

TestRail 

# Exploring the Impact of AI in QA





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# Introduction



It's hard to avoid getting swept up in the excitement when something as potentially transformative as artificial intelligence (AI) is introduced to the market. It seems like suddenly the impossible is possible: tasks that previously took hours (if not weeks) can now be accomplished at the push of a button. Long-standing barriers like “writer’s block” have been dropped seemingly overnight—the excitement around this new frontier of how we work is undeniable.

But then come the anxieties. If we don't adopt AI, will we be left behind? Is this a new skill we'll all have to learn and hire for? As more developers rely on AI to write code, do testers need to follow suit and use AI to keep up with testing? Are AI tools a security and privacy liability? And perhaps the biggest question of all is: Will AI replace the need for a human to do my job?

We wanted to cut through the noise and get real data on how real QA teams are adopting, planning for, and feeling about artificial intelligence. To that end, we decided to survey over 1,000 quality professionals about their use and plans for AI and share those insights with the broader QA community.

In this report, you'll find the results of this survey, including:

- ◆ How many QA teams have already adopted AI practices
- ◆ Common barriers and challenges to AI adoption
- ◆ Which test types are benefiting the most from AI assistance
- ◆ Tips for effectively leveraging AI in your QA processes
- ◆ And the biggest hopes and opportunities for the future of AI in QA

AI is still very new, but the future looks bright. At TestRail, we believe that AI has the transformative potential to complement testing as an equally important piece of a holistic QA strategy. We believe it will be an enhancement, not a replacement, for human testers. We believe that AI will empower human testers to do what they do best: provide a uniquely human touch to quality.

We hope you find valuable and actionable insights inside this report and that you're just as excited as we are about what the future holds for AI in QA.

Happy testing,  
Judy Bossi  
*VP of Product, Idera*



# Methodology

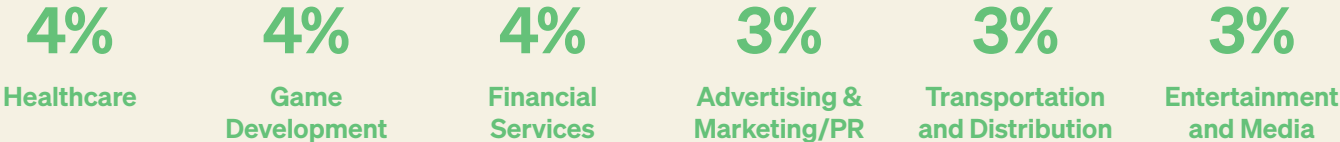


To conduct this research, we surveyed over 1,000 professionals in the software quality assurance field.

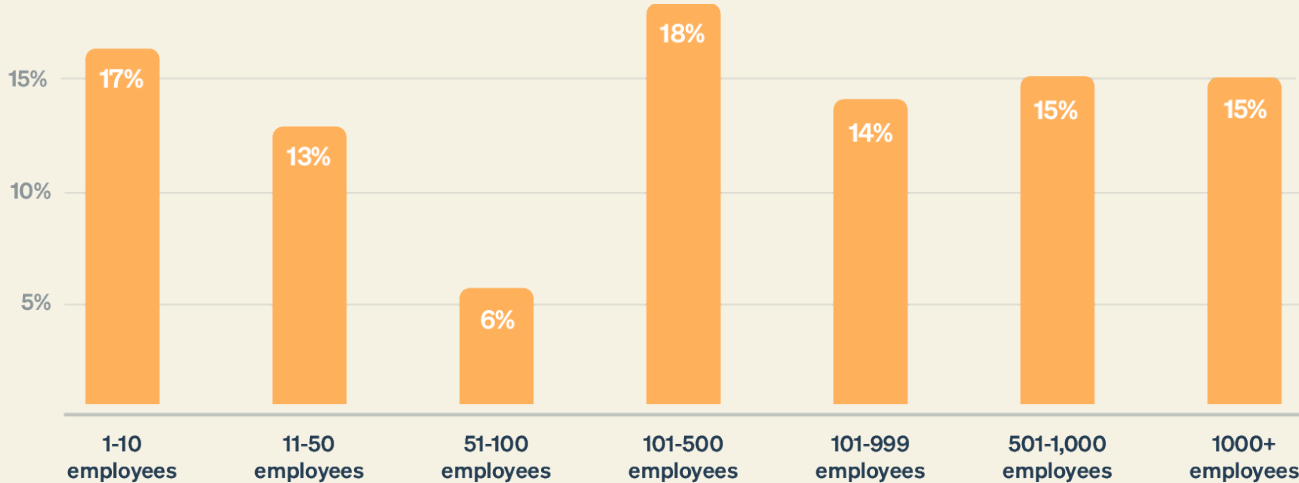
The top job titles represented in our survey respondents were:

QA / Test Engineer	19%
QA / Test Lead	11%
QA / Test Analyst	8%
QA Manager	8%
Head of QA / Testing	7%
Test Automation Engineer	6%
Software Developer in Test (SDET)	6%

We also had representation from over 30 unique industries of work, with the highest representation from:



Additionally, we heard from teams of all sizes, with a steady distribution of QA team sizes ranging from 1 to 1000+:



