2009

WORLD QUALITY REPORT

An in-depth evaluation of current trends in software testing and application quality

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Preface

We are pleased and excited to introduce the first edition of the *World Quality Report*

As we are a prominent provider of professional testing services and testing governance know-how around the globe, we believe that this report will guide companies to look at "quality testing" across different industries and lines of business and learn from other companies how to do things better, quicker, and cheaper.

We at Capgemini are convinced that it is important to continually develop market-driven and shaping solutions that meet our clients' quality assurance demands.

It is our goal to make this an annual publication to monitor business, technology and economic trends in the software quality and testing space. We hope you find this report to be valuable and provide insights into an increasingly important aspect of the application lifecycle management process.

Of course, we want to thank HP for its continued collaboration and for helping to make this study possible. Capgemini and HP share a common culture, so it is natural to combine the depth and breadth of our business intellectual property with the strength of HP's testing product suite. Introducing the *World Quality Report* is just one of many collaboration points between Capgemini and HP.

Raf Howery
Vice President, Global Channels
& Partners Executive
Capgemini

HP's Application and Quality Management business (built on a strong history from the former Mercury portfolio) has long been a bellwether of the IT Quality Management Industry. Our continued investment, technology and market leadership is based upon a deep understanding of industry shifts and trends before they *impact the masses*. That given it seems only natural to team with Capgemini on this inaugural *World Quality Report*.

What excites me most about this joint effort is the spirit of the report itself and the people involved. The purpose is to understand the most current issues facing an industry at an important juncture. Quality is no longer a simple gate in the software development process. It is now, arguably, the top ingredient for business success for an IT organization, that begins far upstream in demand and requirements management and extends far downstream into production. There should be no doubt that Quality is a top CIO priority. The quality, performance and security of a company's applications *are* the quality, performance and security of its business.

I am firmly convinced that we are in the midst of a profound change in how applications are built and delivered. This is driven by two mega trends that make this report most timely. The first is process and organizational changes driven by the movement to Agile from Waterfall methods, in sourcing to outsourcing shifts and the continued growth of Centers of Excellence from project-based silo models. The second are "ready for primetime" technologies such as Web 2.0, composite applications based on standard services and cloud computing. All of this is taking place in the backdrop of the current economic downturn, which proves that organizations are taking advantage of the crisis to make sweeping changes.

I want to thank Capgemini for the invitation to participate in this report. We are proud to co-sponsor it and are excited about what 2010 will bring as we build on our joint success for the delivery of applications through industry-leading technology and services.

Enjoy the report!

Jonathan Rende
General Manager
& Vice President, Application Business
HP Software

Foreword by the Authors

Welcome to the 2009 edition of the *World Quality Report*

The software quality industry has come a long way over the last 20 years, from virtual obscurity to being a formalized discipline that cannot be overlooked or minimized. With application quality being on the minds of many CIOs today, we are often presented with questions from our clients, such as how to measure the various aspects of quality and how to build a world class quality organization.

Organizations are increasingly challenged with having to bring new products to the market faster and cheaper and with stricter quality requirements than ever before. To answer the questions and tackle these challenges we needed to first gather enough data from the industry to serve as a benchmark before creating a highly optimized strategy that combines efficient technology leverage, effective process improvements and Rightshore®[1] allocation.

For many years, Capgemini and HP have been respected global leaders in the software quality industry helping our clients optimize software quality for better business outcomes. Since 2008, we have teamed to conduct global research in the software quality industry to help our clients and partners become more market aware and make better decisions based on industry trends.

The research covers all major global geographies and verticals, and focuses specifically on the areas of software quality tools, the state of quality, quality organizations, outsourcing and the recent economic effects in the quality testing space. We are excited to be able to publish formally the results and trends from our research for the first time. We hope that you enjoy this report and find the data to be interesting and helpful!

Finally, we would like to thank all of the contributors from HP and Capgemini for their immense support and dedication to this research and the resulting report.

Charlie Li
Vice President, Global Testing Services
Capgemini

Murat Aksu
Global Head of HP Software Alliance
Capgemini

[1] Rightshore® is a Capgemini registered trademark that describes Capgemini's global delivery approach which brings together the best talent from a right balance of onshore, nearshore, and offshore locations.

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Executive Summary

Companies will increase investment in the areas of requirements definition and visualization, test environment and data management and domain-specific, intellectual property-based solutions.

As a global leader in application quality management, Capgemini Group has conducted the first comprehensive, global survey of CXOs, IT directors, quality assurance managers and engineers to gain a deeper understanding of the different facets of quality testing in 2009.

Published jointly by Capgemini and HP, the 2009 *World Quality Report* provides a revealing record of emerging trends in quality and a forecast of how these trends will shape Application Lifecycle Management (ALM)[2] and associated software in the future.

The report seeks answers to questions that are on the minds of many quality assurance (QA) leaders:

- What investments are being made in the area of application quality?
- Are ALM tools being fully leveraged and are they generating the expected return on investment (ROI)?
- Is application complexity increasing? Is the overall quality of applications improving?
- How has the worldwide economic crisis impacted new application development projects?

Throughout the *World Quality Report*, we will provide insights into these questions to help organizations understand how they can maintain and improve application quality.

