



Build vs. Buy

The hidden costs of in-house software test automation

eBook

 KEYSIGHT

INTRODUCTION

To Build or to Buy?

Software testing is an essential part of the software development life cycle. Testing ensures that applications are high quality, meet end-user requirements, and are free from defects or bugs.

While many organizations prefer to use their resources and expertise to automate testing in-house, business leaders increasingly see compelling reasons to move to a commercial software testing solution from an in-house version.

Keysight Technologies commissioned a study with Forrester Research to understand how decision-makers at global enterprises strategize their software testing for future growth. The research identified that investing in enterprise software test automation is critical for leaders looking to scale their businesses without sacrificing software quality.

At Keysight, we share your dedication to software quality. For companies moving into automated testing for the first time or replacing existing tools with a platform approach, it is critical to understand the trade-offs when choosing test automation software. This report guides you through the key considerations.





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CHAPTER 1

The Importance of Software Testing



Businesses Run on Software

Software is the engine that drives businesses forward. Over the last decade, the dramatic shift to online services has forced businesses to rely on software more than ever. Consequently, the software itself is becoming more complex and challenging to test.

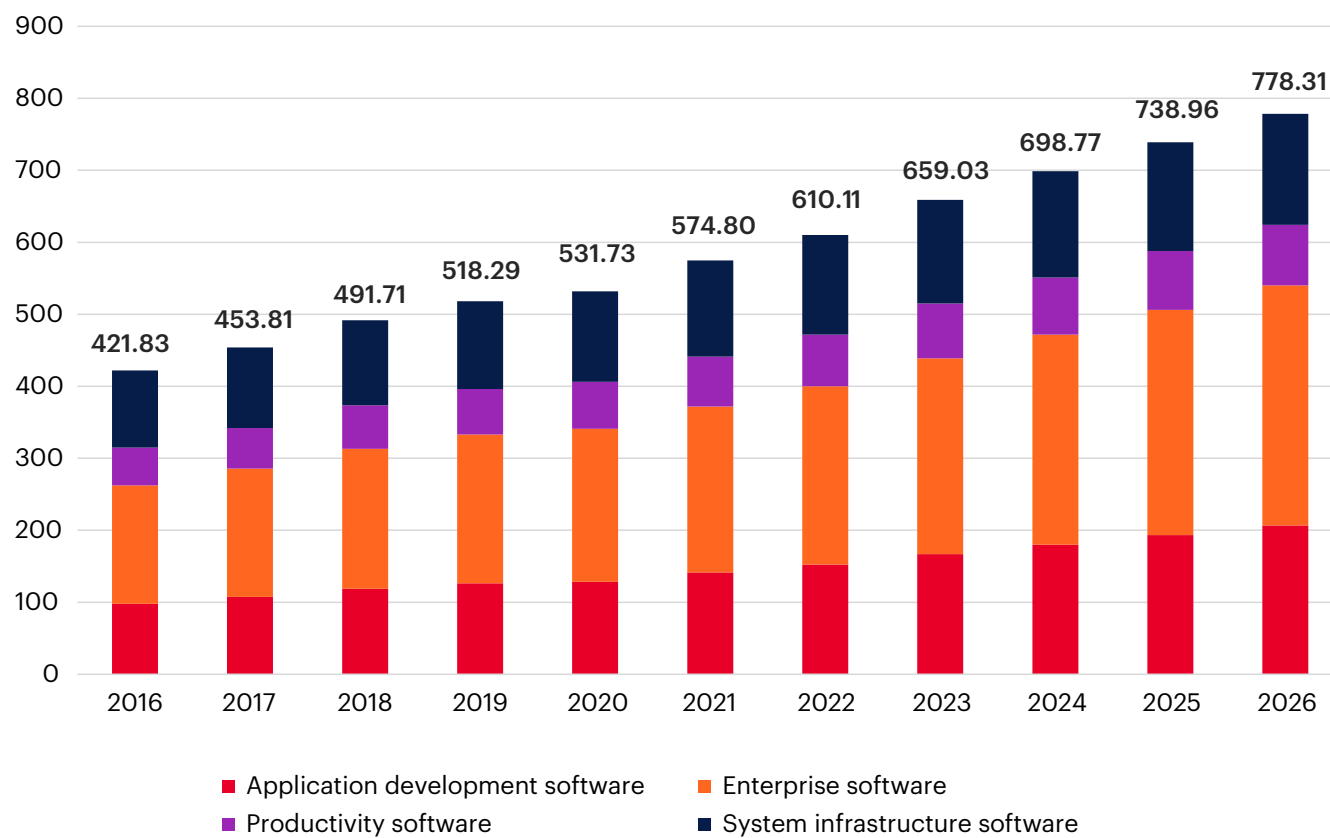
Remote work, eCommerce, development operations (DevOps), and cloud applications are just a few factors contributing to the increased complexity of software testing. The technology industry has quickly moved from creating individual software components to delivering entire software ecosystems.