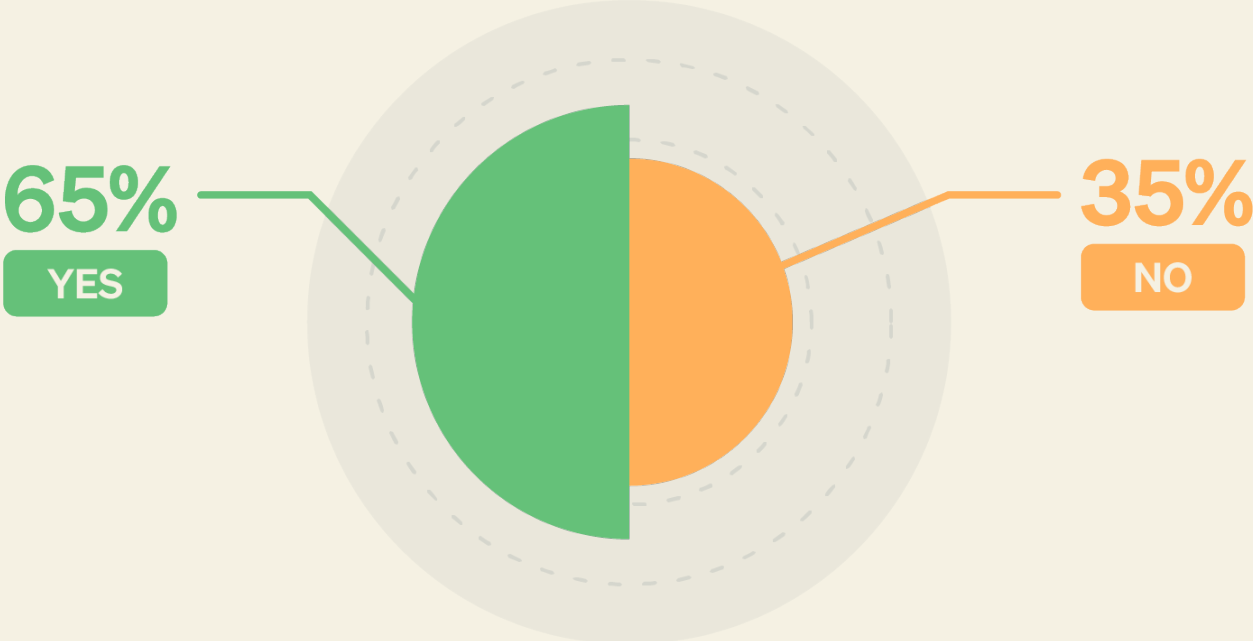
With representation from such a wide variety of QA roles, industries, and team sizes, we're confident that the insights from this report will be valuable to anyone.



# AI adoption



Are you currently leveraging AI in your QA process?



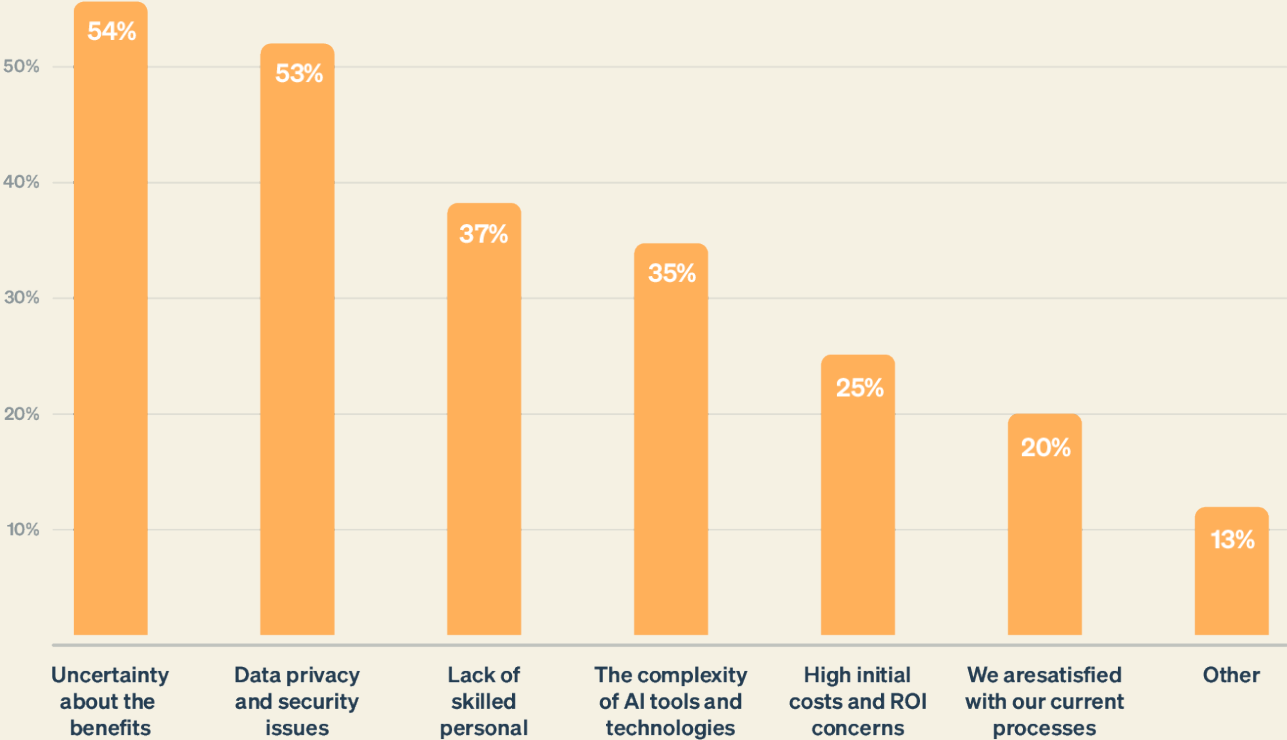
With 65% of respondents already leveraging AI in their QA processes, it's clear that AI in QA has moved beyond being a trend. This growing adoption positions AI as an important element of modern QA strategies. As AI technology advances, we anticipate its role in QA will become even more prominent.