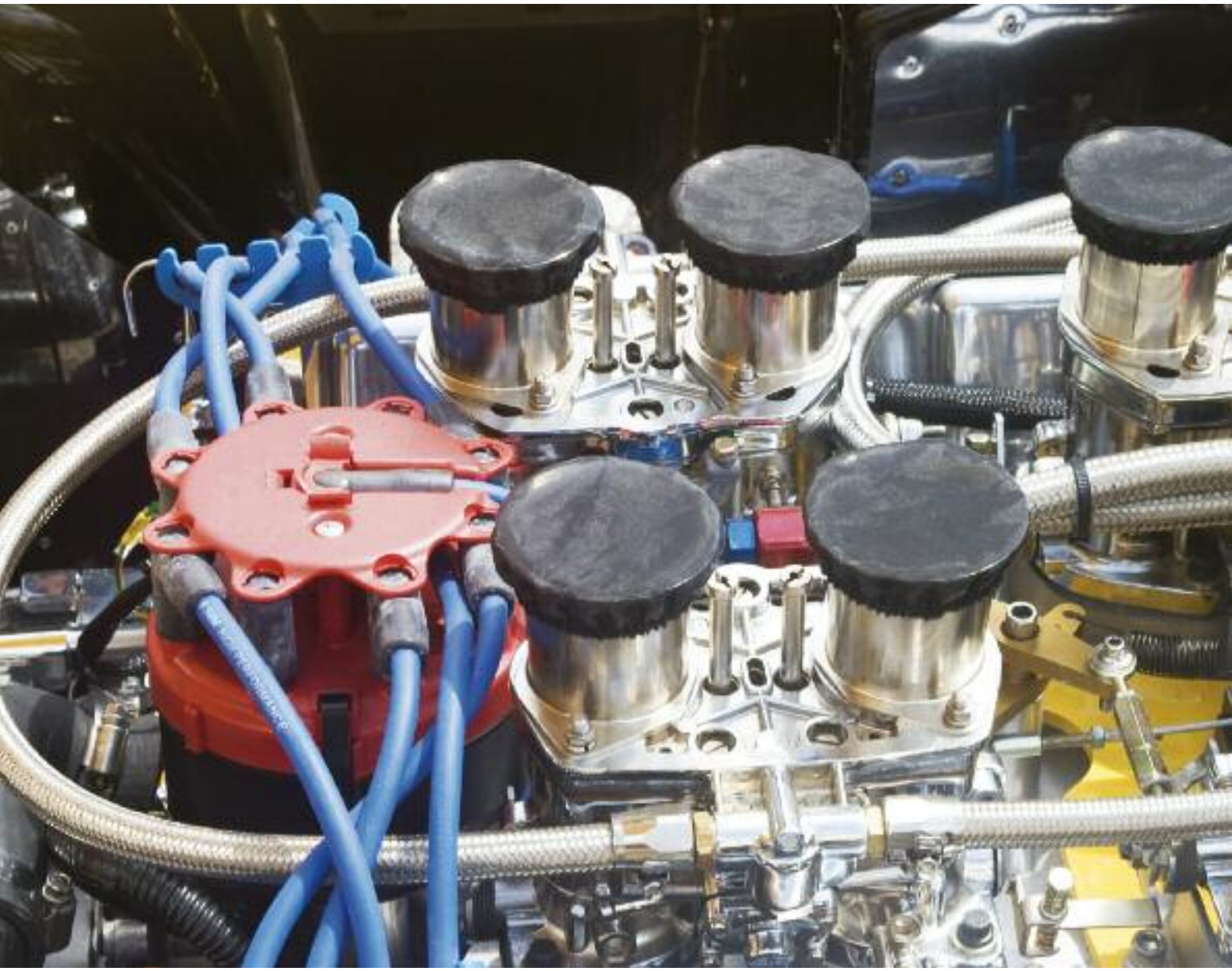
Key Findings

The research revealed a number of key findings:

- Despite the economic downturn, the report's findings show that **companies will increase investment** in the areas of requirements definition and visualization, test environments and data management and domain-specific, intellectual property-based solutions. An overwhelming 88 percent of respondents are expecting more investment from business leaders for new application development projects in 2010. Our analysis indicates that IT investments are shifting from a daily, operational focus towards new application development that provides a competitive advantage for the business.
- The report also indicates **large-scale transformational changes** in QA organizations and the resources deployed by these organizations. The QA resources of the future will possess diverse skill sets including application level technical expertise to better guide the development team. They will also be able to demonstrate a deeper business domain knowledge and improved expertise in the area of test automation. The goal of this organizational shift is to achieve a shorter and higher quality ALM lifecycle with reduced overall project costs.
- This report also establishes that the **outsourcing trend to use external vendors is here to stay** and will increase in the next few years. The outsourcing of quality management will see its biggest growth in the European markets, outpacing all other regions. The need to tightly govern outsourced teams will result in larger operations being replaced by smaller, nimbler groups consisting of business domain savvy-practitioners.

[2] For the purposes of this survey, we have defined Application Lifecycle Management as the "marriage of business management to software engineering made possible by tools that facilitate and integrate requirements management, architecture, coding, testing, tracking, and release management."

- Nearly nine out of ten respondents concur that the **complexity of applications is increasing.** The majority of respondents also agree that application quality is keeping up with the increased complexity. While these are positive signs for QA, the organizations fall short in their ability to accurately calculate ROI for ALM technology purchased to supplement the increased testing effort. Inaccurate or, worse yet, unavailable ROI measurements, make it difficult to justify even the minimum future investment required to keep application quality at existing levels.



Introduction

On a daily basis, Capgemini's clients are asked to make strategic decisions on critical issues such as new technology purchases, organizational structure, budget allocation, and IT governance processes.These decisions affect the future direction and success of their respective organizations. To support their assessment, they often approach Capgemini's experts, seeking pertinent leading practices that can be applied to their unique business needs.

Capgemini has been offering testing and quality management services for over 30 years, giving the company a venerable perspective in analyzing software/application quality that is supported by extensive sector-based and global experience. We have been recognized for our leadership in quality management, and named as the number one provider of independent testing by leading analyst firm, NelsonHall.[3] Our perspective leverages our extensive client experiences, active involvement in leading and shaping the future of software quality through international organizations, and our research and development efforts, which have produced industry-standard best practices.

In order to provide clients with the important data points, as well as direction on future trends, Capgemini has addressed a number of specific questions that relate to quality assurance and testing. We used our global reach to survey over 10,000 individuals responsible for testing at more than 400 unique companies of various sizes in different industries around the world, including Telecom & Media, Technology, Research & Education, Manufacturing & Logistics, IT Service Providers, Health Care, Government, and Financial Services.

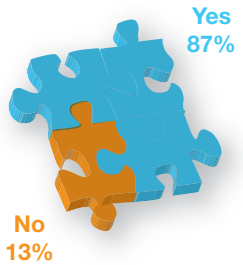
These findings, coupled with our thought leadership provide the basis for this report. This study examines the state of testing quality, explores key issues and trends affecting the industry, weighs up the economic volatility, and discusses upcoming challenges.

We used our global reach to survey over 10,000 individuals responsible for testing at more than 400 unique companies of various sizes in different industries around the world.

[3] Software Testing Assessment and Forecast, NelsonHall, February 2008

Testing Tools and Technology

Figure 1 Is application complexity increasing in your organization?



Source: Capgemini

While adding more resources and automating test scripts have proved sufficient to date, in the future, QA teams will grapple with the age-old dilemma of how to do more with less by expanding automation into the earlier stages of testing.

