Apexon

THE IMPACT OF DIGITAL TRANSFORMATION ON TESTING & QA

A RESEARCH REPORT BY APEXON

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INTRODUCTION

THE NEW DIGITAL ERA REQUIRES INCREASED SPEED AND AGILITY IN TESTING & QA

For organizations that see digital driving their future, test/QA organizations play an increasingly critical role in their success.

The ability to support the demand for faster cycle times and higher service levels is essential in every aspect.

Apexon has observed that by making this shift successfully, enterprises can improve employee productivity, open up new revenue channels, enhance customer service and engagement, and distinguish themselves from their competition – all while reducing their operational costs in development and QA.

APEXON FINDINGS

INCREASING OPERATING EXPENSES

Apexon has also noticed that companies that couldn't make this shift faced increasing operating expenses and were unable to deliver quality products quickly to market.

Digital has pushed the boundaries of application development and delivery teams to adopt Agile and DevOps principles. This trend has drastically shifted the role of testing and QA.

Therefore, in late 2017, Apexon surveyed QA and test professionals and executives in the US and UK about the impact of digital transformation on their enterprise software testing/QA efforts.

The results shed light on some of the key challenges and opportunities organizations face as they re-think their approach to QA to meet new market demands.

Several key themes emerged:

AUTOMATION COVERAGE IS STILL LOW

Manual testing processes can only cover so many different use case scenarios. Automation Is starting to fill the gap for some QA teams, but there is still a big opportunity for improvement.

TESTING COMPLEXITY IS INCREASING

New apps and services have to be developed for multiple platforms, devices, operating systems, and geographies. Increasing connectivity multiplies this complexity.

INTELLIGENT QA IS HERE

There is keen interest in leveraging continuous monitoring, predictive analytics, and machine learning tools to further accelerate software testing and provide inputs to test strategy.

TEST BACKLOGS A HINDRANCE

A large portion of testing today is still manual and highly dependent on factors such as skilled resources, infrastructure, and tools, etc. To accelerate release cycles, enterprises need to automate the huge backlogs of test cases. This is difficult without the proper resources and tools in place.

PRODUCTIVITY PRESSURES ARE PREVALENT

As demand increases, test/ QA teams need to be more productive and responsive. There is less time to properly define test requirements.

USER FEEDBACK IS STILL CHALLENGING

It's difficult to incorporate it within tight time frames – especially when applications are brand new to market.
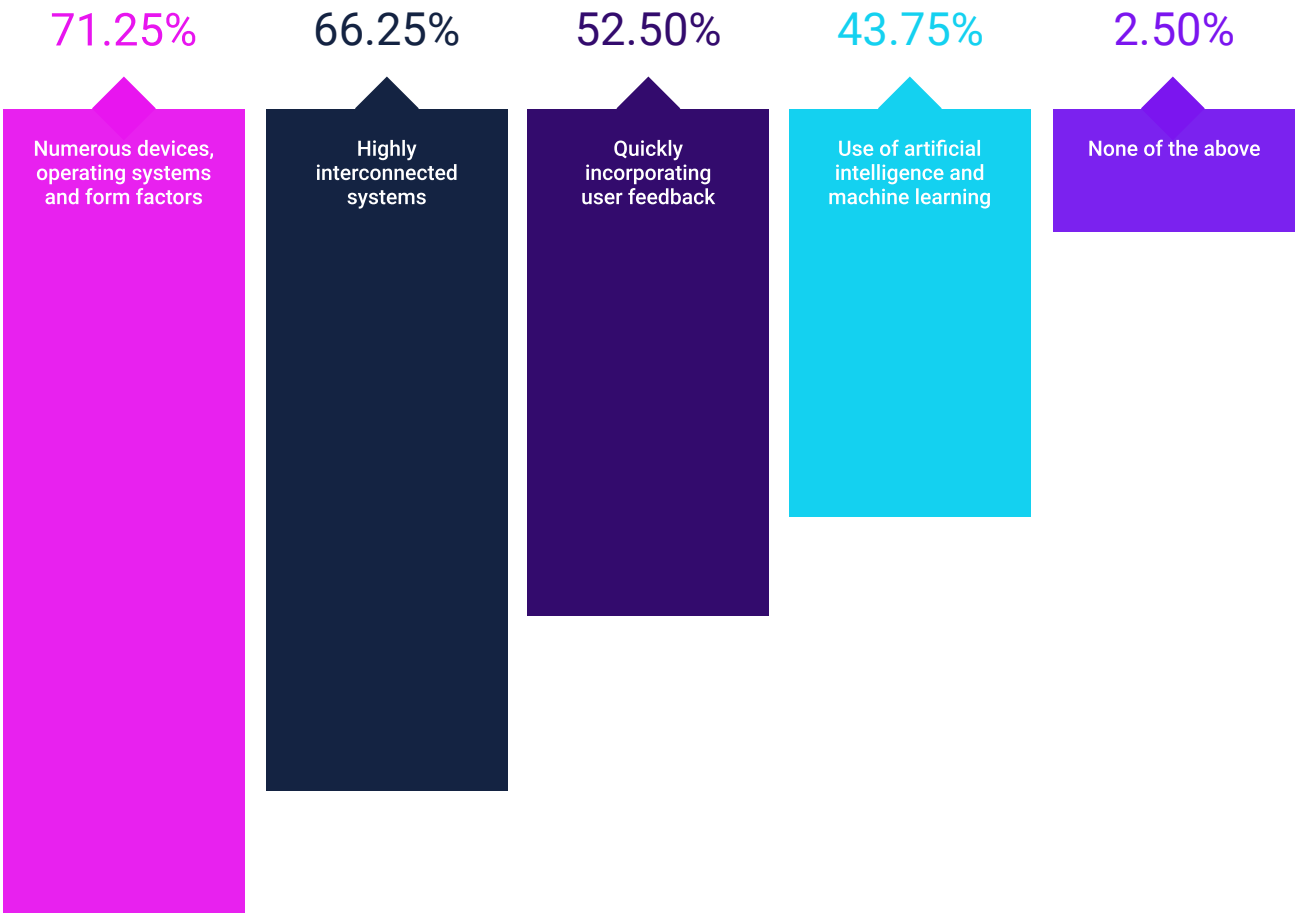
KEY FACTORS