In addition, the end user is likely to run the software on two or more devices. The experience should remain the same, no matter the end user's device, browser, or operating system. This complexity adds to the number of test cases that quality assurance (QA) teams must consider. These scenarios make it necessary to have a technology-agnostic test automation tool.

“Test automation has become more complex, while technical and nontechnical testers must work collaboratively in teams with developers and other testers and with business analysts in an automated fashion,”

The Forrester Wave: Continuous Automation Testing Platforms, Q4 2022

As a result of this complexity, software test, and quality assurance (QA) teams have become inundated with test cases to manage and are often struggling to keep up with the fast pace of development. To ensure continuous improvement, companies must implement a tactical test automation strategy that will help — not compromise — business growth.



Global Software Market (in billion USD)

Source: Statista Market Insights;
Most recent update: Mar 2023

Keeping with the Pace of Innovation

Software test automation is rapidly becoming a business-critical asset in a digital-first world. As a result, the test automation industry is at the center of innovation, drawing on artificial intelligence (AI), machine learning (ML), and advanced analytics to ramp up the speed and scope of testing.

According to Gartner, “By 2027, 80% of enterprises will have integrated AI-augmented testing tools into their software engineering toolchain.”

Source: 2022 Gartner® Market Guide for AI-augmented Software Testing Tools

However, many QA teams still opt to automate their software tests in-house using an open-source program to save on costs. **More than half of the companies surveyed** reported using in-house solutions for their software tests. Of the respondents currently using in-house testing solutions, 37% believe their organizations will invest in more commercial platforms in the next 12 months. As for the other 63%, they have concerns about the investment.

Leading test automation vendors are charging ahead, modernizing the entire software test process from planning to maintenance and test analysis using self-learning capabilities to loop back and self-heal. Gartner predicts that “by 2027, 80% of enterprises will have integrated AI-augmented testing tools into their software engineering toolchain.”¹

Key Concerns

When asked about the barriers preventing them from investing in an automated software testing platform, the top answers were lack of expertise to implement a platform and insufficient funding.

Lack of expertise

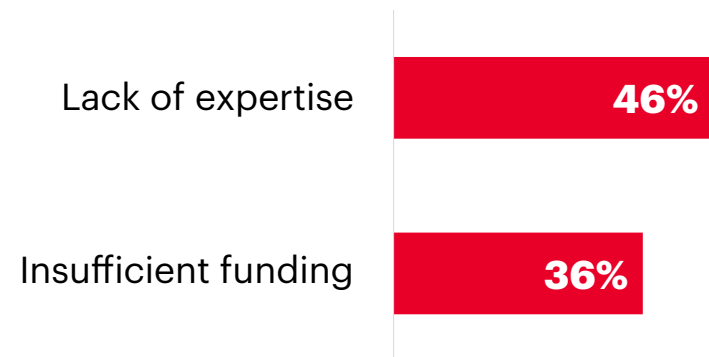
Decision-makers report that their ability to invest in more effective software testing solutions has stalled because they lack the expertise to define, implement, or maintain a new platform.

Insufficient funding

Additionally, funding for software-testing technologies is lacking, making it difficult for organizations to effectively implement the solutions they need to scale and meet future needs.

As decision-makers consider how best to meet their business goals, they inevitably question whether to implement commercial test automation solutions or build their test processes in-house.

What barriers are preventing your company from investing in an automated software testing platform?



