



SOGETI



Journey To

COGNITIVE QA

The New Essential Ingredient

THE DRIVE TO COGNITIVE QA AND INTELLIGENT TESTING FOR SMART PRODUCTS AND APPLICATIONS

Quality Assurance (QA) and Testing operations are in catch-up mode. Increasing volumes of new, digital technologies, more connectivity, and escalating levels of intelligence in applications demand a smarter, cognitive approach – and it must begin right now.

The world of IT is evolving far more rapidly than ever before. We are on the cusp of real intelligent software that will drive business decisions and operations: software robots, machine learning, and artificial intelligence (AI) will increasingly become embedded in applications to perform tasks once reserved for humans.

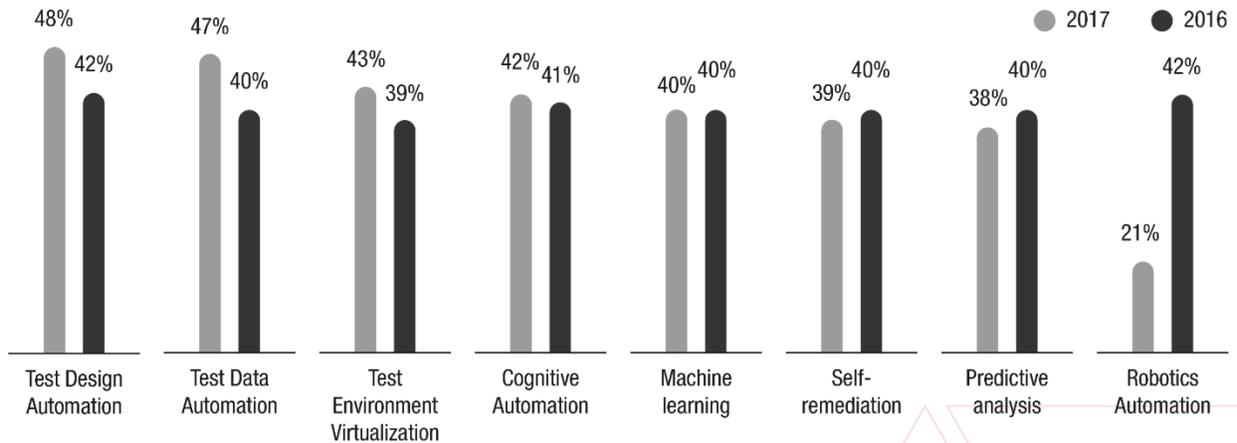
This naturally has an impact on an organization's Quality Assurance and Testing operation. The smarter and more complex the application or product, the smarter the QA and Testing must become. And as smart products proliferate, the volume of testing must grow in tandem. Yet there's a problem: while the integration of agile testing with DevOps initiatives helps to speed time-to-market, there is still heavy reliance on manual processes. And as the volume of testing need grows, this has the potential to stand in the way of the test velocity and quality outcomes required for competitive advantage and differentiation in today's marketplace.

MAKING MORE OF TEST AUTOMATION

Test automation helps, and is an essential part of continuous testing in agile and DevOps models. However, as our *World Quality Report 2017-18* survey found, it is currently under-exploited, largely due to a lack of specialist in-house knowledge of the depth and range of automation techniques. The survey revealed that only 15% to 16% of common test activities, ranging from functional test execution, functional test case design and test data generation to testing of end-to-end business scenarios, were performed with automation technologies. The pace of today's digital agenda, demands much more automation than the current 15% to 16%. It also demands greater intelligence in the QA and Testing process.

42%-38% of the organizations, that participated in this year's *World Quality Report 2017-18* survey, believe that Cognitive Automation, Machine learning, Self-Remediation and Predictive Analytics, are important emerging techniques, that will help to increase the outcomes and benefit returns of test automation initiatives.

Figure 1: Emerging Test Automation Techniques



One area where intelligence will also play a bigger role: is to ensure testing—whether automated or manual—is targeted at the right risk areas. With so much to test and assure, in short timeframe, there is real uncertainty at product owner level, about whether test cases used by the teams are actually targeting the right things. In today’s intensive QA and Testing environment, subjective decisions about what to test and how far, are no longer enough. Which brings me back to my earlier point concerning the need for QA and Testing to become smarter.