Application complexity is increasing

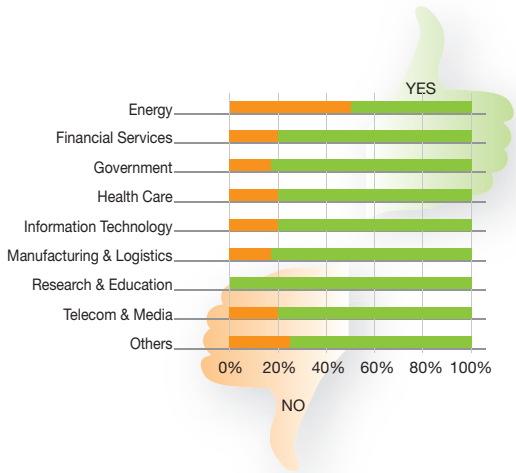
Clients often hear from vendors of technology services and tools that the complexity of applications is increasing. Our survey validates this, with an overwhelming majority concurring with this statement. (See Figure 1)

In the past, companies have been able to deal with increased application complexity by adding additional resources to their quality management teams or by purchasing automation technology. As the advantage of labor arbitrage diminishes with increasing labor costs at offshore locations, firms will look for different means of addressing the management of complexity.

Application quality has also improved

When asked whether the overall quality of the organization's applications had been keeping pace with the increasing application complexity over the last two years, 80 percent of respondents replied "Yes" (See Figure 2). While adding more resources and automating test scripts have proven sufficient to date, in the future, QA teams will grapple with the age-old dilemma of how to do more with less by expanding automation into the earlier stages of testing.

Figure 2 Has the overall quality of your organization's applications improved over the last two years?



Source: Capgemini

Organizations are not realizing the full benefits of test automation

Companies that purchased automated testing tools have a patchy record of meeting their initial automation objectives. Capgemini's field engagement records indicate that over 50 percent of clients had not reached their initial automation goals three years after the purchase of automation tools.

In general, the efforts to implement these tools and realize ROI have been marginally successful. One of the main reasons for this failure has been the lack of planning and inadequate funding needed to deliver key initial services around the deployment of tools, training, and mentoring of resources by the purchasing parties. Many IT managers still believe that the tools will and should work by themselves.

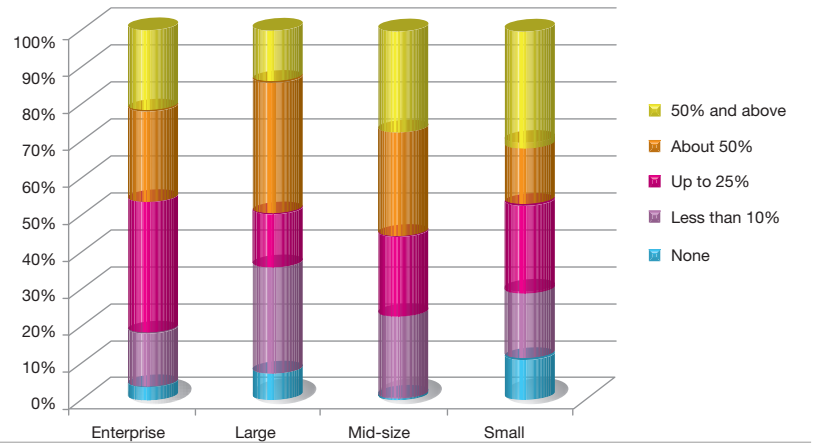
In order to cut costs at the time of technology acquisition, purchasing departments often veto service line items that would help with the planning and successful implementation of those technologies at enterprise levels. In some cases, the services may have been purchased for a successful initial implementation, but the future maintenance and ongoing mentoring needs may have been underfunded, thereby undercutting the future success of the investment.

In other cases, turnover in resources and key champions caused the automation efforts to slow down or completely stall, with QA teams reverting back to creating manual test cases using word processing applications. In extreme circumstances, QA teams could diligently create thousands of automated scripts without a clear strategic plan, only to find that their efforts go to waste due to drastic changes in the platforms and the functionality of applications under test.

In mature testing organizations, the percentage of test case automation is significantly improved through the use of test case components that are re-used in multiple testing cycles. QA teams that are able to identify repeatable business processes and create re-usable artifacts can then incorporate these components in test scenarios to create fully automated scripts. The maintenance cost and the risk of components becoming obsolete is minimized due to the componential nature of these test scripts.

Just under 50 percent of our survey respondents indicated that they re-used 50 percent of their test artifacts in ALM through the multiple cycles of testing. Companies that are reaching these levels of higher re-usability numbers are benefiting in three areas: more automated testing coverage leading to a higher quality of applications; higher percentage of test case automation; and shorter and more agile testing cycles. (See Figure 3)

Figure 3 Percentage of re-use of quality and testing artifacts



Source: Capgemini

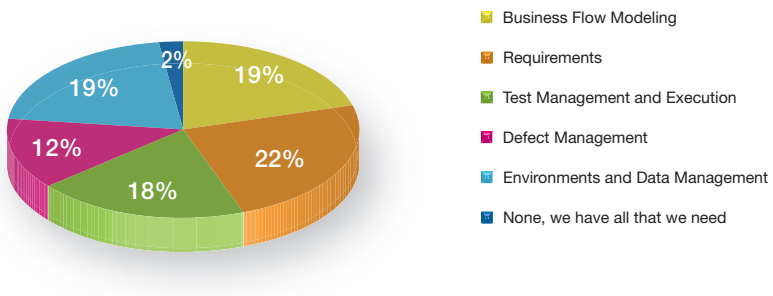
Respondents believe that new and increased investment needs to be considered for automation throughout IT, particularly for Requirements Visualization, Business Flow Modeling, and Environments and Data Management.

Companies plan to shift their investments in automation technologies

Technologies that support test automation and defects management have existed for the last 15 years. Our survey research shows that both are well leveraged, with 25 percent of respondents using automation for test cases and 22 percent of respondents using it for defect management. In addition to the continued strong emphasis on test automation and defect management, there is an increased interest in adopting technologies that could support activities in the earlier stages of the Software Testing Life Cycle (STLC).

The survey results show that respondents believe that new and increased investment needs to be considered for automation throughout IT, particularly for Requirements Visualization, Business Flow Modeling, and Environments and Data Management. Investment made in these areas is expected to generate higher quality applications and a decrease in the cost of testing and defect management during testing and in production environments. (See Figure 4)

Figure 4 Need for additional technological investment for automation



Source: Capgemini

1. Requirements visualization and business flow modeling

Requirements gathering and management have traditionally been a problematic area for the STLC. Most of the requirements documents that are generated by the business analyst community have been fairly large. The sheer size and complexity of these documents have limited the ability of QA teams to extensively leverage them, not only to understand the requirements but also to translate them into corresponding test scripts. The complexity of tying large requirements to test scripts has undermined the establishment of repeatable testing processes. This has resulted in ad-hoc testing rather than the requirements-based validation that is industry best practice.

