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A woman with a headband of gold coins and stars is looking into a glowing crystal ball. Her hands are positioned around the crystal ball, and she has a focused expression. The background is dark, and the crystal ball is the central source of light.

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# Focus on testing: Radical market changes put pressure on quality assurance teams

by Murat Aksu & Stefan Gerstner

## World Quality Report 2011-2012: Testing estimation methods and test automation tools remain underutilized

The recent economic downturn forced businesses around the world to run their IT operations with smaller budgets and fewer resources. Without much money to spend on new application development, IT managers had to make the best use of their existing systems, ensuring that they function without fail to support the companies' core business processes. This lean approach has increased the pressure on quality assurance (QA) teams to put in place solid processes, methodologies, and tools for thorough validation and monitoring of applications' functionality, availability, and performance. As the economy continues to recover globally, the focus on quality remains vigilant. Most companies are not willing to go back to the old practices of supporting a sprawling landscape of outdated and disjointed legacy systems and outdat-

ed technologies. Application modernization and consolidation initiatives are on the rise across all industries, and QA is playing a critical role in ensuring that this process goes smoothly. These trends are confirmed by the findings of the respondents of the 2011-2012 World Quality Report.

### QA budgets remain under pressure

The new trends, technologies and initiatives are increasing the workload for QA teams. However, there's no exponential corresponding increase in QA budgets to support the added pressure. Only five percent of companies have significantly amplified their QA budgets, and surprisingly 13 percent still don't have dedicated QA budgets at all. Just over a third of respondents indicate that their quality-related budgets have increased slightly, and an additional 35 percent suggest that they stayed the same (see figure 1).

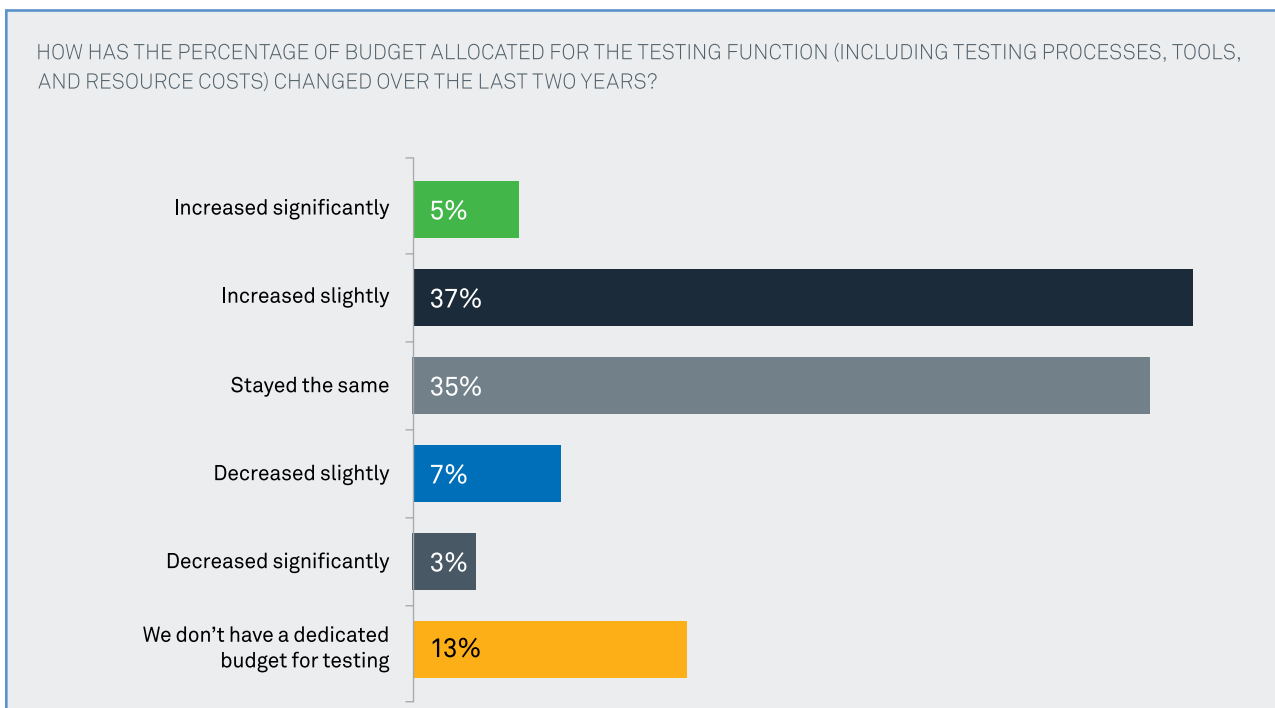


Figure 1: How has the percentage of budget allocated for the testing function (including testing processes, tools and resource costs) changed over the last two years?