CHANGE IS INEVITABLE

Change is inevitable as digital transformation puts more pressure on software delivery teams.

Test/QA teams can adjust by:

1. Leveraging cloud-based testing labs like Perfecto Continuous Quality Lab to help manage the increasing number of devices, operating systems and form factors that need to be tested to assure a great user experience. Solutions like this can also replicate system interconnectivity that is becoming such an integral part of the digital landscape.

2. Adopting continuous testing and automation approaches to enable faster feedback cycles for development teams.

3. Incorporating intelligent testing solutions like Apexon ASTUTE that leverage advanced machine learning techniques to optimize every aspect of the testing cycle from discovery to maintenance.

With the evolution of digital, which of the following factors are becoming inevitable for QA teams?

71.25%	66.25%	52.50%	43.75%	2.50%
Numerous devices, operating systems and form factors	Highly interconnected systems	Quickly incorporating user feedback	Use of artificial intelligence and machine learning	None of the above

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PRIORITIES

SHIFTING FOR TEST & QA TEAMS

1 More companies are adopting best practices for DevOps and Agile environments such as continuous integration and continuous delivery (CI/CD) processes that integrate dev/test efforts to compress cycle time and increase ROI.

2 They are also looking at artificial intelligence and machine learning algorithms for predictive and prescriptive analytics - to not only help anticipate defects early, but also provide appropriate recommendations against those defects to speed cycle time and improve quality.

3 There is a renewed focus on streamlining both operational and infrastructure costs in test/QA leading to greater interest in cloud-based testing services.

4 The ability to effectively test new IoT and smart devices has also gained in importance. As the IoT ecosystem grows, so do the number of unique combinations of use cases against devices, operating systems and other conditions. This not only reinforces the need for a well thought out development strategy, it also makes testing and QA more complex.

How is digital transformation shifting priorities of QA organizations?

79.6%	Adopt best practices for DevOps and agile environments
59%	Use Intelligent and self-learning QA technologies
58%	Adopt cloud testing solutions
52.8%	Focus on cost savings
50.8%	Focus on IoT and smart devices testing