In-House Solutions Struggle to Support Scale

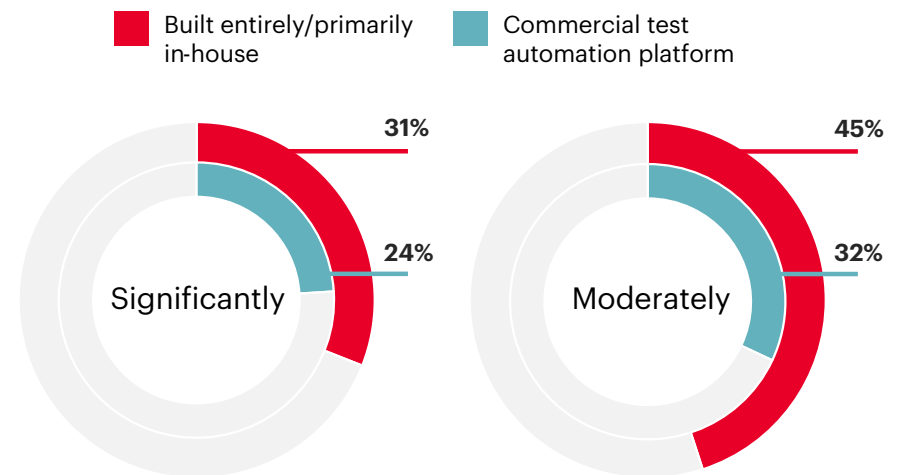
According to the Forrester study, the inability to scale is a tipping point for organizations with software solutions built in-house.

Organizations currently relying on in-house solutions are less worried about money and more concerned about future growth. A staggering 76% fear their current solution will hinder them from expanding in the future. These organizations must carefully weigh the trade-offs to make the best choice for long-term success.

The research from Forrester found that the perceived cost savings from in-house solutions may be holding companies back from meeting their business goals.

76% of business leaders fear that their current solution will hinder them from expanding in the future.

How much will your current test solution limit you when scaling to meet your future requirements?



CHAPTER 2

The Hidden Costs of In-House Software Testing



In-House Solutions Require More Tools and Manual Testing

Many companies look to software test frameworks to solve a current problem without considering the impact in the long-term. The impact of software testing tends to progress as the size of the application increases and as the business evolves.

Business leaders should consider tool reduction and consolidation

Most companies have multiple test teams in disparate departments who are each using a different testing tool to solve a similar problem. The research from Forrester found that respondents who rely on in-house solutions require more automation tools than those who use commercial solutions.

Nearly two-thirds of in-house testers reported using **three or more testing tools** in their tech stack, while most commercial solutions only require one or two to meet their needs.

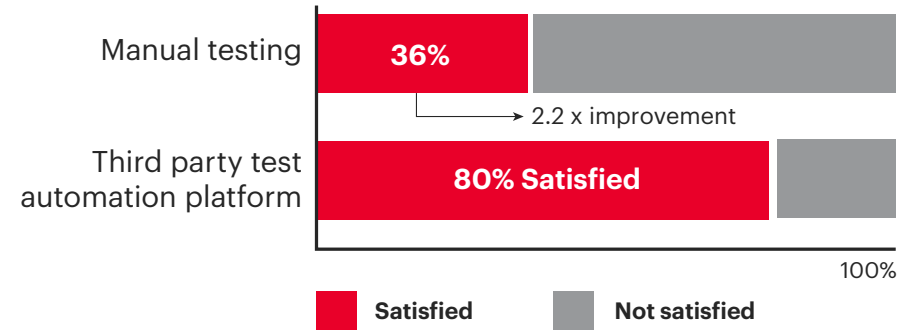
This multi-tool approach has several cost issues. Considering the expenses associated with licenses, training, and maintenance, there is a significant opportunity to reduce financial waste.

Beyond the factor of cost, when there is no strategic oversight, there are inevitably blind spots and data siloes, with no clear understanding of how the end-to-end testing process works.

Manual testing costs more than businesses realize

Despite having access to more resources, respondents who rely on in-house automation solutions still struggle with manual testing, citing cost and time as significant barriers.