Even though QA teams are making an effort to tie their results to the business goals and quantify the losses from production defects, there still aren't any established standards for measuring QA success or estimating the amount of time and resources needed to sufficiently test an application. Only 22 percent of respondents say that they use industry standard estimation methods, with an additional 37 percent indicating that they use internally developed estimation techniques, and further 30 percent admitting to approximate the effort required for application validation based on past experiences or as a portion of the total development effort.

### Large companies and developing countries welcome automated testing

For the third consecutive year we've observed the rise in the use of test automation technologies; however, manual testing is still often the preferred method for application verification. Not surprisingly, the degree of test automation varies by company size and geography (see figure 2).

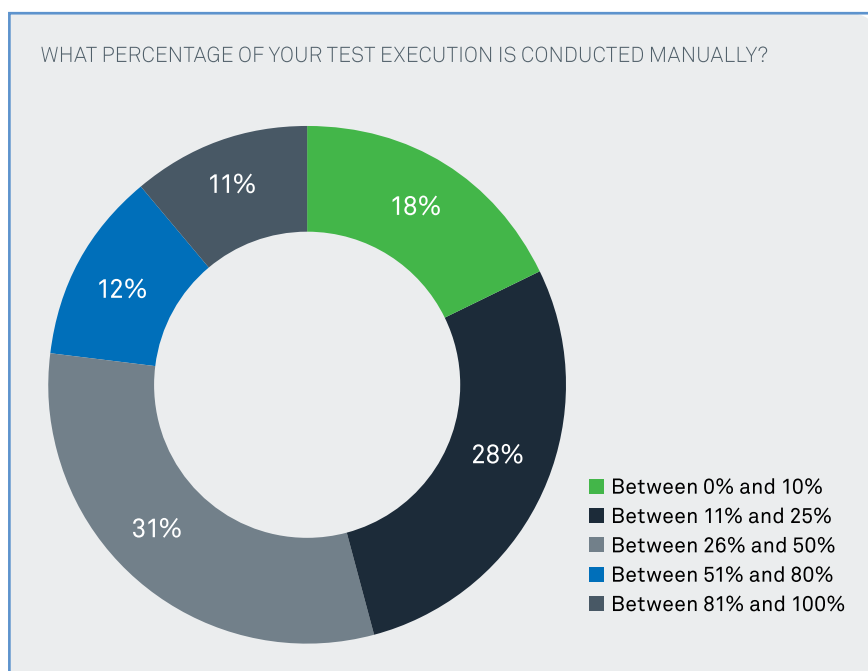


Figure 2: What percentage of your test execution is conducted manually?

For example, a quarter of small company respondents indicate that nearly all of their tests are run manually. In contrast, only about five percent of medium and large enterprise respondents say that close to 100 percent of their tests are manual. China appears to be in the forefront of automation use with only six percent of respondents suggesting that more than half of all tests are being run manually, followed by Western Europe and North America. This can be explained by the fact that often developing countries have the ability to leapfrog ahead of the developed world and use the latest technology available. North America appears to be lagging behind in test automation with an average of 28 percent of American and Canadian respondents suggesting that more than half of their tests are being run manually. In comparison, only 14 percent of Western European survey participants say that most tests are executed manually.

German companies in particular are rather more advanced in their use of automated testing. An overwhelming majority (90 percent) of respondents use automated test execution for more than half of their work. This is 13 percent higher than the inter-

national average. It appears that the technical preconditions for a more industrialized approach to testing are in place, although automation is not yet being used to the full extent, due to a limited influence of the QA role within German organizations. Despite the lower automation numbers, we observe an increase in the use of automated testing methods and tools. Business pressures for faster time to market and reduced costs can explain part of this trend. The rest of the picture is formed by the efforts of testing software vendors to develop increasingly easy-to-use automation tools that require minimum scripting and development effort.

### Outsourcing is increasing across a broader number of geographical bases

For the third consecutive year, we have seen outsourcing in testing activities and its growing role in the quality management process. Over three-quarters of survey respondents say that their companies employ the services of contractors or third-party vendors for quality assurance.

At the beginning of the outsourcing movement, companies were seeking cheaper resources to augment their internal capabilities at lower costs. Today's providers must offer a complete suite of services – including testing strategy, requirements definition, functional and performance testing, user acceptance testing, and security testing.