# Barriers to AI adoption



## What are the main barriers to adopting AI into your QA process?



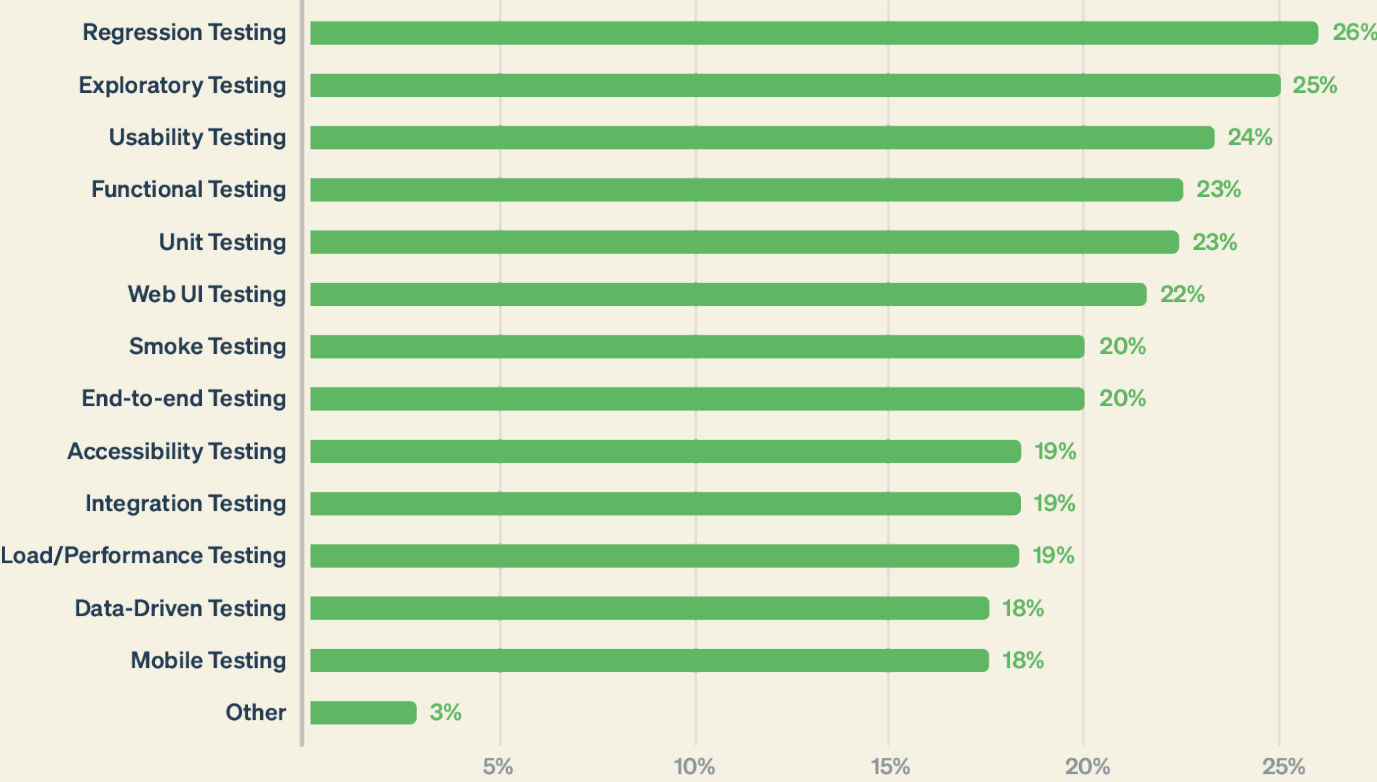
The main barriers to AI adoption in QA are uncertainty about its effectiveness and data privacy. The top challenge reported was uncertainty about the benefits AI can offer (54%), followed closely by concerns over data privacy and security (53%). Additionally, many respondents cited a need for more skilled personnel (37%) and the complexity of AI tools and technologies (35%) as significant obstacles to effectively integrating AI into their processes. Additionally, respondents provided more detail and thoughts surrounding AI’s reliability. Specifically, respondents expressed concerns about potential errors and inconsistencies.



# Which test types are being assisted by AI?



Are you currently using AI tools to assist with any of the following types of testing?



The types of tests that are already being assisted by AI are surprisingly evenly spread—with regression testing (26%), exploratory testing (25%), and usability testing (24%) taking a small lead ahead of the pack. This shows that AI is applicable to all types of testing: manual, automated, front-end, back-end, and everything in between.



# Where has AI been particularly effective?



While AI is seeing utilization across the full gamut of testing, it's not equally effective across all types of testing.

34%

## Regression Testing

AI is particularly effective in automating and optimizing regression tests, ensuring recent code changes haven't affected existing functionalities.

16%

## Smoke Testing

AI is effective in smoke testing, quickly validating core functionalities to ensure the stability of new builds.

10%

## Performance Testing

AI assists in performance testing by predicting potential issues, optimizing test scenarios, and analyzing system behavior under various conditions.

10%

## General Effectiveness in Automated Testing

AI is broadly useful in automating test creation, execution, and analysis—including unit tests, functional tests, and system integration tests.

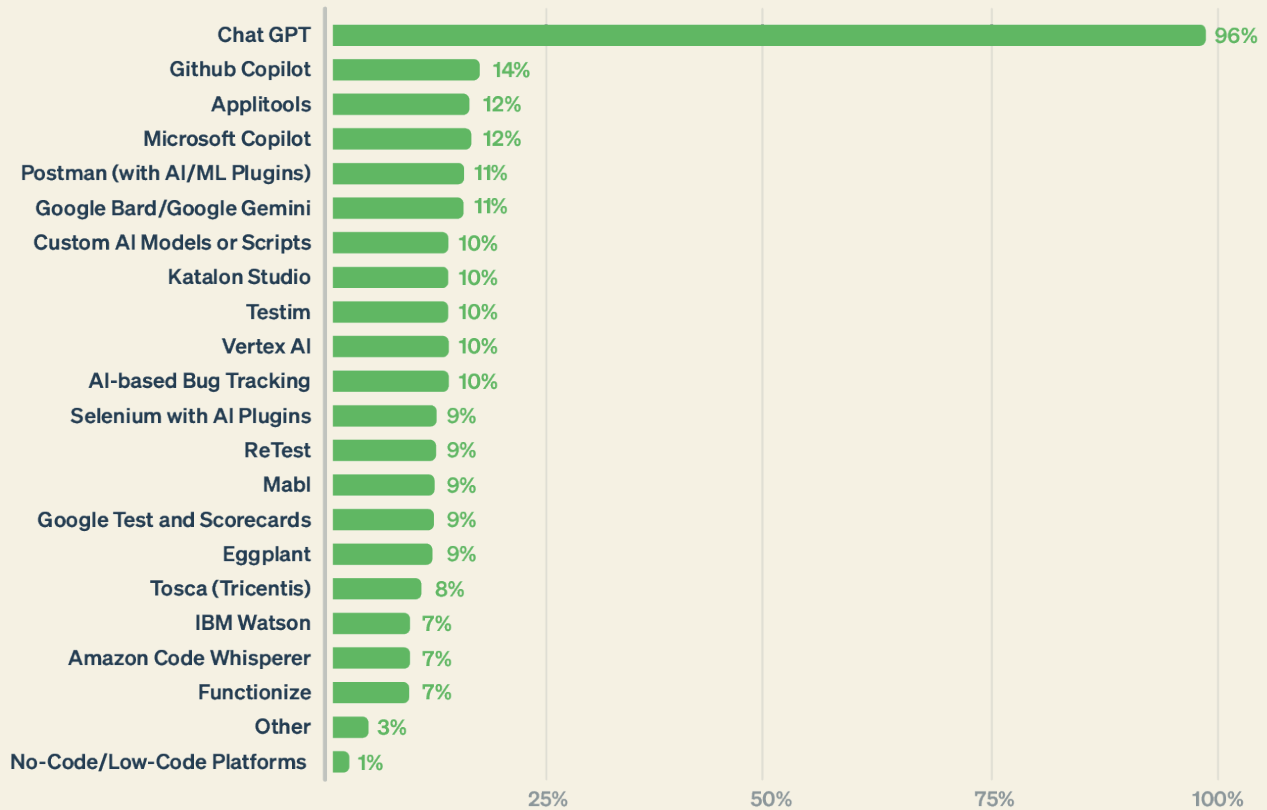
It's no surprise that regression testing and smoke testing top the list, as these time-consuming and repetitive tests leave plenty of room for increased productivity. Much like test automation before it, we predict that AI will assist with taking the burden of these test types off of human testers, freeing up their valuable resources for areas that need a truly human touch.