COGNITIVE QA COMES OUT OF THE SHADOWS

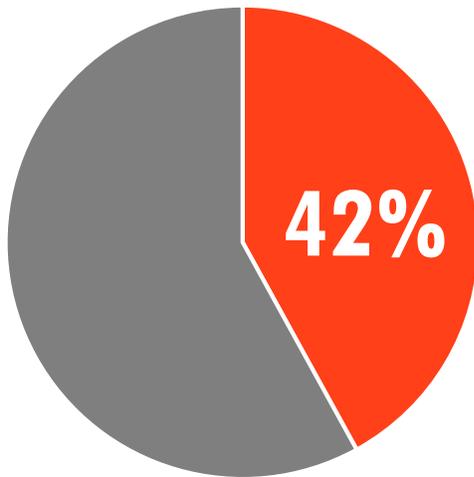
The notion of smart automatically provisioned self-aware and self-adaptive environments is not new but, in reality, this cognitive approach is only just emerging. I have no doubt, however, that it will become mainstream because, as the *World Quality Report 2017-18* points out, “It is not only speed that will drive the need for more intelligent automation, but also the emergence of smarter applications and smarter products that demand an integrated, intelligent and automated approach to testing these continuously changing products and business environments”.

Which means it's time for organizations to embark on the journey to Smart QA, embedding it in their development activities. For many, artificial intelligence (which is part of the cognitive QA journey) is still something that can only be imagined, but it is here, right now, in products and applications already in the marketplace. And the *World Quality Report 2017-18* findings suggest I am not alone in this thinking:

Figure 2: Respondent Organizations

BETWEEN 38% AND 42% OF RESPONDENT ORGANIZATIONS

saw cognitive automation, machine learning, self-remediation and predictive analysis as promising emerging techniques for the future of test automation



The WQR states:

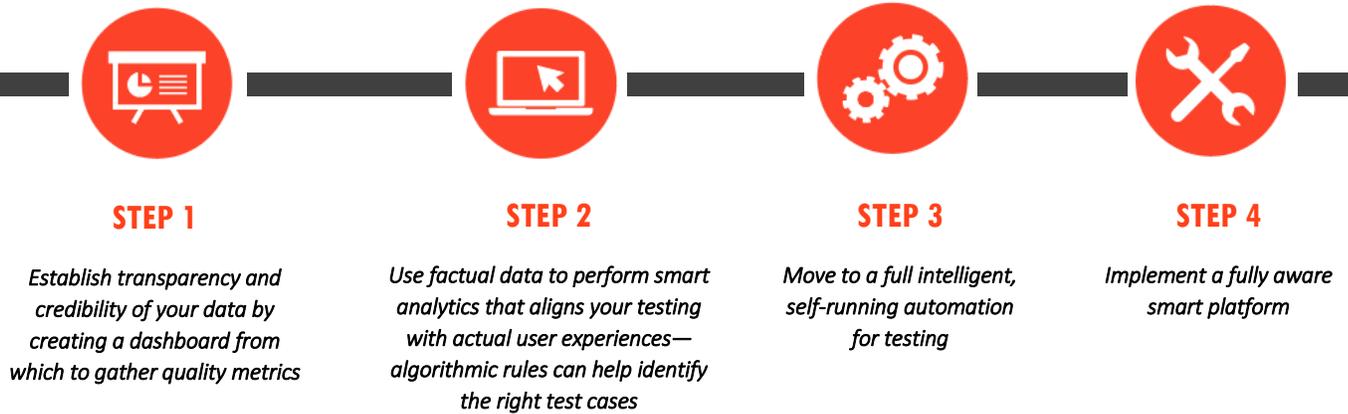
“Intelligent test automation and smart analytics will become essential to support testing as they enable smart decision making, fast validation and automatic adaptation of test suites.”

EMBARKING ON THE JOURNEY

So, where do you start? To adopt smart analytics in the QA and Testing process you must begin with your data. You need to rely on its transparency to derive the metrics that will enable your QA and Testing operation to predict the quality of applications based on factual data. Creating a 360-degree application quality dashboard providing real-time information on aspects of your key applications (e.g. number of production incidents, positive user feedback comments, negative user feedback comments, readiness of upcoming releases) will give you meaningful insight into where you don't have the right data. This is a simple step and even if you go no further, you will have information that can help you improve your decision making.