The Capgemini Germany study IT Trends 2011, reveals that today the average German IT department provides 50 percent of its own IT services, while leading companies with more industrialized IT departments have reduced the volume of services provided by their own department to 15 or 20 percent. That study also shows that German companies have a preference to outsource services to Central European or nearshore locations rather than to offshore locations such as India or China.

Compared to other countries, German companies have a lower percentage of testers working at a nearshore or offshore location outside the company's main offices. Over 40 percent of test resources are located within their own office facilities. Nearly half (47 percent) of respondents have between 19 percent and 25 percent of their testers in nearshore and/or offshore locations. Only 12 percent of respondents have between 26 percent and 50 percent of test resources abroad, and none above 76 percent.

The average of all other countries has more than double the amount of testers abroad. The reasons for these differences are partly language issues, since a majority of companies work in a German language environment and are reluctant to change this. It also reflects the fact that German companies have large IT departments and use IT service providers primarily for getting access to specialized resources. The answers regarding the ideal geographical location to contract and/or outsource testing activities also confirm these findings. Almost half (48 percent) of German respondents prefer contractors co-located with their own employees. This is nearly double that of the international average. For 11 percent of respondents, Eastern Europe is the highest-ranked outsourcing location, while India and China are rated significantly lower than the international average.

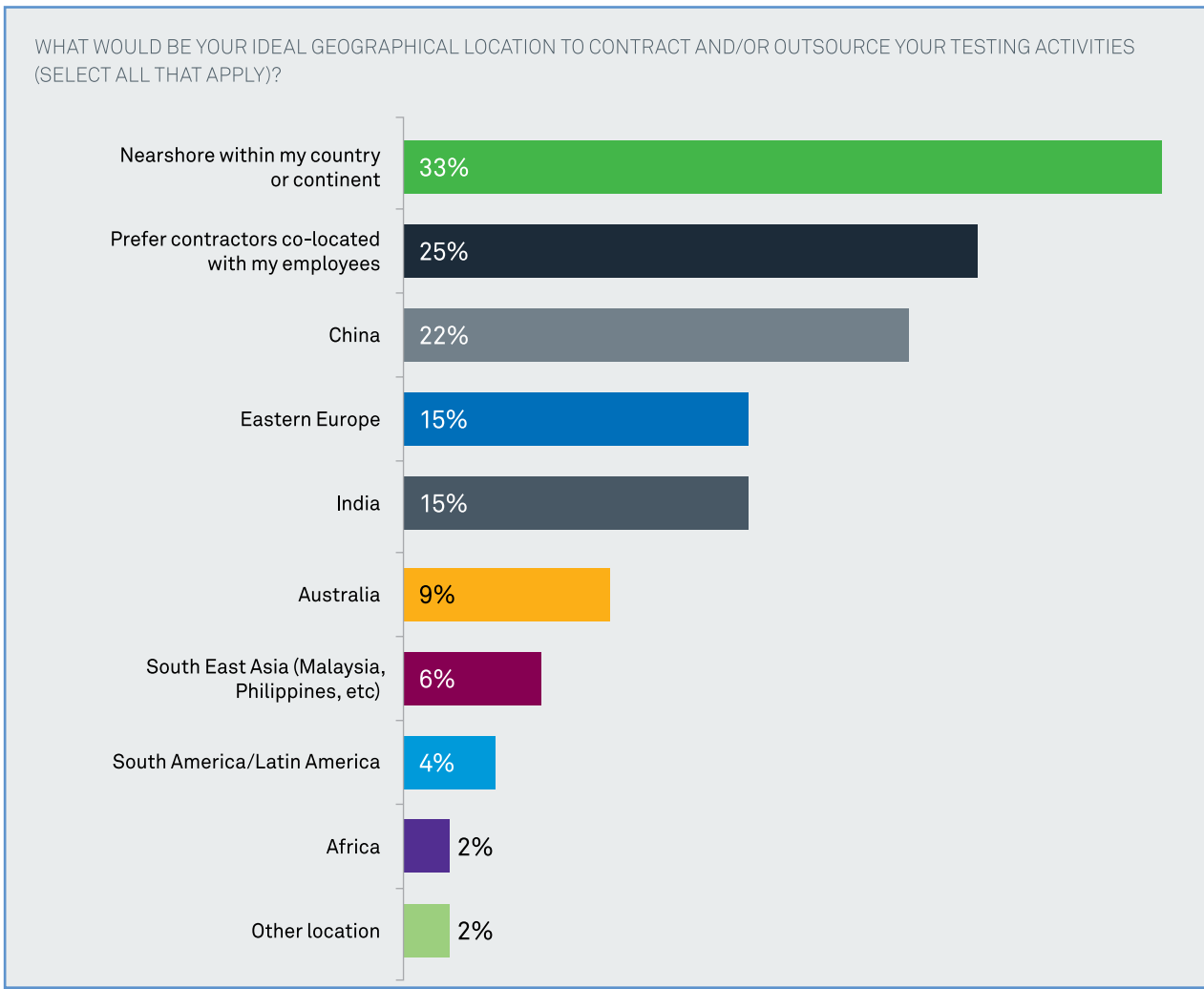


Figure 3: What would be your ideal geographical location to contract and/or outsource your testing activities? (select all that apply)