# Which AI tools and platforms are being leveraged for QA?



## What tools or platforms are you using to implement AI in your QA environments?



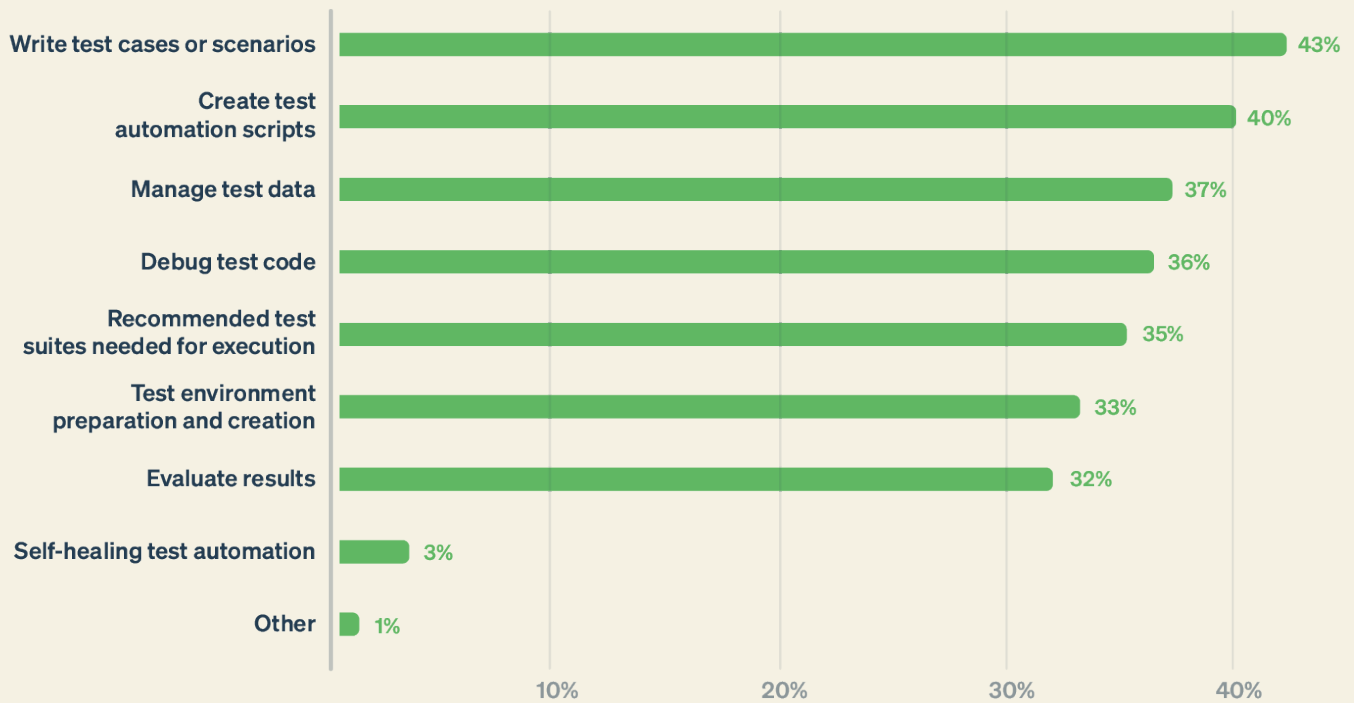
ChatGPT has rapidly become the go-to AI tool in QA environments, reflecting its widespread adoption across the industry. While other AI tools are also in play, the landscape remains fragmented, with no clear leader emerging beyond ChatGPT. This trend illustrates the industry's embrace of AI but also highlights a challenge: the proliferation of narrow-use AI tools has created a fragmented approach that can complicate consistency and efficiency in QA processes. This suggests a growing need for more centralized solutions that can unify these diverse tools and enhance their overall effectiveness in testing environments.



# How is AI incorporated into the QA process?



## How do you incorporate AI into your quality assurance process?



Much like the types of testing being assisted by AI, our survey respondents reported a relatively even spread of ways they are incorporating AI in their QA processes. From writing test cases to evaluating results, AI is proving beneficial across the entire software development lifecycle. Our survey respondents shared additional thoughts with us and a wealth of use cases from every step of the process—and ChatGPT helped us summarize the top takeaways and how often respondents mentioned them. On the next page you'll find tips, tricks, best practices, and prompt ideas sourced from actual quality pros that you can start applying to your own QA processes today.