From there, the next step is to look at the decision processes currently used by your test teams. How do they decide which area to test and how many test cases are required? These decisions are typically highly subjective, leading to poor QA and Testing outcomes. For example, in an average existing test set, 20% of what should be covered isn't, while 30% is typically irrelevant and doesn't tell you anything you didn't already know from other test cases.

Figure 3: 4 Steps to Smart Cognitive QA



One solution to this is to build algorithmic rules that help to objectify the decision making and automatically optimize test sets. They can identify test cases where defects have never been identified and, vice versa, they flag up where a test case has already identified a particular defect, making it irrelevant for another test case to do so. Analytics and algorithmic rules can help to identify a test that is only run once and which doesn't really need automation, whereas a test covering a recurring feature is better suited to automation. Analytics also uses algorithmic rules to make sense of the data.

With better insight into what to test and which cases to automate, the next step is to move to full intelligent self-running automation for testing. This includes: automatic selection of scenarios that need to be automated, automatic generation of test cases (model-based testing), automatic generation of required test data, and automatic selection of test cases to be executed based on the content of the feature. I advise investing in continuous monitoring, predictive analytics and machine learning tools to derive patterns from operations data. These tools will provide valuable insights in defining test strategy and test coverage based on actual risks and real-life issues.



A FUTURE VISION

The ultimate vision is for the creation of fully aware smart platforms with self-aware and self-adaptive environments, which are automatically provisioned. Interestingly, in this year's *World Quality Report 2017-18*, test environments and test data were the most cited challenges for core enterprise applications, like those supporting ERP, HR, and finance, as well as for what the WQR describes as "more fluid applications developed in short cycles, often deployed on smartphones, tablets or a web browser".

Smart test platforms will manage the growing challenges in these areas. A smart test platform will feature automatic test scheduling, in-time scheduling, and provisioning or creation (e.g. virtualization) of the required test environment or test environment's components. These smarter test environments should be coupled with automated test data generation and test data management that supports QA and Testing for the complete application lifecycle.

AUTOMATION V HUMANS IN SMART QA

In all of this, we cannot assume that everything in the QA and Testing process will be fully automated. The expertise and knowledge of testing professionals will remain part of the QA and Testing story – but in new ways.

We know that the human element is often a bottleneck in testing and development, so perhaps the future is for QA and Testing professionals to be freed up by automation to focus on other aspects where human reasoning, analysis and creativity add true value. Experience testing is one such area. In today's user-centric digital world, it comes as no surprise that ensuring end-user satisfaction is viewed as one of the most important objectives of QA and Testing, coming second only to increasing the quality of software or product in this year's *World Quality Report 2017-18* survey.

Thus, for the time being at least, humans will continue to be needed in QA and Testing operations. But who knows what will be possible with a truly intelligent system at some stage in the future. For example, we are already seeing greater use of intelligent automated image recognition in product testing, and this could be adapted to usability and user experience testing for comparison analysis on the journey to more cognitive, intelligent QA and Testing.

CRITICAL SUCCESS FACTOR

I began this paper with a comment about the speed of change in IT. It is this speed that makes it an almost impossible task to predict future IT developments and their ultimate impact on today's IT professional. However, one thing I can predict, and this is borne out in our *World Quality Report 2017-18*, is that with single most important critical success factor for – QA and Testing Industry in 2017”.

Sogeti's Cognitive QA solutions are paving the way in this respect, helping organizations formulate their long- and short-term objectives and aspirations for making the test and validation process more intelligent. With Cognitive QA, you will start with better defined quality metrics and transparent implementation that will provide you with predictive insights on the quality status of applications.

Further, Cognitive QA will help you to implement algorithmic rules based on the factual data residing in your repositories and available from any information source. This will help you to optimize and align tests with actual user patterns as you drive towards more intelligent QA and Testing in the coming months and years.



About Sogeti

Sogeti is a leading provider of technology and engineering services. Sogeti delivers solutions that enable digital transformation and offers cutting-edge expertise in Cloud, Cybersecurity, Digital Manufacturing, Digital Assurance & Testing, and emerging technologies. Sogeti combines agility and speed of implementation with strong technology supplier partnerships, world class methodologies and its global delivery model, Rightshore®. Sogeti brings together more than 25,000 professionals in 15 countries, based in over 100 locations in Europe, USA and India. Sogeti is a wholly-owned subsidiary of Capgemini SE, listed on the Paris Stock Exchange. For more information please visit www.sogeti.com.

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