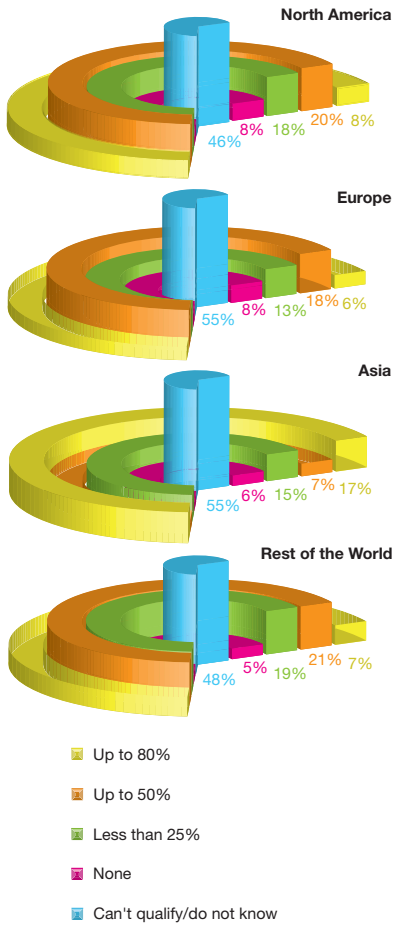
There are new technology vendors, such as Blueprint Systems, that are attempting to bridge the gap between the business analyst and QA teams by transforming requirements from text-based into logical business flows that are supported by visualization and proto-typing. In some cases, the requirements visualization has been tightly linked to QA processes and can automatically generate use cases and test scripts to reduce cost and time.

2. Environments and data management

Test environments and data management are becoming a bigger issue for QA teams. As more complex applications are created, it is becoming increasingly difficult for QA teams to create testing environments that mimic the production applications. In addition, new government restrictions around the world limit the use of production data in testing. Technologies, such as Test Environment Virtualization and Data Masking, are enabling QA teams to manage these situations.

The most important issue is that QA teams are collecting too many metrics that do not help them accurately measure their performance against corporate objectives.

Figure 5 Percentage of purchased ALM tools licenses that are fully leveraged and are generating the expected ROI



Source: Capgemini

Return on investment questioned

A complication that could derail the trend of increased investment in test automation is the inability to accurately quantify ROI. Survey respondents are unclear on the extent to which purchased ALM tools licenses are being fully leveraged and whether they are generating the expected ROI. In fact, in each of the regions, an average of 50 percent of respondents said that they could not quantify or did not know the extent of ROI. (See Figure 5)

In Asia, 17 percent of respondents said that up to 80 percent of tools licenses were being fully leveraged and were generating the expected ROI. However, the picture is not as positive in the other regions.

On average, 7 percent of respondents in the other regions agreed with their Asian professionals, but a significant proportion of respondents (on average, 33 percent) in North America, Europe and the Rest of the World thought that less than 50 percent of purchased ALM tools licenses were being fully leveraged and generating expected ROI.

There are several systemic issues that make it difficult for companies to quantify their ROI.

1. Too many metrics

The most important issue is that QA teams are collecting too many metrics that do not help them accurately measure their performance against corporate objectives. QA teams collect numerous metrics, but not necessarily the right ones. In most cases this issue is resolved by implementing a Goal Driven Measurement Program that enables QA to align their metrics against corporate objectives such as realizing a return on their investments.

For example, one of the most highlighted metrics used by QA organizations is the number of defects discovered. This technical metric isn't always very meaningful to the business. One way to make this metric more relevant to the business is to tie defects found to cause production downtimes to the actual cost of loss of business due to system unavailability.

2. Inconsistent terminology

Another issue hampering QA is the difference in the terminology being selected. Sometimes the terminology that QA uses does not present the same meaning in the business world. Therefore the two worlds of IT and business are not speaking the same language.

For instance, QA uses terms such as “defect leakage” to refer to the percentage of application-related issues found in production environments. The reduction in percentage of “defect leakage” will often produce benefits in time, effort and cost reduction for application development and maintenance. However, the term “defect leakage” used in reporting to business does not communicate a positive reference. QA needs to adapt by using terms and language that better communicate their efforts to business and more clearly define the business objectives. These efforts would increase the IT and business alignment as well as drastically reduce issues and misunderstandings between them.

Testing Organization and Tester Profile

Tester profile is becoming more domain and business oriented

By nature, a good tester tends to be a curious person who wishes to seek the root causes of issues. Historically, testers have been former developers who have switched careers to QA.

Today, the profile of testers is changing rapidly. Due to the rapid integration of IT and industry and company-specific business goals, most companies are now looking for testers who have strong domain and business knowledge. Testers need to be able to understand business requirements and create test validation for specific business needs. Organizations are also looking for testers to provide actionable analysis to developers for fast resolution of defects.

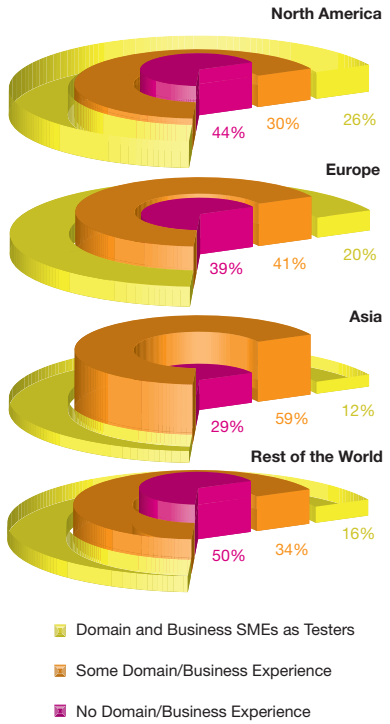
The survey found that when respondents were asked how much relevant industry domain knowledge testers had in their organization, nearly half (48 percent) said that their testers had several years of experience or were considered domain experts.

However, there were variations from one region to the next. In North America and the Rest of the World, there was a higher proportion of respondents who considered that their testers had no domain/business experience. Whereas, in Europe and Asia, survey respondents thought that their testers had some relevant experience. (See Figure 6)

The trends seem to suggest that future testers must become better rounded in both business domain and technical skills. Both traditional developers who have become testers, and cost efficient manual testers offshore, may become inadequate or even obsolete in a few years.

QA is becoming a more professional career where organizations are expecting a smaller but more skilled and highly developed labor force steeped in business knowledge. Based on our research, this is especially true of organizations outside North America. However, trends are starting to show a sharp rise in expectations from North American organizations due to pressures stemming from the recession. As the application complexity increases, time-to-market challenges will require testers to have domain, application and technology knowledge in order to quickly dissect problems and provide fast and accurate information to development teams.