# How is AI incorporated into the QA process?



## Test case design and execution

**1. Automated Test Case Generation (24%)** Respondents reported using AI to generate test cases from user stories, requirements, and design documents using tools such as Prompt Studio.

- ◆ *Real-world example:* “We use AI to create test cases based on very wordy user stories. We can see the AI’s point of view and use its ideas to improve ours.”

**2. Efficiency Gains (20%)** Respondents reported a reduction in the time needed for writing and executing test cases, allowing more time to focus on test execution.

- ◆ *Real-world example:* “We write test cases using Prompt Studio. This is a lot faster than manually writing test cases, giving us more time for test execution”

**3. Test Case Optimization and Prioritization (16%)** Respondents utilized AI algorithms to prioritize test cases based on risk analysis, removing redundant tests.

- ◆ *Real-world example:* “We use AI to pull ideal negative test cases from existing stories and sprints. This streamlines the identification process on what should and shouldn’t be tested prior to a release based on the sprint work.”

### AI Prompt Idea:

Generate a comprehensive set of test cases from the provided requirements in Gherkin format. Each test case should address specific software requirements, defining test objectives, conditions, necessary data inputs, expected results, and automation potential. Ensure the test strategy has considerations for both functional and non-functional aspects, with each scenario linked to corresponding requirements for easy traceability. The generated final output should include both manual and automated test-focused artifacts.

# How is AI incorporated into the QA process?



## Test automation

**1. Script Generation and Writing Assistance (25%)** Many respondents mentioned using AI tools like GitHub Copilot, ChatGPT, or Amazon CodeWhisperer to generate, write, or refactor test scripts. This includes creating scripts in languages they need to become more familiar with and simplifying complex tasks.

- ◆ *Real-world example: "I used AI to automate test scripts in different languages that I wasn't familiar with. It also helped me optimize the existing code and reduce execution time."*

**2. Debugging and Error Detection (15%)** A significant portion of the responses highlighted using AI to assist in debugging, understanding console errors, and optimizing existing code. AI tools help identify and fix issues faster.

- ◆ *Real-world example: "Copilot and ChatGPT helped me quickly understand and process errors in the console and to carry out debugging faster. They will also tell you how to write a piece of code simply by describing it in natural language."*

**3. Test Case Generation and Maintenance (10%)** Respondents used AI to automatically generate test cases from user stories, requirements, or bug reports. This includes creating self-healing scripts that adapt to minor changes in the application's UI.

- ◆ *Real-world example: "I've been using AI to generate test scripts, especially for simpler tasks. Sometimes I even ask it to generate blank/placeholder code which I then populate with my variables."*

### AI Prompt Idea:

Conduct a thorough analysis of a given automated test suite to identify areas for optimization. Focus on eliminating code redundancy, updating or removing deprecated libraries, and increasing modularity and parameterization for better reuse and flexibility. Evaluate code commenting for clarity and completeness and recommend performance enhancements to reduce execution time. Provide a comprehensive report detailing each identified issue, the proposed changes, and a practical implementation plan with code examples where necessary.

# How is AI incorporated into the QA process?



## Test data management

**1. Synthetic Data Generation (24%)** Respondents reported using AI to generate diverse and realistic synthetic test data, closely mimicking real user data without risking user information.

- ◆ *Real-world example:* “I used AI when we had to create fake, valid or invalid data. I didn’t know what libraries were available to generate that kind of data, and AI helped me quickly solve that problem.”

**2. Test Data Masking and Anonymization (16%)** Respondents reported using AI tools to detect and mask sensitive information to protect user privacy while still testing with real production data.

- ◆ *Real-world example:* “We use AI tools to automatically identify and mask sensitive information in our production data, which frees up our team’s time to focus on other testing activities.”

**3. Efficiency Gains (12%)** Respondents reported reduced time required for data preparation, leading to faster testing cycles.

- ◆ *Real-world example:* “We use AI to efficiently generate test cases that cover all possible test data combinations and scenarios.”

### AI Prompt Idea:

Develop a system to create diverse and realistic synthetic test data that mimics real user behaviors without compromising privacy. Analyze anonymized real user data to understand key characteristics, then build a synthesis model that adheres to differential privacy to ensure non-traceability. Provide a comprehensive guide with recommended approaches, tools, and frameworks, along with maintenance strategies.

# How is AI incorporated into the QA process?



## Test result evaluation and analysis

**1. Enhanced Analysis of Performance and Load Testing (20%)** Respondents report that AI helps analyze key metrics from performance and load tests to understand the application's overall health.

- ◆ *Real-world example:* "We run performance and load tests in our company and AI helped us analyze each key metric to understand the overall health of our application."

**2. Predictive Analysis and Defect Identification (20%)** Respondents report using AI to analyze historical test data and code changes to predict potential defects, highlighting areas prone to issues.

- ◆ *Real-world example:* "We use AI to identify app components most likely to fail so they can be more heavily tested."

**3. General Test Results Analysis (16%)** Respondents report using AI to evaluate test results, generate reports, and improve traceability of problematic areas.

- ◆ *Real-world example:* "AI has helped us leverage our test result data for better traceability into problematic areas of our software."

### AI Prompt Idea:

Analyze the provided JUnit XML results file, which includes application error logs and test case failure details (stack traces from automation execution, etc.). Focus on identifying patterns in error frequency and severity and historical trends in system behavior. Based on your findings, generate a prioritized list of interactions that require intensified testing, and recommend specific test types that could effectively prevent future failures.

# How is AI incorporated into the QA process?



## Test environment preparation and creation

**1. Assistance with Browser Integration and Translation (20%)** Respondents report that AI helps integrate different browsers and websites and makes the translation process easier.

- ◆ *Real-world example:* “We use AI to ensure certain things get translated the same, making the translation process ‘easier’ by mass translating a specific phrase into a translated sentence.”

**2. Issue Resolution and Instructional Guidance (16%)** Respondents report that AI assists in resolving issues such as GitLab pipeline problems and provides instructions for creating systems, like report systems connected to Slack.

- ◆ *Real-world example:* “I asked AI for instructions on creating a report system and connecting it to Slack so results of tests can be sent directly to a Slack channel.”

