, the enterprise can be sidelined by an upstart competitor that wasn’t even on the radar screen months before. Delivering ever more software, across ever more platforms, ever more quickly and at higher levels of quality poses a massive challenge for what used to be called “testing” organizations. But it’s also a game-changing opportunity, to move from a reactive, cost-center gatekeeper to a mission-critical driver of business value. Making the shift requires everything from new technologies to new mindsets.

For more details about how our QE&A leaders are succeeding, look for our upcoming white paper based on case studies from the leaders at our summit.

### About Cognizant Quality Engineering and Assurance

Cognizant’s Quality Engineering & Assurance (QE&A) practice is an independent business unit within Cognizant, offering a comprehensive suite of assurance services spanning QA consulting, quality engineering, environment management, and digital QA. With the establishment of this business unit in 2001, Cognizant pioneered the concept of a practice dedicated to independent verification and validation. Since then, the practice has grown organically to more than 31,000 professionals, making it one of the world’s largest providers of QA services. Cognizant’s QE&A practice is organized by areas of industry specialization to leverage Cognizant’s domain expertise and provide domain-aligned QA services. Today, more than 550 global, regional and local enterprises trust Cognizant QE&A with their QA needs. For more information, please visit [www.cognizant.com/quality-engineering-and-assurance](http://www.cognizant.com/quality-engineering-and-assurance).

About Cognizant

Cognizant (NASDAQ: CTSH) is a leading provider of information technology, consulting, and business process outsourcing services, dedicated to helping the world’s leading companies build stronger businesses. Headquartered in Teaneck, New Jersey (U.S.), Cognizant combines a passion for client satisfaction, technology innovation, deep industry and business process expertise, and a global, collaborative workforce that embodies the future of work. With over 100 development and delivery centers worldwide and approximately 218,000 employees as of June 30, 2015, Cognizant is a member of the NASDAQ-100, the S&P 500, the Forbes Global 2000, and the Fortune 500 and is ranked among the top performing and fastest growing companies in the world. Visit us online [www.cognizant.com](http://www.cognizant.com) or follow us on Twitter: Cognizant.