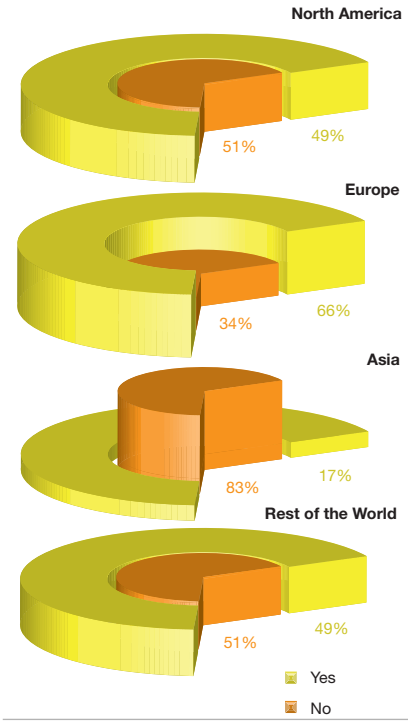
Figure 6 On average, how much relevant industry domain knowledge do testers in your organization have?



Source: Capgemini

Outsourcing Trends

Figure 7 Does your organization use outsourcing?



Source: Capgemini

Outsourcing continues to play a key role in quality management and, by all indications, this trend will increase over the next few years. More companies are focusing on their core business and shedding functions like QA to third-party vendors.

We asked participants in the survey whether their organization currently outsourced for testing resources. Europe is leading the way in terms of outsourcing, with 66 percent of European respondents saying that they use outsourced resources for testing. However, in North America and the Rest of the World there was a slightly larger majority saying that they do not use outsourcing. And in Asia, there was an overwhelming negative response, probably because these countries already have lower labor costs. (See Figure 7)

Overall, regions with the highest outsourcing rate tend to have the highest labor costs and the regions with the lowest outsourcing rate tend to have the lowest labor costs. This further supports the fact that labor arbitrage is still the leading reason for companies to outsource and off-shore IT functions.

Several key trends are emerging:

1. QA outsourcing on the rise in Europe

One of the surprising results from the survey is that Europe is leading the world for QA outsourcing. In fact, 41 percent of European respondents say that their organization is increasing to leverage outsourced resources for testing, compared to 28 percent in North

America. Across all of the regions, roughly the same percentages of respondents said that their level of outsourcing would stay the same. North America and Asia respondents foresaw a decrease in the use of outsourcing. (See Figure 8)

First, the strengthening of the Euro against the US Dollar has created an additional value incentive for European organizations to seriously consider off-shoring and labor arbitrage. This is something European organizations have been more reluctant to do in the past compared to their North American counterparts due to cultural differences and language barriers. The English language is prevalent in many of the outsourcing countries as compared to European languages such as French, Italian, German and Spanish.

The second reason involves differences in contractor laws, which allows many European countries, such as the UK, to use large quantities of affordable long-term contractors. Many of the organizations that we researched had QA organizations completely filled by long-term contractors (with 20 continuous years or more in some cases) and niche local consultants. This would not be possible in the US, for example. Independent contractors in the US are traditionally more expensive than outsourcing locations. They are also more cost-conscious as compared to their peers in other parts of the world. Furthermore, large enterprise accounts in the US have internal policies that limit the number of years a resource can be employed as a contractor before the contract must be converted into a full-time employee.

2. Outsourced resources are becoming more skilled and domain and business oriented

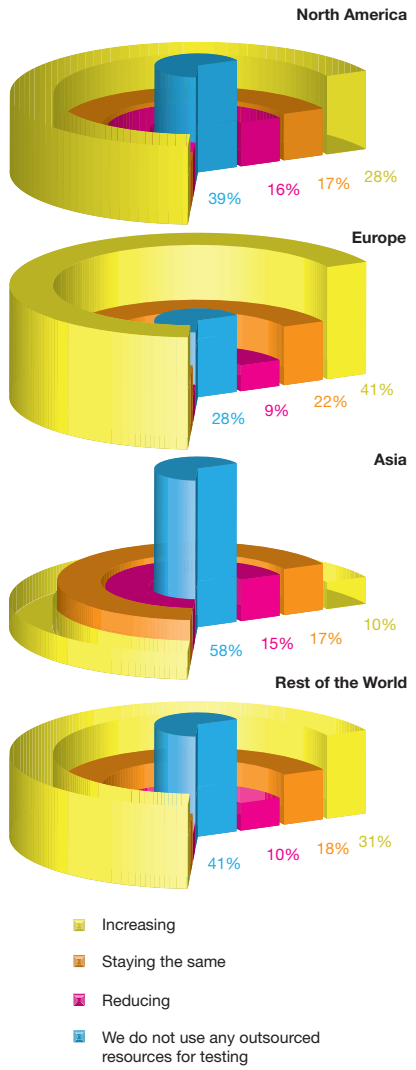
The trend toward IT, business and domain knowledge is also increasing in outsourcing, along with more highly skilled capabilities. One of the biggest challenges that we hear from clients is that their vendors do not provide enough skilled resources with the business and domain knowledge of the client. In the earlier phases of outsourcing, companies were seeking cheaper resources to augment their capabilities at lower cost.

With rates at overseas outsourcing centers increasing, companies in the West are seeking different types of profiles. In the near future, companies located in the Western hemisphere will require the outsourcing resources to provide domain-IP knowledge, and industry-specific experience, in addition to highly technical testing skill sets that are backed by robust best practices.

Western companies that have used outsourcing without governance found themselves supporting larger testing teams than their original ones due to unchecked growth. Rising costs and current economic conditions are compelling reasons for companies to look for ways to reduce the number of outsourced resources leveraging automation. In the survey, most of the respondents said that if more automation could be achieved in the area of QA in conjunction with having a higher skilled labor force, then existing QA team sizes could be reduced.

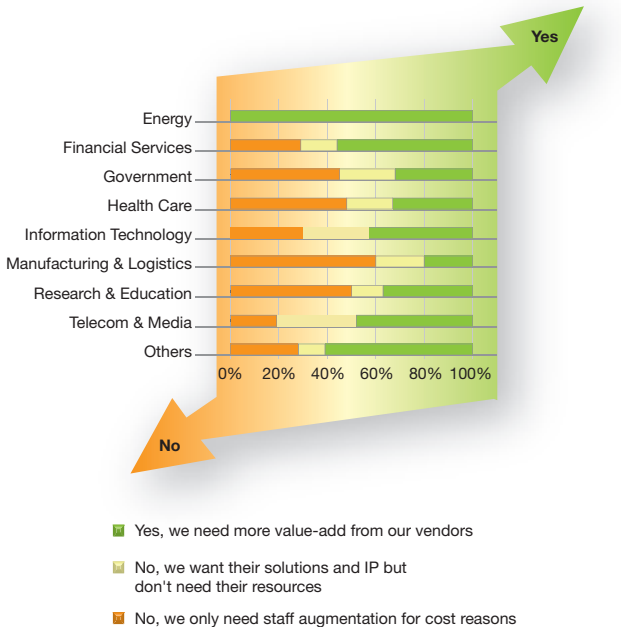
The strengthening of the Euro against the US Dollar has created an additional value incentive for European organizations to seriously consider off-shoring and labor arbitrage.