**3. Predictive Analytics and Anomaly Detection (12%)** Respondents report that AI models can analyze historical test data to help predict future outcomes and detect anomalies.

- ◆ *Real-world example:* “We use AI models to analyze historical test data, allowing us to be proactive in anticipating issues before they occur and taking action to mitigate risks.”

### AI Prompt Idea:

Create an integration with your automated test framework to push notifications using the Slack API. Detail the integration process with Slack APIs, define a clear and informative report format, specify trigger mechanisms for sending reports, and address error handling. Ensure the solution adheres to security and compliance standards, and provide guidelines for scalability and maintenance. Include code snippets and a step-by-step implementation guide with recommended tools.

# How is AI incorporated into the QA process?



## Code debugging

**1. Automated Code Analysis and Suggestions (24%)** Respondents reported using AI to provide automated suggestions for fixing and enhancing code, including conducting static code analysis to identify errors.

- ◆ *Real-world example:* “AI is able to explain what is happening in a piece of code and give suggestions based on the context around your piece of code.”

**2. Efficiency and Speed Improvement (20%)** Respondents report that AI speeds up the debugging process by quickly explaining code and making suggestions.

- ◆ *Real-world example:* “Github Copilot helps with reviews and suggests fixes or even improvements when analyzing a bug or a defect.”

**3. Log and Anomaly Analysis (16%)** Respondents report that AI tools can analyze logs and detect anomalies to help identify issues in the code.

- ◆ *Real-world example:* “We leverage AI-powered anomaly detection techniques to identify unusual patterns or behaviors in test execution results. This helps us quickly pinpoint areas of concern and potential defects in the code.”

### AI Prompt Idea:

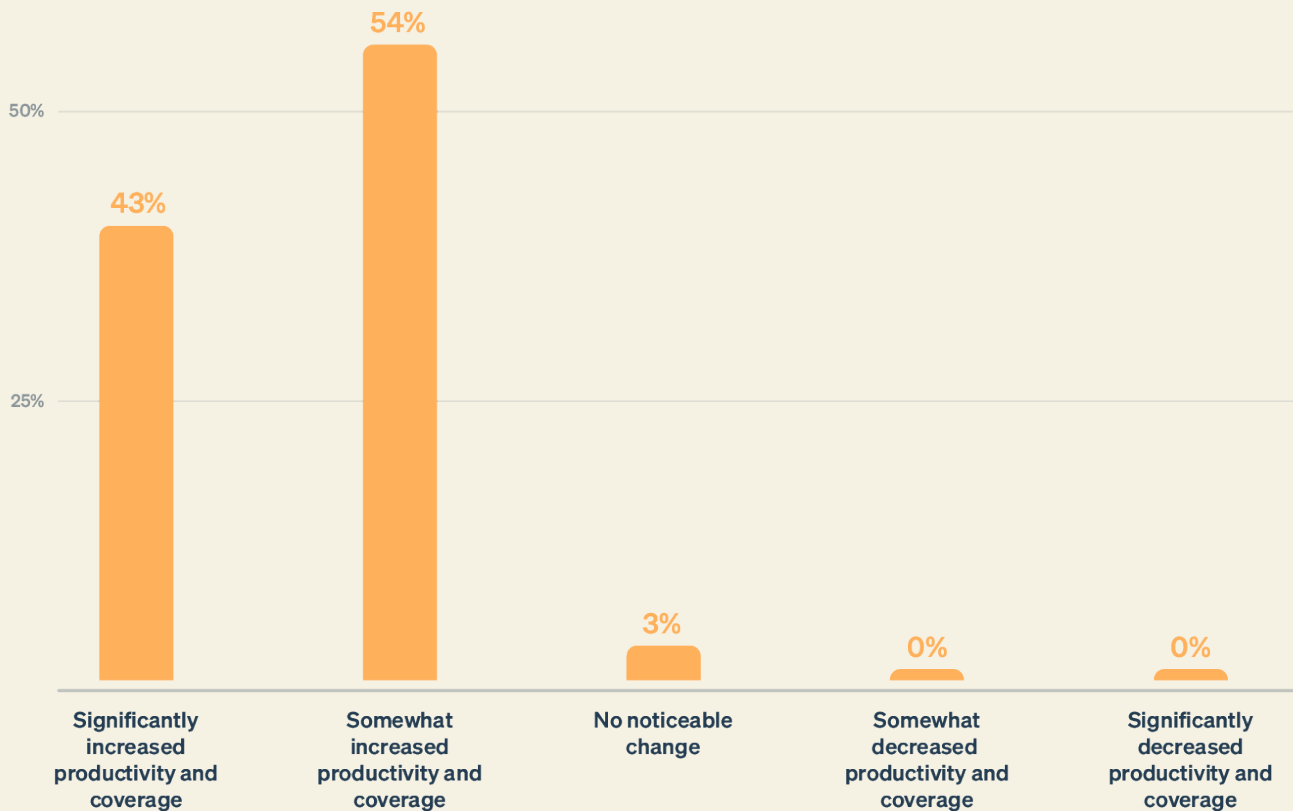
As an example, a test engineer may want to iterate through multiple checkbox UI elements using Java Selenium, interacting with the elements to “uncheck” them all as a prerequisite to test UI functionality. Review this provided code to assess performance bottlenecks and evaluate adherence to industry best practices. Offer specific recommendations for enhancements, including refactoring suggestions and potential algorithmic improvements. Provide detailed code snippets for each suggested improvement to ensure clarity and effectiveness in implementation.