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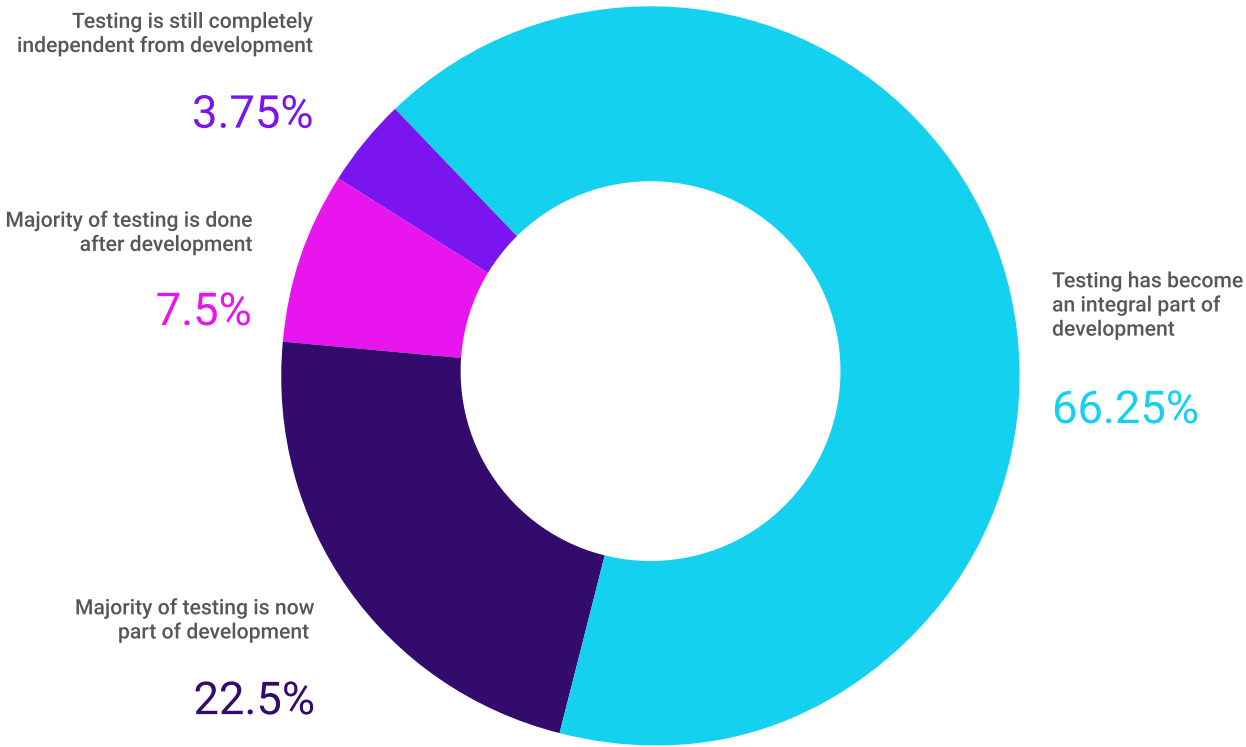LEARN MORE >

ADOPTION

QA IS "SHIFTING LEFT"

As DevOps gains adoption, QA is "shifting left" in the software development lifecycle - and being more closely integrated with development.

2/3rd of respondents see testing becoming an integral part of development in their organizations.

This "shift left" approach enables QA teams to find bugs and defects sooner and development teams to fix them more quickly and less expensively - before they impact a customer.

This model ensures quality throughout the entire software development lifecycle, reducing costs, accelerating release cycles, and increasing customer satisfaction.

With increasing DevOps adoption, how do you see the role of QA changing on the software development lifecycle?

Testing is still completely independent from development

3.75%

Majority of testing is done after development

7.5%

Testing has become an integral part of development

66.25%

Majority of testing is now part of development

22.5%

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Shift Left Best Practices to Keep Pace in Digital