Figure 8 Outsourcing trends by geography



Source: Capgemini

Figure 9 Would you increase the use of outsourced testing resources if also getting more value-added services?



Source: Capgemini

3. New requirements demanded from outsourcing partners

Survey responses show that there is a divide between organizations that are looking to continue business-as-usual by leveraging global labor arbitrage and organizations that are looking for more value-added services from vendors.

The more mature organizations that have reaped the benefits of labor arbitrage are looking at the next evolutionary step to gain more value-added services, such as industry-specific, quality solutions out-of-the-box with pre-built requirements, models, test cases, or automation from outsourcing vendors.

On average, 45 percent of respondents said that they would increase outsourced testing resources if they could have more value-add from vendors, and a further 22 percent said that, while they would not increase outsourced resources, they would still be interested in solutions and intellectual property.

There is strong interest in outsourced testing resources with value-add from Energy, Financial Services, Information Technology and Telecom & Media. (See Figure 9)

Economic Impact

While the current economic conditions may be stabilizing, the recession is likely to leave long-standing negative effects in the traditional method of delivering testing and quality management services. We are already seeing that our clients are looking to have smaller, technically-skilled, and business-aligned teams to deliver testing in agile development cycles.

As the current economy has been going through a very sharp decline, we wanted to get a better understanding from organizations on the impact that the recession was having on their organizations. Our survey identified three specific trends based on the effects of the current economic crisis.

1. IT investment has been reduced

Our survey indicates that there has been an overall decline in the total investment in IT across most sectors, with the exception of Research & Education. (See Figure 10)

This means that companies are trying to do more with less in every respect, including the number of employees and total investments. For each of the roles (engineer, senior engineer, mid-level manager, and executive) there have been reduced IT investments.

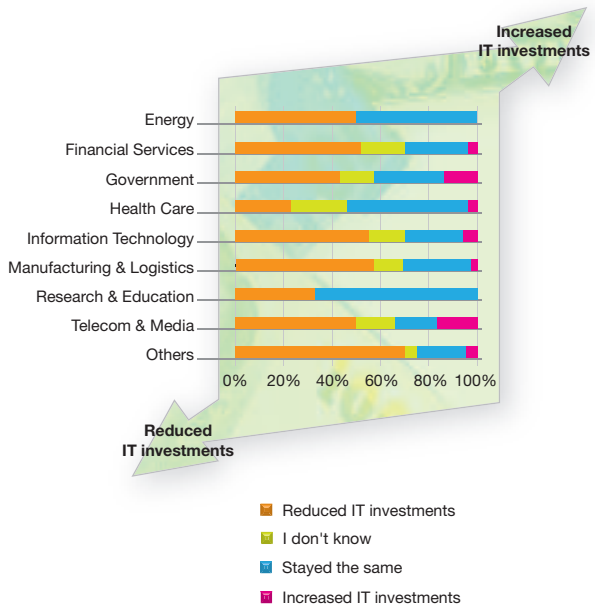
Potentially, this means that companies will have to find resources that can deliver more with less or their applications in production may suffer potentially embarrassing and financially devastating setbacks. The reduction in IT investment has also shifted from custom-built to package-based solutions, changing the nature of the application ecosystem.

2. Testers are facing an increased work load

When looking more closely at the economic effects of IT spending, workers who are hardest hit in terms of increased work load due to staffing cuts are predominantly employed by enterprise companies (i.e. more than a few thousand total employees).

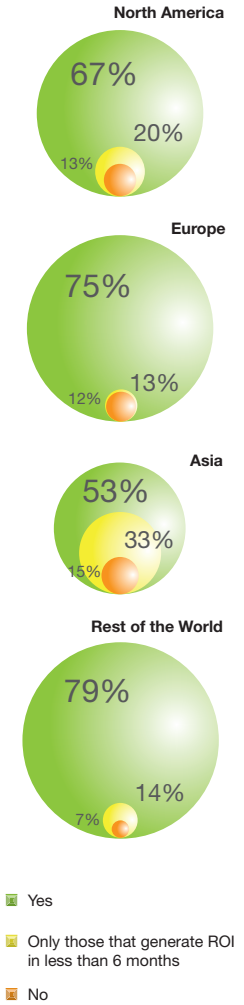
This is expected, since in smaller companies employees wear many hats with limited overlapping responsibilities among team members. Therefore, it is conceivable that smaller companies are less tolerant to resource reductions than their larger counterparts. This could be because larger companies tend to cut workforce more severely in bad economic times than smaller companies.

Figure 10 How have the current economic conditions affected IT investments in your organization?



Source: Capgemini

Figure 11 More investment in new application development projects



Source: Capgemini

3. Investments in new application development projects will increase

Among a majority of respondents, there is an expectation that there will be an increased number of application development projects and a higher intensity of work. This is applicable in each of the regions, as can be seen in Figure 11.

This is good news for existing QA teams as well as out-of-work testing professionals who are looking to re-enter the work force. Companies are investing in several areas to reduce IT's operational cost to free up funds for new application development.

The first area is in Application Development & Maintenance initiatives where-by companies re-examine their current application portfolio to identify their relevant business critical and non-critical applications. The outcome of this initiative is to eliminate unused or underused applications and create savings in the IT operations budget that can be leveraged to build model applications, providing the companies with competitive advantage against their industry peers.

The second area is in Legacy Modernization where companies identify their costly and outdated applications and port them onto modern platforms to cut cost and gain competitive advantage in their markets. As these trends increase, we are likely to see higher numbers of new application developments leading to shifts in demand for QA resources in 2010.

Summary

The 2009 *World Quality Report* offers both a quantitative and qualitative view of the emerging trends in QA testing and a forecast of how these trends will shape ALM in the future.

Companies have historically invested in the functional and performance testing components of the STLC. We expect to see investments shifting towards Requirements Visualization and Test Environment and Data Management. In the new world of Agile-driven development, the goal of these new investment areas is to expand automation into all facets of the STLC and drive additional cost savings from the quality assurance process while improving application quality.