# Successes, challenges, and tips for implementation



## How has AI automation affected your team's productivity and test coverage?

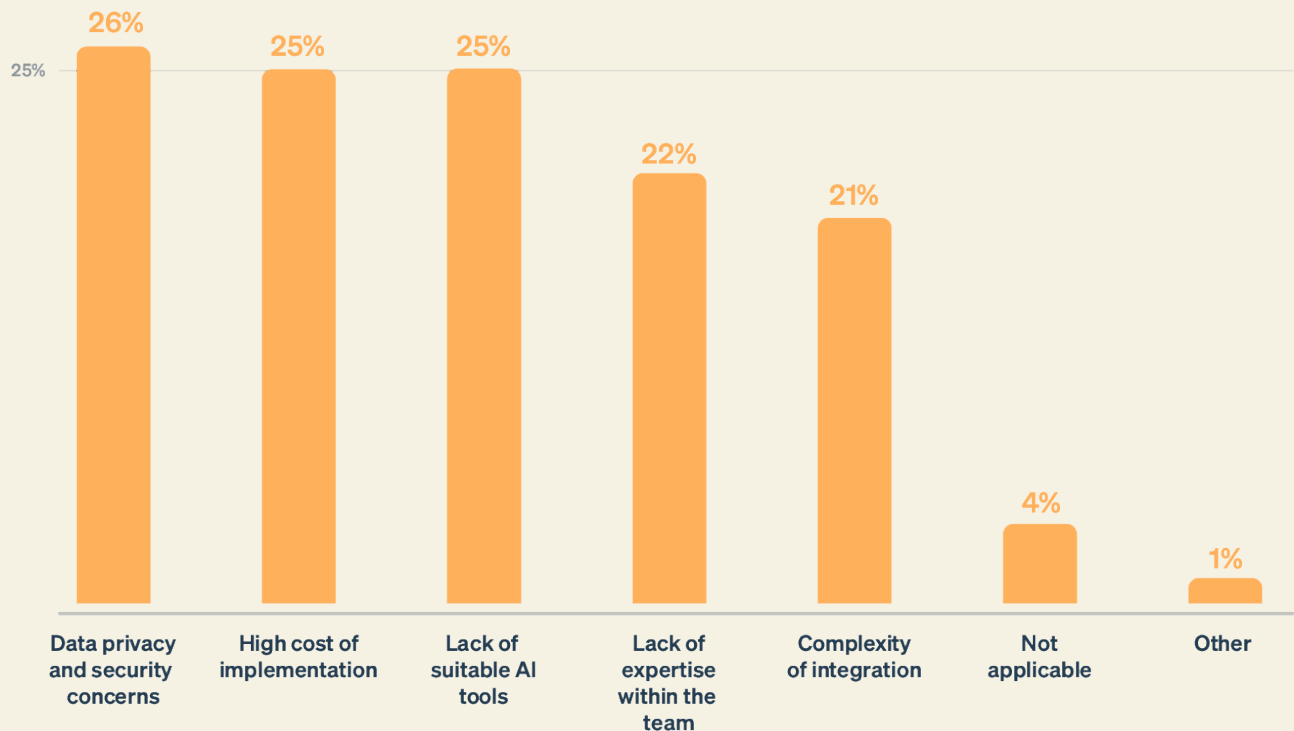


54% of respondents reported a 'somewhat increased' productivity and coverage, while 43% noted a 'significant increase.' Though this outcome might seem predictable, it underscores the growing industry confidence in AI's role in QA. Even in its early stages, AI is delivering real improvements, signaling its transition from an experimental tool to a key component in effective QA strategies. As the technology evolves, its impact is likely to expand, driving more significant advancements.

# What challenges have you faced integrating AI into your QA testing process and environment?



What challenges have you faced integrating AI into your QA testing process and environment? (select all that apply)



Again, data privacy and security concerns were the top challenges at 26%, followed by high implementation costs and the lack of suitable AI tools at 25% each, and a lack of expertise within the team at 22%. Nevertheless, the number of positive responses regarding AI’s impact on productivity and coverage significantly outweighed the reported challenges. This suggests that, despite the hurdles, AI adoption in QA has been largely successful, with the benefits surpassing the difficulties faced.



# Tips for effectively leveraging AI in a QA testing role



We asked respondents who use AI in their QA processes to share tips for effective AI utilization. Below are their key recommendations for integrating AI into your QA processes. The responses reveal the following themes and the corresponding percentages reflect how often they were presented in the results, highlighting the most important strategies and considerations:

- 12%** **Specificity in instructions**  
Provide detailed and precise instructions when using AI to ensure accurate results.
- 12%** **Education and staying informed**  
Keep up with AI advancements, engage in training, and understand how to apply AI tools.
- 10%** **Experimentation and pilot projects**  
Test AI tools through small-scale pilot projects to gauge their capabilities and limitations.
- 10%** **Collaboration with data scientists**  
Work with data scientists to develop and implement AI models for QA.
- 10%** **Use case identification**  
Identify areas within QA where AI can add significant value, such as test automation and defect prediction.
- 8%** **Data collection and preparation**  
Ensure high-quality, relevant data sets are collected and prepared for training AI models.
- 8%** **Integration with existing tools**  
Seamlessly integrate AI with your current tools and platforms to improve efficiency.
- 8%** **Continuous learning and improvement**  
Regularly monitor and refine AI models based on performance and feedback.



# What would need to change to make AI more practical for testing?



We asked respondents who use AI in their QA processes to share tips for effective AI utilization. Below are their key recommendations for integrating AI into your QA processes. The responses reveal the following themes and corresponding percentages, highlighting the most important strategies and considerations:

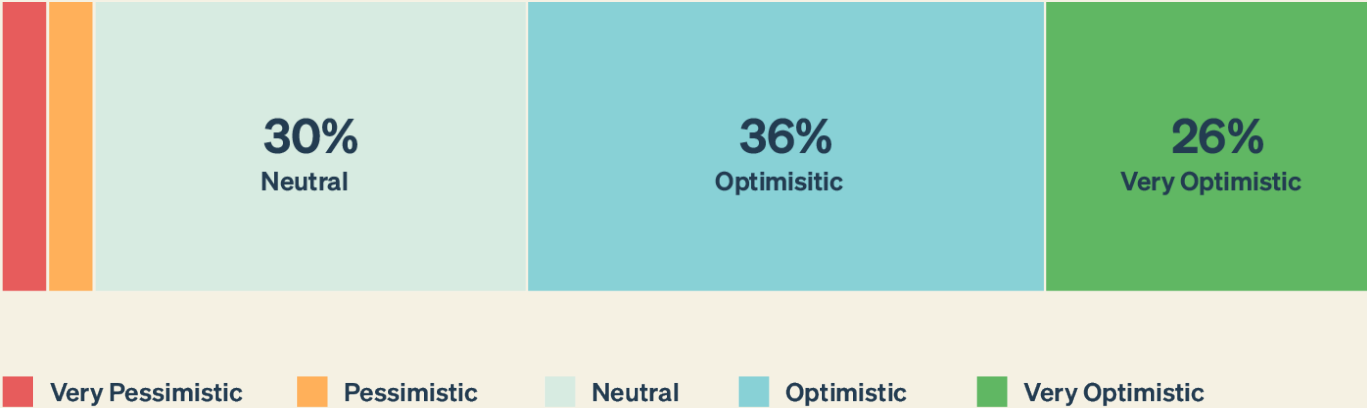
- 16%** **Training and education**  
Improve training and knowledge for your QA teams on AI tools and methodologies.
- 14%** **Integration with existing workflows**  
Ensure AI tools seamlessly integrate with your current QA processes and development tools.
- 12%** **Accuracy and reliability**  
Work on improving the accuracy and reliability of AI models in generating and understanding test cases.
- 10%** **Customization and adaptability**  
Focus on making AI solutions customizable and adaptable to your specific QA needs and environments.
- 10%** **Data privacy and security**  
Address data privacy, security, and compliance issues when implementing AI in your QA processes.



# The future of AI in QA



How would you rate your optimism about the role of AI in enhancing QA testing processes?



It's clear from these survey results that AI in QA is still a work in progress—early results are promising, but quality professionals are still feeling out where and how AI fits into their tests and processes. However, despite AI technology and its impact on QA still being in its infancy, QA professional's outlook on the future of AI is overwhelmingly optimistic.

This may seem surprising when compared to news coverage of AI, which tends to examine it through a less optimistic lens in regards to its risks and uncertainty. But it is not surprising that among our survey respondents, the majority of whom are already using AI and seeing benefits from it, optimism is strong.



# Hopes for the future of AI in QA



Given the bright outlook for AI in QA, we asked survey respondents to elaborate on which area they think AI capabilities will be the most useful in the future. Here are the top responses:

24%

## Test automation and script generation

AI for creating, automating, and self-healing test scripts, including regression testing.

16%

## Test repository integration and maintenance

AI to integrate with and maintain test repositories, ensuring optimal test coverage and relevance.

12%

## General automation and productivity

AI to automate repetitive tasks and enhance overall productivity in various areas.

12%

## Data analysis and predictive analytics

AI for data analysis, validation, and predictive insights to improve test results and decision-making.

8%

## Debugging and code analysis

AI for debugging, code analysis, and code generation, improving efficiency and accuracy.

8%

## Functional and regression testing

AI to optimize functional and regression testing, predicting risks and improving test effectiveness.



# The biggest opportunities for AI in QA



We also asked survey respondents to tell us what they predict as the biggest opportunity for AI in QA in the next five years:

- 20%** **Autonomous testing systems**  
AI developing autonomous testing systems capable of generating, executing, and maintaining test cases with minimal human intervention.
- 16%** **Improved efficiency and reduced manual effort**  
AI can increase efficiency in QA processes by automating repetitive tasks, reducing manual effort, and speeding up release cycles.
- 14%** **Enhanced test coverage and quality**  
AI can improve test coverage and quality by generating vast numbers of test cases and identifying defects early.
- 10%** **Self-healing scripts and adaptability**  
AI can enable self-healing scripts that adapt to changes in the application's codebase, UI, or functionality.
- 10%** **Predictive insights and proactive testing**  
AI can provide predictive insights to identify potential failure scenarios, performance bottlenecks, and high-risk areas.
- 8%** **Automation of test case and script generation**  
AI can generate test cases and scripts automatically based on code analysis and user processes.



# Wrap-up



It's too early to predict the full impact of AI on QA, but the outlook is promising. AI adoption is growing rapidly, and while QA managers are still fine-tuning its integration, 97% of current users are already seeing benefits.

Though uncertainty around such a major technological shift is natural, we believe AI will complement human testers, boosting efficiency, accuracy, and data-driven decision-making, while enhancing human capabilities—not replacing them.

It's an exciting time for quality. We may not have all the answers yet, but like 62% of our survey respondents, we're optimistic about AI's future in QA.

## Key takeaways

- **AI is gaining ground:** With 65% of QA teams using AI, it's clear it's becoming a core part of QA strategies.
- **Challenges remain:** Concerns about AI's effectiveness, data privacy, and tool complexity are still barriers for some teams.
- **Versatile applications:** AI is proving its value across various testing types, including regression, smoke, and performance testing, demonstrating its adaptability and broad applicability.
- **Enthusiasm for AI:** QA professionals see AI as a tool that enhances, not replaces, human expertise.
- **Evolving role of QA professionals:** As AI handles more routine tasks, QA professionals are shifting towards more strategic and analytical roles, focusing on areas that require human insight and creativity.

As we explore how AI is reshaping QA, one thing is clear: AI isn't here to replace us—it's here to help us work smarter. The feedback from our survey paints an exciting picture of AI's potential to enhance our testing efforts. While challenges like data privacy and the need for more skilled professionals remain, the overall outlook is bright. We hope this report offers valuable insights and inspires you to embrace the possibilities AI brings to the future of QA.







## About TestRail

Gurock Software was founded in 2004 and now has offices in Frankfurt, Dublin, Austin, and Houston. Our flagship test case management solution, TestRail, is used by more than 100,000 members of development and QA teams to build rock-solid software—including companies like Amazon, NASA, Adobe, Sony, PayPal, and Siemens.

TestRail is the only platform that empowers QA teams to build, connect, and optimize all their testing processes. TestRail's Quality OS centralizes manual and automated test management and gives you visibility into your entire quality operation so you can manage your team more flexibly and build repeatable, scalable workflows. And, with a unified platform that integrates with your DevOps pipelines, you can share testing timelines, data, and insights across your whole organization.

TestRail is a leader in the [G2 Grid for Test Management and Software Testing](#), with top ratings year-over-year for best results, most implementable, and overall enterprise leader. For more independently verified research and reviews, visit the TestRail page at [G2](#) or [Capterra](#).

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