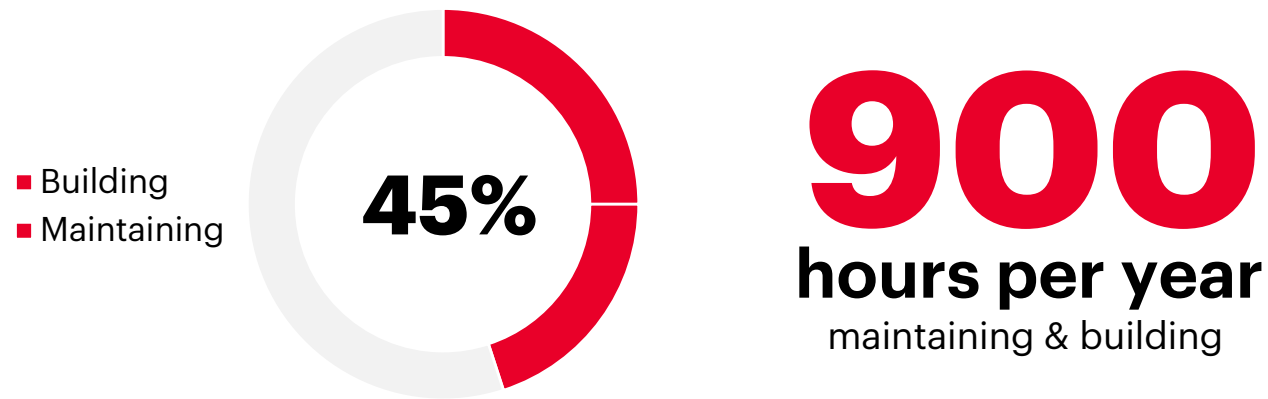
According to the Forrester study, *“While in-house solutions may initially appear more cost-effective, they underdeliver on these promises as buyers realize the reality of hidden costs associated with their implementation and maintenance.”*



Despite having access to more resources, nearly 70% of in-house solution users admit they are doing a lot of time-consuming and expensive manual testing to bridge gaps.

The hidden costs of in-house solutions can weigh heavily on a company's productivity and resources. Using an open-source solution may not actually be cost-effective when considering the amount of time testers spend building and optimizing test scripts (45%).

How much time spent building and maintaining your in-house test automation framework?



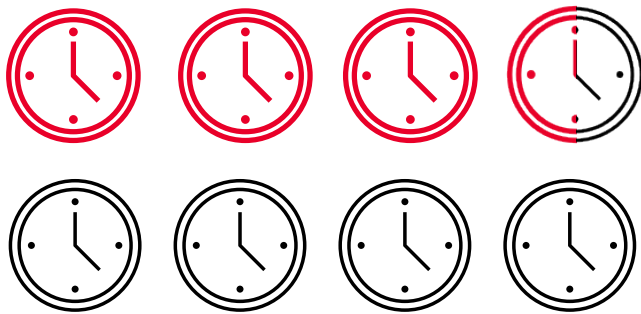
Time spent writing scripts, fixing bugs, and manually testing possible user journeys can quickly add up and often becomes the bottleneck when implementing a new feature release.

Addressing the Cost of Technical Debt

In software development, technical debt is the implied cost of future reworking required when choosing an easy but limited solution instead of a better approach that could take more time.²

Many technology executives have cited technical debt as their biggest software challenge, taking energy away from innovation.

How many hours each week do you spend on addressing technical debt?



Out of an average work week, the average developer at a company spends 17 hours addressing technical debt and bad code – *that's 43% of their time.*

Technical debt comes with substantial, initially hidden costs that organizations must pay later. According to the *2022 Cost of Poor Software Quality (CPSQ)* report, “*the growing impact of technical debt has become the biggest obstacle to making any changes to existing code bases.*”³

Business leaders have initiated strategies for managing technical debt, but they face ongoing pressures to mitigate technical debt across legacy applications, devices, and computing infrastructure.⁴

Given the complexity of a modern organization’s systems, most application software testing tools do not have the capacity or ability to scale. For each software product in an organization’s technology stack, there is often a separate testing process that goes with it. For example, most UI test automation tools require constantly updating object models and test scripts. Multiply the technical debt by each testing process; the actual cost may far exceed the expenses associated with an in-house solution.