The profile of a traditional tester was a former developer or technical analyst who moved into a QA role. However, we have seen that companies are now demanding both business domain knowledge and technically savvy resources, and we expect this trend to continue. The outcome of these changes will be the formation of smaller, more nimble QA teams that possess a deep business domain knowledge as well as the ability to provide actionable analysis to development teams in support of Agile methodologies.

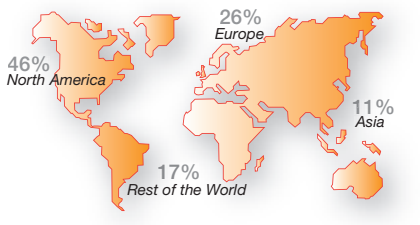
The outsourcing of testing is here to stay. In North America, where testing outsourcing has reached a comparatively advanced state, we expect the levels of offshore engagement to remain stable. However, the outsourcing trend for testing is expected to expand to the other parts of the Western hemisphere. In 2010, Europe will likely outpace other regions in the growth of test outsourcing, switching from onsite contractors to an offshore model.

In 2010, the silver lining for QA professionals is the expected shift of funds due to legacy modernization initiatives. This means an increasing move from an operations-centric IT to a focus on newer package applications. Our survey response overwhelmingly indicates that testing practitioners, especially those in North America, expect their workload to increase next year due to new application development projects.

We have seen that companies are now demanding both business domain knowledge and technically savvy resources, and we expect this trend to continue.

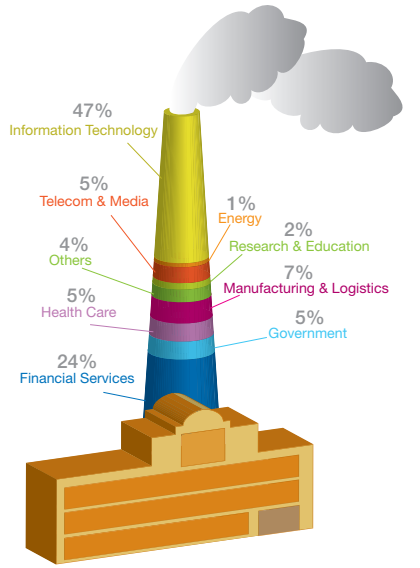
About the Study

Figure 12 Respondents by Geography



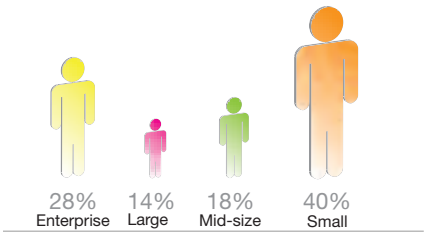
Source: Capgemini

Figure 13 Respondents by Industry



Source: Capgemini

Figure 14 Respondents by Size of Company



Source: Capgemini

The *World Quality Report* Survey was sent to over 10,000 CXOs, IT directors, QA managers and engineers at more than 400 unique companies around the world. It addressed a number of specific questions that relate to quality assurance and testing:

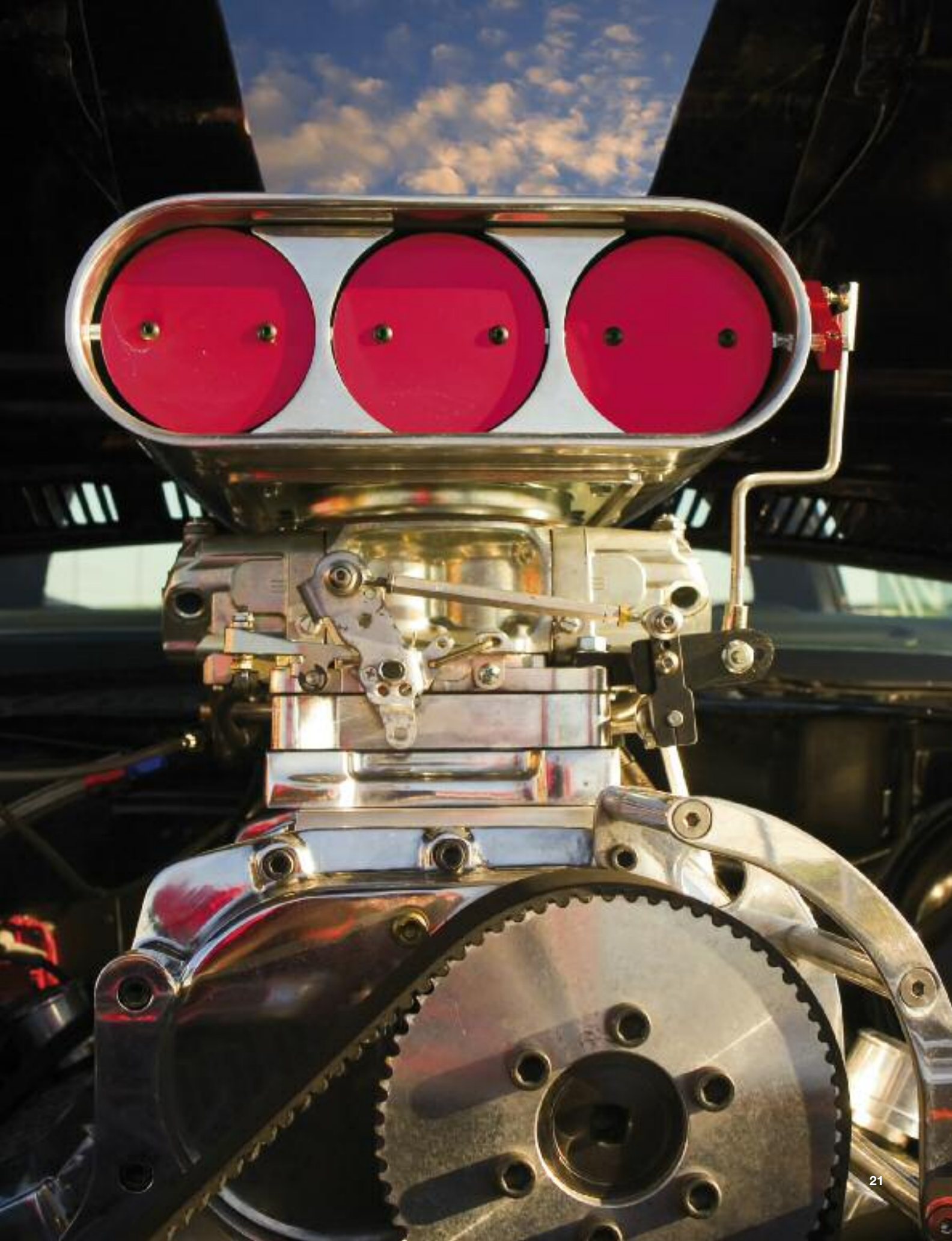
1. What are the trends in tools and technology (application complexity, automation technology, investment)?
2. Is quality assurance and testing getting better? What are the challenges?
3. What changes are happening in the testing organization (professionals, roles) within companies?
4. What are the outsourcing trends and what plans do companies have to address them?