**Using the cloud to reduce IT costs and increase agility**

The model of deploying and consuming IT services on the cloud infrastructure is quickly gaining traction. Compared to last year’s survey, the percentage of companies that are moving at least some portion of their IT systems to the cloud has grown by five percent.

The cloud has a great impact on the world of quality and testing – both for testing on the cloud and testing of the cloud itself. Using the cloud while testing offers obvious benefits – instead of installing many servers for load and performance testing, testers can use the elastic cloud to generate load on their applications. Similarly, the cloud can be used as a separate test environment or as a pay-per-use model for testing software applications. A much more complicated use case is the testing of cloud-based applications and infrastructures. If an organization’s IT portfolio contains a mixture of cloud-based and internally-hosted applications, maintaining the quality of the portfolio becomes a combination of traditional QA verification and the management of contractual terms and SLAs. A QA manager, with a portfolio containing a cloud-based CRM system for example, cannot afford to test it in a vacuum without understanding how the provider’s security, performance, availability, and backup procedures might affect the entire end-to-end business process. Testing cloud applications is a three-pronged approach. It still has the traditional user-experience testing element, but it also adds a service-level testing component below that, and the end-to-end business process testing above it. This approach allows testers to validate the

application infrastructure in the shared model, as well as exercise the end-to-end processes that touch multiple applications.

**Germans more cautious towards the cloud**

Cloud is perhaps the biggest game changer in the art of testing requiring a different skillset and a different portfolio of automation tools to successfully validate the functionality and performance of complex applications that are running on a shared infrastructure. Testing in the cloud is more about managing the entire IT portfolio of services, rather than verifying the quality of individual systems.

The approach of German companies towards cloud computing seems to be more cautious compared to other countries. The vast majority of respondents (67 percent) expects that only a quarter of their applications will be hosted or migrated to the cloud over the next year, while the international majority expects to host or migrate 50 percent, or more of their applications to the cloud. This careful attitude is confirmed by the clear preference for standard office applications (mail, agenda, word processing, etc.) as typical candidates for cloud computing. Over half of German respondents favor this option compared to 33 percent for business-critical systems.

**Security testing is shaping up**

Application security is typically viewed as an audit and risk management function, and different companies place this responsibility with different organizations, although this distribution varies widely by geography, industry, and company size. The larger

the company, the greater the percentage of respondents who say that they have a dedicated Information Security team – a specialized group of security professionals who help design the company's security procedures and requirements. Over half of respondents from China and nearly half from Brazil say that the primary owner of application security at their companies is Information Security. In contrast, respondents from North America and Western Europe state that they rely equally on QA and Information Security, followed closely by Operations. This suggests that perhaps in more mature markets, security testing is becoming a more mainstream discipline that is being incorporated into the application lifecycle. Unfortunately, even companies that have a dedicated Information Security team don't always follow their recommendations. Our survey also finds that there is a significant lack of communication and cooperation among different teams involved in security testing.

Most commonly, organizations spend their security funds on network security. Since the introduction of the first corporate networks, companies have been aware of the potential security issues such as unauthorized access or denial-of-service attacks. Over time, firewalls were invented, standards introduced, and now, most companies automatically assume the safest settings when they build their networks. Application security on the other hand is a lot less mature, and application security testing often lacks common goals, standards, and tools. In our survey, very few respondents admit that they are engaged in automated dynamic (6 percent) or static (10 percent) security testing. Most companies perform application security audits by Information Security teams (42 percent) or have manual source code reviews (21 percent).

Security testing is an evolving discipline. Just a few years ago, it would have been acceptable to focus solely on finding vulnerabilities in existing applications and patching them to remedy any potential problems. This approach, however, can no longer keep up with the pace of innovation among the attacker and hacker communities. The only way guaranteed to ensure that applications are secure is to build security into the entire development process, including requirements, design, and code, and develop IT systems to the highest security standards from the start.

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## > biography



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