Commercial Solutions Reduce Costs and Resources

Of the businesses that have invested in commercial solutions for software test automation, 79% are expecting significant improvements in cost and resource reduction, according to the survey results.

Decision-makers who opt for commercial solutions report greater optimism about the impact on their organization, with reduced testing costs being the most expected improvement.

Eighty percent of organizations view investment in commercial solutions as transformational. Additionally, these investments position companies to better achieve their top business goals through a predicted reduction in manual testing time and resources.

In contrast, companies consider in-house software testing solutions as having a less significant impact on scalability than those using commercial solutions.

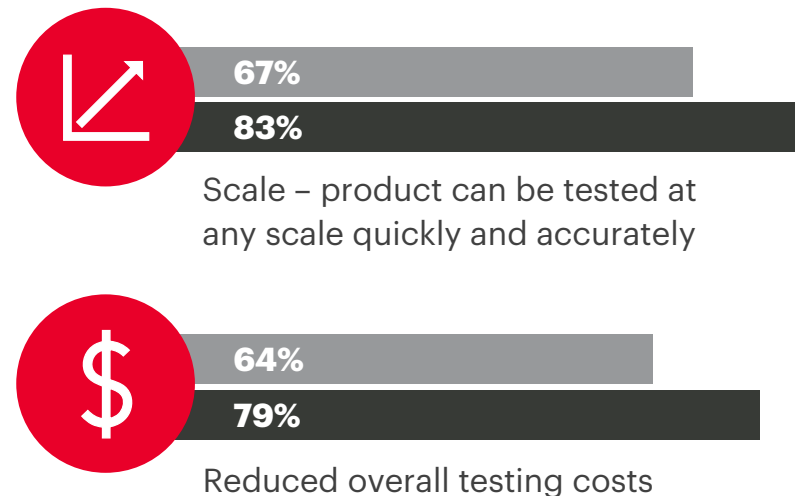
Commercial Test Automation Brings Transformational Improvement

According to the Forrester study, *“Those using commercial solutions say reduced testing costs was the biggest business improvement their organizations expected, and the impact was significant or transformational for their organizations (79%).”*

With this expectation, product teams need to transition from individual testing tools to unified testing platforms that offer a multitude of test automation capabilities.