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New Jenkins Plugin Tackles DevOps Pipelines and App Maintenance
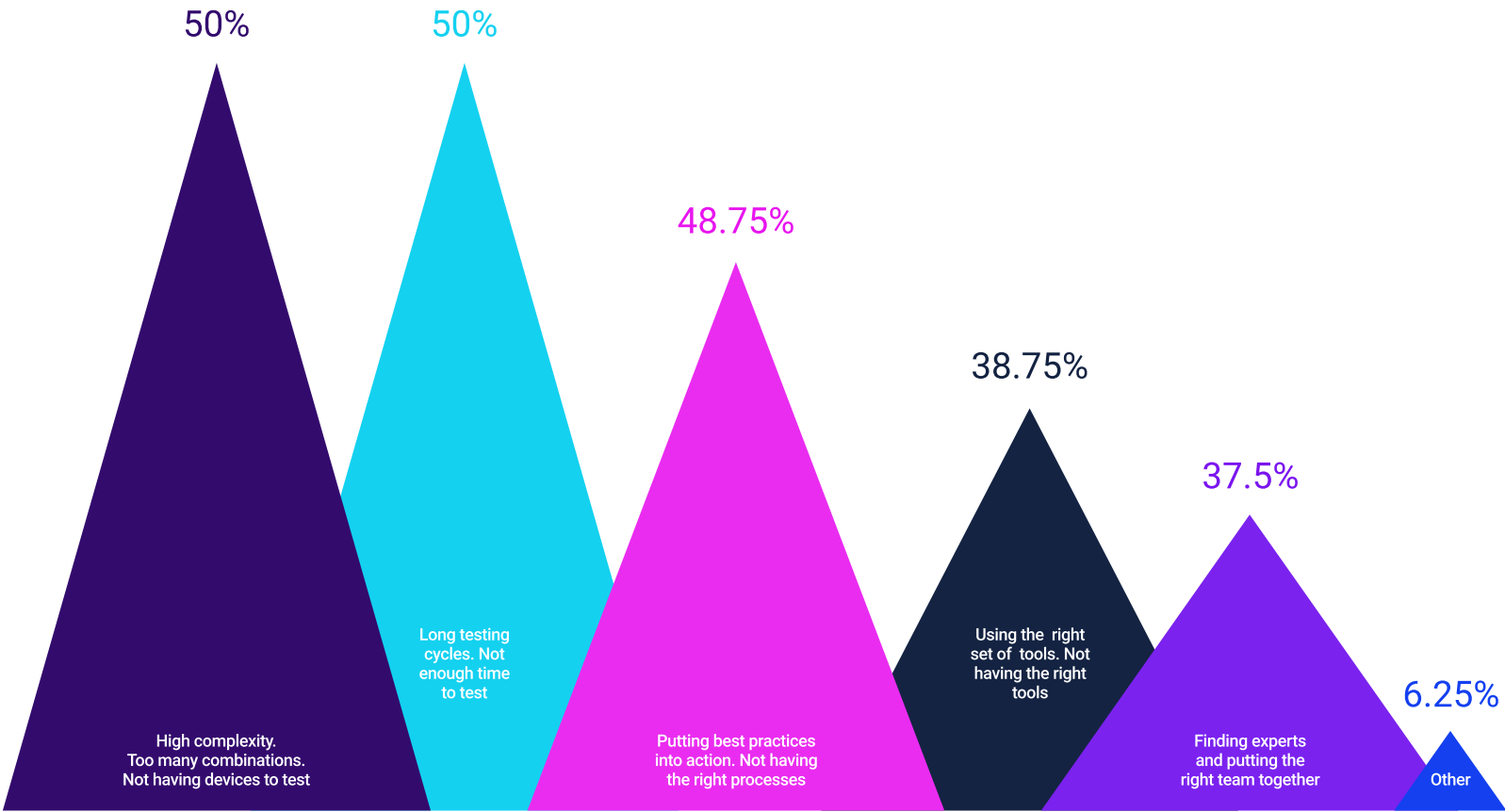
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CHALLENGES

CREATING & EXACERBATING EXISTING ONES

1 Insufficient time to test new applications and services forces difficult decisions about how to prioritize test resources and increases the risk for poor service quality and negative impact on brand reputation.

2 Increased complexity created by an increasing number of technological combinations and a lack of new devices to test on makes it even more difficult for test/QA teams to keep up with the accelerated pace of development. As a result, delivery teams are unable to take full advantage of gains from DevOps and Agile initiatives.

3 Putting the right people and processes in place to enable implementation of best practices has become increasingly difficult as demand for digital skills intensifies. Many organizations are looking to third party experts to extend their existing capabilities and to help put the infrastructure in place to meet their future digital needs.

4 Finding and accessing the right set of tools to support their testing efforts is also challenging delivery teams. This is another area outside experts can help – finding the right solution to fit the organization's existing infrastructure and skill set along with its future plans.

What are some of the major QA challenges of your organization?

50%
High complexity. Too many combinations. Not having devices to test

50%
Long testing cycles. Not enough time to test

48.75%
Putting best practices into action. Not having the right processes

38.75%
Using the right set of tools. Not having the right tools

37.5%
Finding experts and putting the right team together

6.25%
Other

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Quality Assurance to Quality Engineering: A Must Cross Chasm

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TEST AUTOMATION

PROGRESS IS NEEDED FOR ENTERPRISES

Test automation is critical and QA organizations are increasing their use, but more progress is needed for enterprises to meet the new demands of digital.

Enterprise progress in automating software testing efforts varies, but the majority have automated less than 25%.