All major industries were represented in the survey: Information Technology, Financial Services, Manufacturing & Logistics, Telecom & Media, Health Care, Government, Research & Education, and Energy. By far the largest number of respondents – 47 percent - said that they worked in an Information Technology company.

In terms of the size of the companies where respondents work, the majority were employed in: Small companies (less than 1,000 employees) followed by Enterprise companies (more than 20,000 employees), Mid-size companies (1,000 to 5,000 employees), and Large companies (5,000 to 20,000 employees).

In addition to the responses collected from survey participants, the content of this report is supported by Capgemini's benchmark data carried out on client projects, best practices, as well as over 30 years of experience in testing and quality management.

Throughout the years, Capgemini and Sogeti have developed a range of best practices, including TMap® and TPI®, which are now accepted as industry standards around the world. TMap®, Test Management Approach, is Capgemini's business-driven, risk-based methodology for structured software testing that is designed to address the key issues of quality, time and cost - across the whole development lifecycle of solution delivery. TPI® (Test Process Improvement) is our registered model for the improvement of testing that offers insight into the maturity of the current test process and identifies improvement actions to accomplish the desired test maturity level.



Glossary

Agile Methodology
Agile is an approach to software development based on iterations. Both requirements and the resulting solutions evolve through collaboration between self-organizing cross-functional teams though multiple incremental iterations.

Application Development & Maintenance (AD&M)
AD&M can be described as the comprehensive and integrated process for managing the entire lifecycle of a single application landscape from its conception, through design and deployment, to service, renewal and disposal.

Application Lifecycle Management
Application Lifecycle Management (ALM) is the marriage of business management to software engineering made possible by tools that facilitate and integrate requirements management, architecture, coding, testing, tracking, and release management.

Artifacts
An artifact is one of the many kinds of tangible by products produced during the development of software. Examples include use cases, test cases and test plans.

Automated Testing Tools
An automated instrument that typically improves the efficiency of testing and supports one or more testing activities, such as planning, design and execution.

Data Masking
Data masking is the process of obscuring (masking) specific data elements within data stores. It ensures that sensitive data is replaced with realistic, but not real, data. The goal is that sensitive customer information is not available outside of the authorized environment.

Goal Driven Measurement Program
A metrics program which can identify, select, define, and implement software measures to support business goals.

Legacy Modernization
Rewriting or porting of a legacy system to a modern computer programming language, software libraries, protocols, or hardware platform. It aims to retain and extend the value of the legacy investment through migration to new platforms.

Quality Assurance
Software Quality Assurance is the monitoring of the software engineering processes and methods used to ensure quality. The methods by which this is accomplished are many and varied, and may include ensuring conformance to one or more standards, such as ISO 9000 or CMMI.

Quality Management
The aim of Software Quality Management (SQM) is to manage the quality of software development processes and products.

Requirements Visualization
A new requirements paradigm that leverages modeling, UI prototyping, story boarding and mock ups to better represent and capture the needs of the end-users of a particular product.

Software Testing Life Cycle (STLC)
A linear and sequential approach to testing by partitioning all testing activities into phases that methodically remove levels of software risk and integrates with the software development lifecycle.

Test Environments and Data Management
The planning, design, creation, maintenance of infrastructure and components such as connections, test data, tools, management processes, operating environments and hardware in which a test is carried out.

Test Environment Virtualization
Testing teams require multiple environments to conduct a large array of tests ranging from integration test, system tests to user acceptance tests. Test Environment Virtualization assists in the creation and management of these environments by splitting the same hardware capacity between multiple environments with the help of virtualization software.

Software Testing
An empirical investigation conducted to provide stakeholders with information about the quality of the product or service under test, with respect to the context in which it is intended to operate. Software Testing also provides an objective, independent view of the software to allow the business to appreciate and understand the risks at implementation of the software.

TMap®
TMap®, Test Management Approach, is the Capgemini / Sogeti business-driven, risk-based methodology for structured software testing that is designed to address the key issues of quality, time and cost across the whole development lifecycle of solution delivery.

TPI®
TPI®, Test Process Improvement, is the Capgemini / Sogeti registered model defined to increase the maturity of Testing processes. The model offers insight into the maturity of the current test process and identifies improvement actions to accomplish the desired test maturity level.

About us

Capgemini

Capgemini, one of the world's foremost providers of consulting, technology and outsourcing services, enables its clients to transform and perform through technologies. Capgemini provides its clients with insights and capabilities that boost their freedom to achieve superior results through a unique way of working, the Collaborative Business Experience.

The Group relies on its global delivery model called Rightshore®, which aims to get the right balance of the best talent from multiple locations, working as one team to create and deliver the optimum solution for clients. Present in more than 30 countries, Capgemini reported 2008 global revenues of EUR 8.7 billion and employs 90,000 people worldwide.

More information is available at www.capgemini.com

Sogeti

Sogeti is a leading provider of professional technology services, specializing in Application Management, Infrastructure Management, High-Tech Engineering and Testing. Working closely with its clients, Sogeti enables them to leverage technological innovation and achieve maximum results. Sogeti brings together more than 20,000 professionals in 14 countries and is present in over 200 locations in Europe, the US and India. Sogeti is a wholly-owned subsidiary of Cap Gemini S.A., listed on the Paris Stock Exchange.

Sogeti is a world leader in innovative, business-driven quality assurance and testing services. As independent and objective testing specialists, our clients benefit from the identifiable results from our onshore and offshore cost-effective testing solutions: Managed Testing Services, TMap NEXT®-based project and program testing, and TPI® - test process improvement. As the largest testing service provider in Europe and the USA, with over 2,500 test professionals and a further 5,000 application specialists with test experience, in 14 countries worldwide, we help organizations achieve their testing and QA goals.

More information is available at www.sogeti.com

Hewlett-Packard

HP, the world's largest technology company, simplifies the technology experience for consumers and businesses with a portfolio that spans printing, personal computing, software, services and IT infrastructure.

Our Business Technology Optimization (BTO) products, along with our new and complete approach to Application Lifecycle Management (ALM), help our customers to achieve better business outcomes.

More information about HP (NYSE: HPQ) is available at www.hp.com

Contacts

We value your comments and ideas. We welcome you to contact us in relation to any questions you might have concerning the 2009 *World Quality Report*.

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