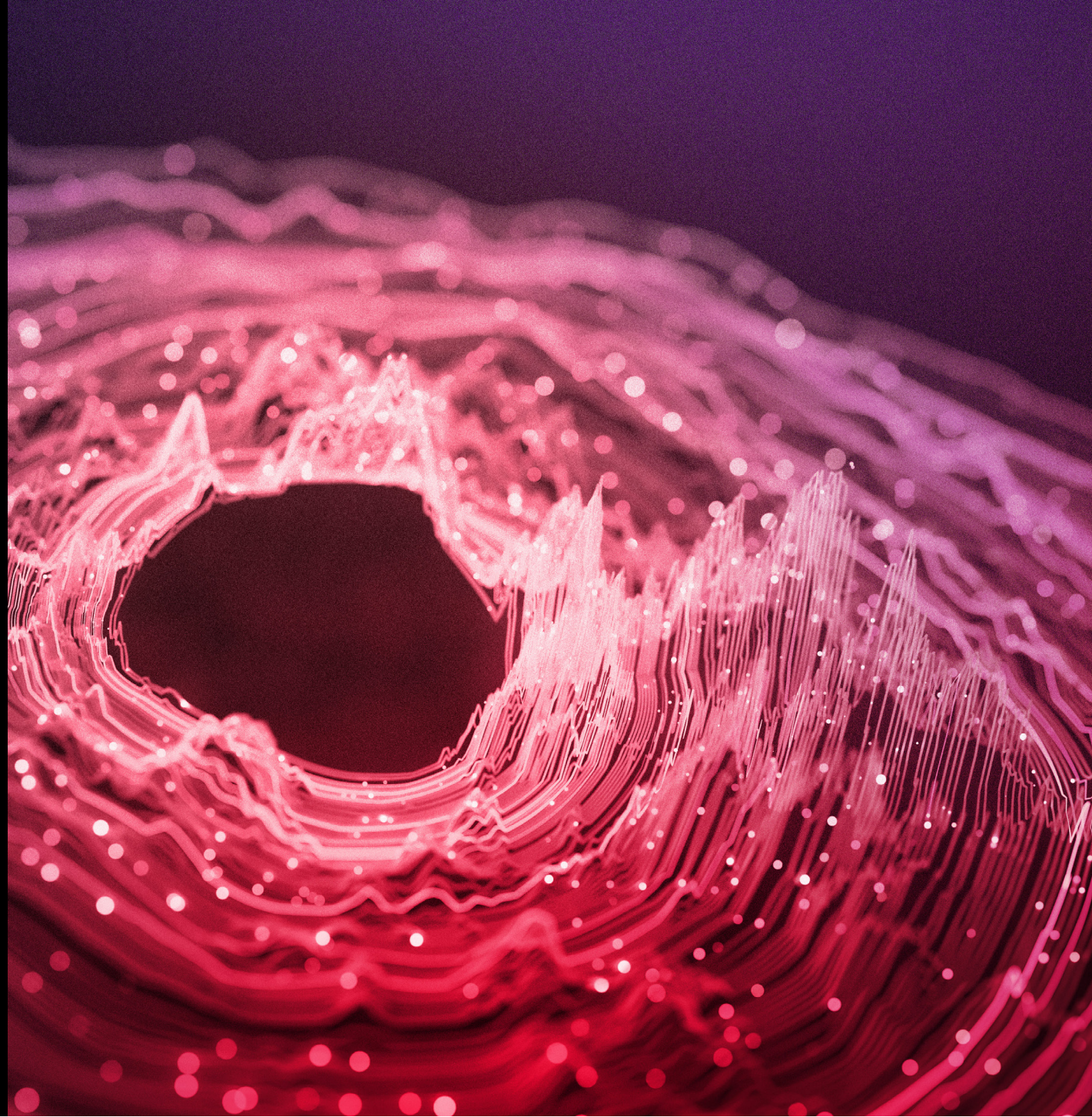
Top benefits expected from investing in testing automation technologies

■ Built entirely/primarily in-house ■ Commercial test automation platform



CHAPTER 3

How Keysight Eggplant Addresses These Challenges



Reduce Technical Debt

Eggplant uses a single digital twin model to test complex systems, workflows, or user journeys across platforms. Model-based testing tools help predict how your application will function under different conditions, allowing for more accurate and reliable releases.

With Eggplant's model-based testing, you can:

- Reduce maintenance costs with scriptless testing modeling.
- Streamline development with low-code, UI-driven testing tools.
- Produce actionable insights with AI-powered exploratory testing.
- Achieve full test coverage on any device, platform, OS, and UI layer.

It makes it a powerful tool for understanding the impact of technical debt and helping to prioritize managing it, enabling you to deliver a best-in-class performance and user experience.

Consolidate Test Tools

Eggplant enables you to test on any platform, at any scale, and for any location. It means you can consolidate multiple testing tools into one platform, helping you to cut costs.

Because you have a unified testing platform, you reduce the time and effort required to perform testing tasks, helping you to improve efficiency.

You also have a centralized repository for test data and results, reducing the risk of data silos and inconsistencies and helping to enhance visibility.

Eggplant simulates virtual users at the application UI and network protocol levels to accurately measure user experience performance at scale. These capabilities help to improve the customer experience and gain market competitiveness.

Seize Opportunities to Scale

Eggplant provides a suite of functional, performance, and security testing tools, reducing the time and effort required to perform testing tasks. Automated testing processes can run consistently and accurately, reducing the risk of human error. The platform provides a more reliable testing process because you only need to update test scripts in a single location, not multiple locations.

It enables you to scale testing processes and accommodate growth without adding additional resources, helping to improve productivity.

Eggplant's AI capabilities mean you can go far beyond the user journeys your engineering teams have envisaged. Our solution covers all types of journeys, providing extensive coverage and detecting issues beyond the expected scope, regardless of the frequency of upgrades or releases. This tool drives an enhanced user experience — and the vital differentiation you need.

Eggplant's infrastructure evolves with you as you navigate digital transformation and continue to become a digital enterprise. Ultimately, it is a scalable tool for your organization that helps with your present and future needs.