As business demands put more pressure on organizations to speed cycle time for new digital services, enterprises must embrace automation more than ever before.

This facilitates the organization's ability to:

1. Unify the testing of web, mobile and native apps and services.

2. Adopt a feedback-driven approach to identify user issues early in the cycle.

3. Support continuous integration/delivery processes.

Yet, the reality is that most organizations still have a huge backlog of manual test cases that need to be automated before they can move forward. This is difficult without the proper resources and tools in place.

What percentage of your testing efforts are automated?

36.25%
<25%

31.25%
25-50%

21.25%
50-75%

6.25%
No

5%
<75%
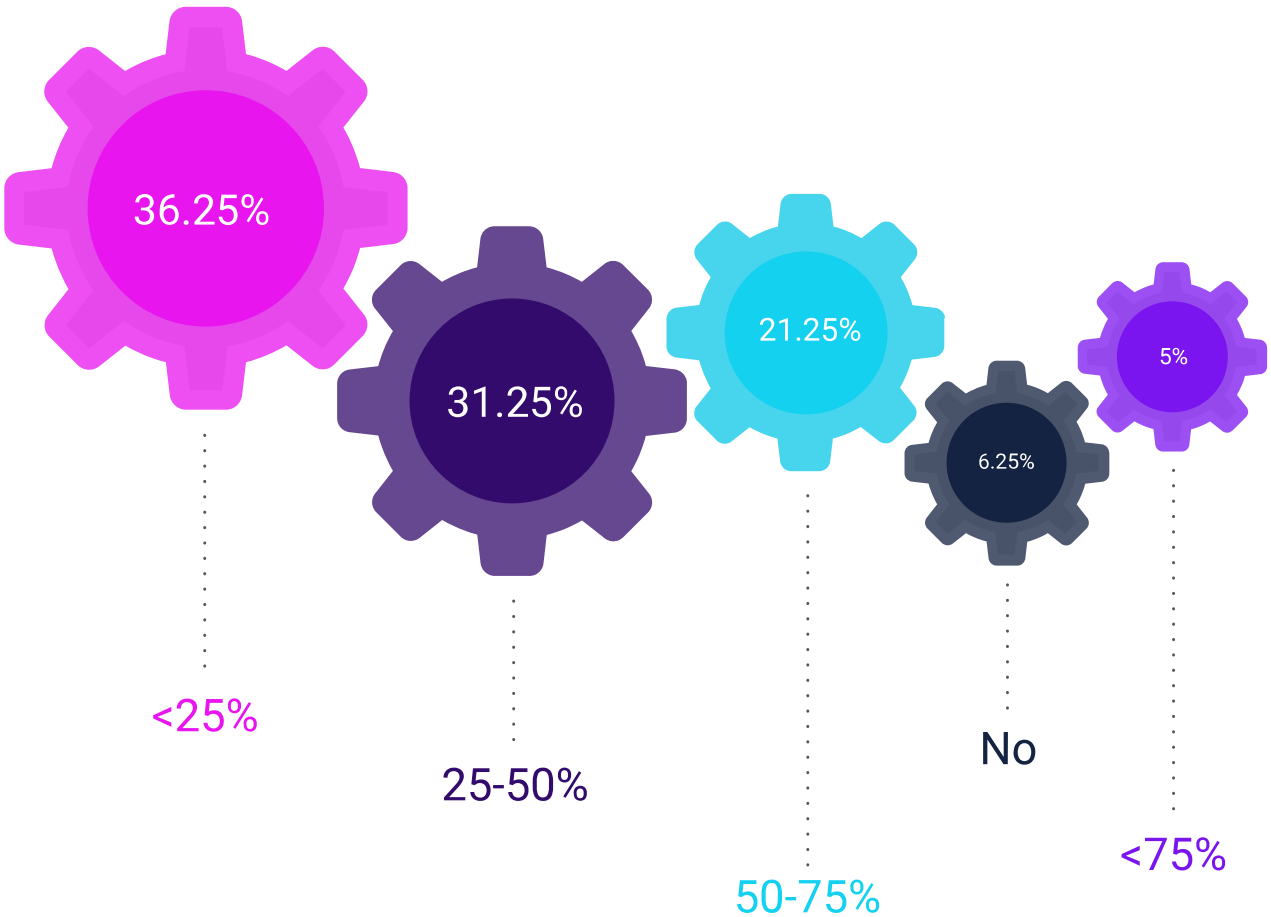
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SOFTWARE CODE

FREQUENCY CONTINUES TO ACCELERATE

Software code release frequency continues to accelerate, but there are still some laggards.

Over 20% of respondents are releasing new code weekly, and the majority (40%) currently managing to a monthly release schedule. Less than 20% are still on a quarterly release schedule.

To accelerate cycle time, delivery teams need to address multiple areas:

1. QA teams need to start test execution early in the project development lifecycle.

2. Development team needs to prioritize feedback from the QA team based on the product requirements as well as issue severity. And then make team resources available to act on those priorities and resolve them.

3. Both development and test/QA need to commit to allocate or free up enough resources to provide the feedback as well as to act on the feedback provided within the stipulated amount of resolution period.

4. Automation is also critical to accomplishing these things – from deployment of virtual services, to installation of the latest build.

What is the frequency of your releases?

Weekly	Monthly	Quarterly	Other
21.25%	40%	18.75%	20%

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SOFTWARE CODE

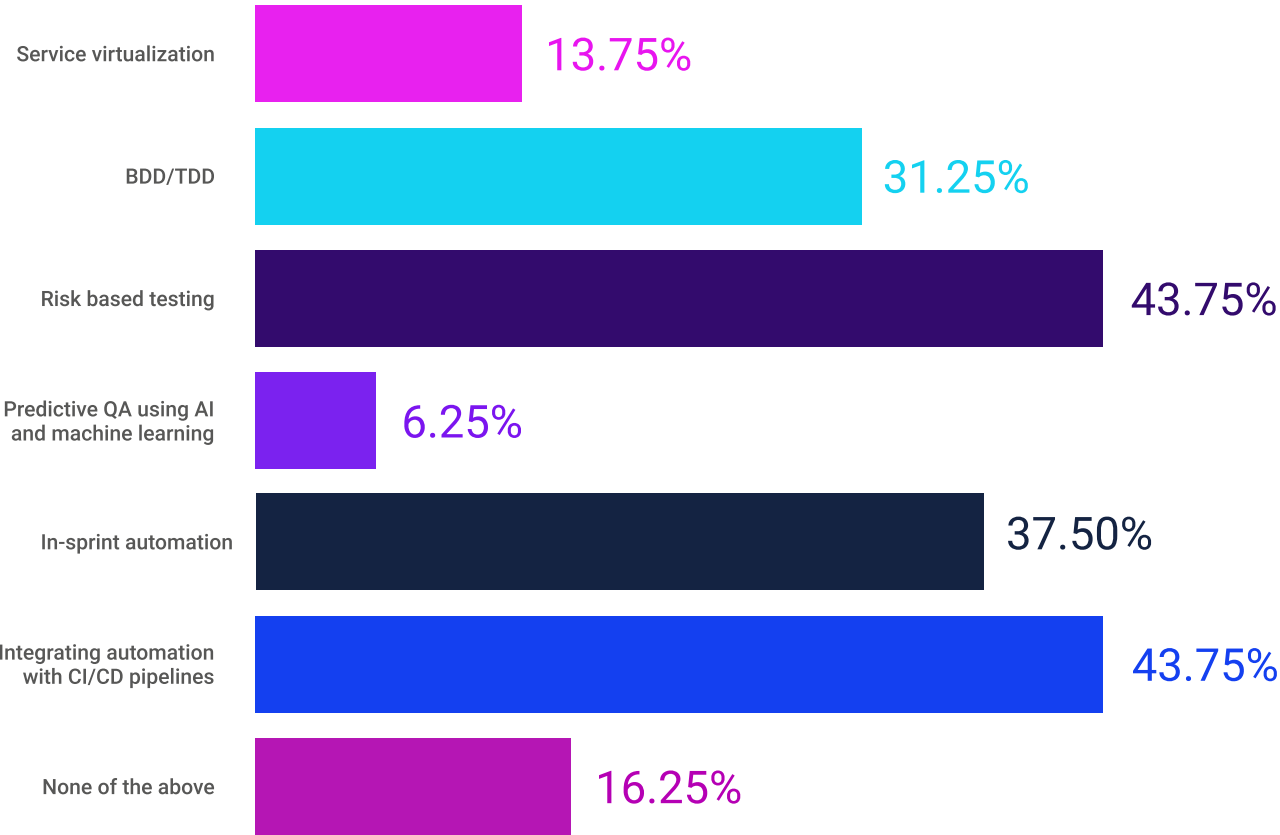# QA PROCESSES & BEST PRACTICES

Companies are leveraging a variety of QA processes and best practices to accelerate their software delivery efforts.