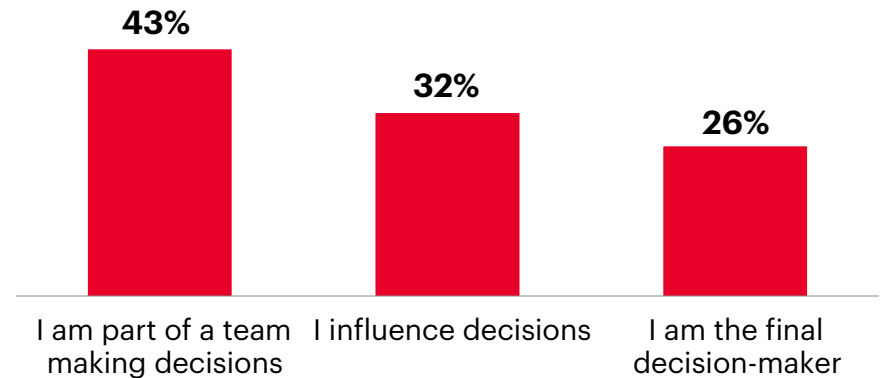
About the Forrester Study

Demographics

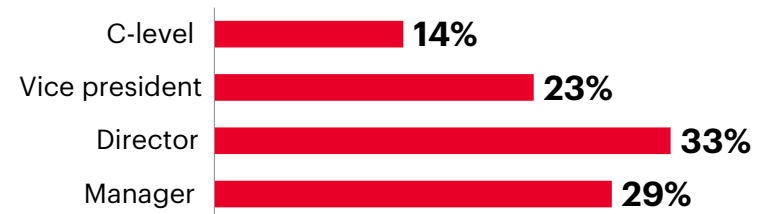
The study analyzed the perspectives of individuals who played significant roles in shaping their organizations' software testing strategies.

- Seventy-three percent worked in quality assurance (QA) and IT operations, while 15% worked in product / program development, and 11% in research and development (R&D).
- Respondents worked in a range of industries, with 20% technology, 19% government and defense, 18% finance, 16% retail, 16% healthcare, and 11% transportation.
- Twenty-six percent of the participants were the final decision-makers in software testing; the remaining respondents also had significant influence over decisions.

Responsibility for testing automation strategy



Respondent job level



Key findings ⁵

- While solutions built in-house may initially appear to be more cost-effective, *76% of decision-makers acknowledged that in-house solutions limit their ability to meet future business requirements.*
- Despite significant advances in model-based and AI-driven approaches, *89% of organizations still use manual test processes.*
- Of the respondents with in-house solutions, *63% use three or more development tools* or automation solutions to conduct their testing.
- Respondents with solutions built in-house say their firms plan to *invest in commercial solutions in the next 12 months.*
- Of the respondents using commercial solutions, *79% report reducing test costs*, including a significant or transformational business improvement for their organizations.



Final Thoughts

Investing in an enterprise software test automation solution is critical for organizations looking to scale their businesses. While solutions built in-house may seem cost-effective, they often limit an organization's ability to meet future business requirements.

Despite significant advancements in model-based and AI-driven approaches, many organizations still use manual test processes. Organizations using commercial solutions have reported reduced testing costs and significant business improvement.

For those moving into automated testing for the first time or replacing existing tools with a platform approach, it is critical to understand the trade-offs when choosing test automation software.

By embracing the advantages of enterprise software test automation, organizations can ensure their software meets user expectations while keeping up with the rapid pace of development.

For more information on how Keysight can accelerate software testing for you, visit www.keysight.com/find/eggplant.

¹ <https://info.eggplantsoftware.com/gartner-report-2022-market-guide>

² <https://www.techopedia.com/definition/27913/technical-debt>

³ <https://www.it-cisq.org/the-cost-of-poor-quality-software-in-the-us-a-2022-report>

⁴ <https://www.forrester.com/blogs/address-technical-debt-to-mobilize-innovation>

⁵ <https://www.keysight.com/us/en/assets/7123-1062/reports/Look-Before-You-Leap-Understand-The-Trade-Offs-When-Choosing-Test-Automation-Software.pdf>



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.