The most common cited in the survey were integrating automation with CI/CD pipelines, risk-based testing, in-sprint automation, and behavior-driven/test-driven development.

In addition, we see organizations implementing a variety of other strategies to accelerate their software development lifecycles and meet the new demands of digital. These include:

1. Refocusing their QA efforts from testing features and functions to evaluating customer experience and business assurance.

2. Expanding their testing teams' skills beyond manual and test automation to end-to-end quality engineering.

3. Using proven Agile and DevOps practices to break down silos.

4. Prioritizing testing with predictive quality analytics and continuous monitoring and feedback.

5. Leveraging on-demand testing environments to increase their agility.

Which of the following QA principals are you currently using?

Category	Percentage
Service virtualization	13.75%
BDD/TDD	31.25%
Risk based testing	43.75%
Predictive QA using AI and machine learning	6.25%
In-sprint automation	37.50%
Integrating automation with CI/CD pipelines	43.75%
None of the above	16.25%

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Continuous Integration Accelerates Time to Market

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WHAT ARE YOUR PREFERRED TESTING TOOLS?

48.75% ATLASSIAN

26.25% Hewlett Packard Enterprise

16.25% SMARTBEAR

12.50% CloudBees

11.25% Perfecto

8.75% SAUCELABS

8.75% IBM MobileFirst Foundation

5% MICRO FOCUS

2.50% Tricentis

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Leading Digital and Enterprise Technology Solutions Can Help Ensure Digital Initiatives Deliver the Greatest Possible Impact

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DIGITAL TESTING SKILLS

CERTAIN SKILLSETS HARD TO FIND

Digital demands a wide range of testing skills, but organizations are finding certain skillsets very difficult to find.
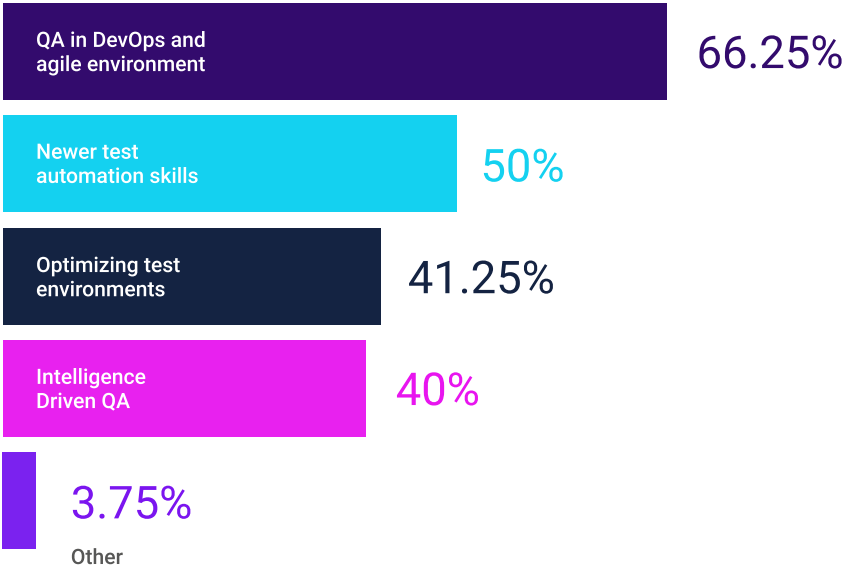
The most difficult skills to find are:

1. QA in DevOps and Agile environments.

2. Newer test automation skills.

3. Optimizing test environments.
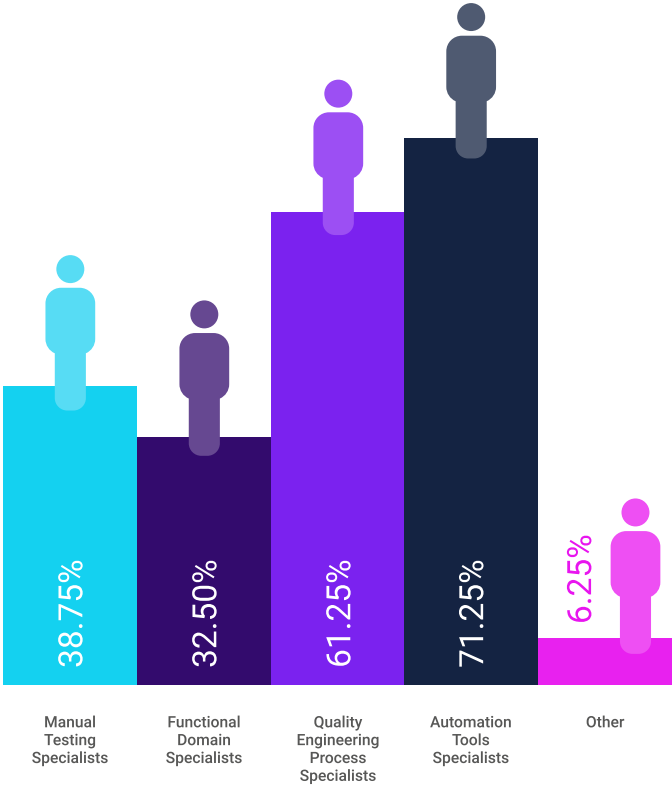
4. Intelligence-driven QA.

Certain skillsets such as test automation and QE process experience have become mandatory when hiring while manual testing and functional domain expertise have become less relevant.

As companies get up to speed on Agile and DevOps, they are starting to turn their attention to predictive analytics and machine learning. We see a lot of demand for this skillset as companies look to see how they can leverage these technologies to further accelerate their automation efforts.

Digital assurance demands a wide range of testing skills. In which areas is finding the right skillset a challenge?

Skill	Percentage
QA in DevOps and agile environment	66.25%
Newer test automation skills	50%
Optimizing test environments	41.25%
Intelligence Driven QA	40%
Other	3.75%

When hiring for your testing teams, what are the mandatory skills you are looking for?

Role	Percentage
Manual Testing Specialists	38.75%
Functional Domain Specialists	32.50%
Quality Engineering Process Specialists	61.25%
Automation Tools Specialists	71.25%
Other	6.25%

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DIGITAL DEMANDS A DIFFERENT APPROACH

Is your organization keeping pace?

Digital requires all businesses to move faster and more flexibly than ever before in software delivery – without sacrificing quality. This requires integrating the efforts of their Dev and QA teams and automating manual processes wherever possible.

Apexon is a digital-first professional services firm. We help enterprises get digital right the first time with proven methodologies, tools and infrastructure enable companies to transform their test and QA efforts to meet the demands of digital. These include best practices in Agile testing, continuous integration and test-driven development and industry-leading products and tools that help clients improve service quality and speed time to market while reducing their operational costs.

We also provide intelligent automation services which encompass testing BOTs that help accelerate automation of backlogs. These services leverage AI and Machine Learning concepts and testing best practices to optimize test cases and take advantage of test data.

APPROACH & BENEFITS

We Deploy the Right Blend of Resources to Complement Your Existing Team and Leverage Existing Tools and Resources Where Appropriate. This Ensures Optimal Impact and ROI.

APEXON APPROACH

- Reusable frameworks and easy-to-use automation tools that abstract complexity.
- Continuous integration, (Acceptance) test-driven development (ATDD), in-sprint automation.
- Business-driven development and testing concepts for plain language scripting.
- Cloud scalability to address unique test environment and test data challenges.
- Test frameworks that support test cases spanning GUI/WEB/Services.
- AI and machine learning-powered test automation services.
- Advanced test reporting and trend analysis.

CUSTOMER BENEFITS

- Easier deployment, less risk and shorter cycle times.
- Access to the latest technologies and best practices.
- Faster, broader market coverage – device, OS, geographies.
- Improved testing quality; higher service levels.
- Faster problem resolution.
- Increased user confidence and adoption.
- Substantial time and resource efficiencies.
- Intelligent decision making.

BEST PRACTICES

See how your organization measures up against industry best practices.

Advance your Quality Engineering efforts with our free comprehensive evaluation.

FIND OUT MORE

Apexon

APEXON IS A PURE-PLAY DIGITAL ENGINEERING SERVICES FIRM FOCUSED ON HELPING COMPANIES ACCELERATE THEIR DIGITAL INITIATIVES FROM STRATEGY AND PLANNING THROUGH EXECUTION.

We leverage deep technical expertise, Agile methodologies and data-driven intelligence to modernize systems of engagement and simplify human/tech interaction.

We deliver custom solutions that meet customers' technology needs wherever they are in their digital lifecycle. Backed by Goldman Sachs and Everstone Capital, Apexon works with both large enterprises and emerging innovators — putting digital to work to enable new products and business models, engage with customers in new ways, and create sustainable competitive differentiation.

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