

The Evolution of Test Automation

Results from the 2018
QASymphony and
TechWell Survey

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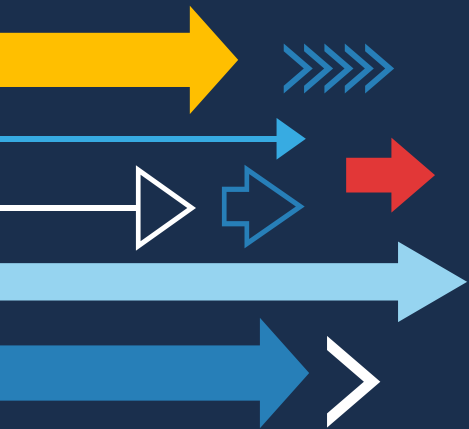


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Introduction

Over the past few years, agile and DevOps have moved from buzzwords to common practice. So much so, in fact, that if you haven't already implemented agile or DevOps, you are lagging behind. With the increasing popularity of these collaborative, fast-moving, adaptable principles, the software development and testing lifecycle has become lightning-fast. Because this lifecycle is so fast, test automation is mandatory to maintain the quality of your software. If you aren't automating testing, you're probably losing sleep worrying that something catastrophic is going to happen and you won't even know about it.

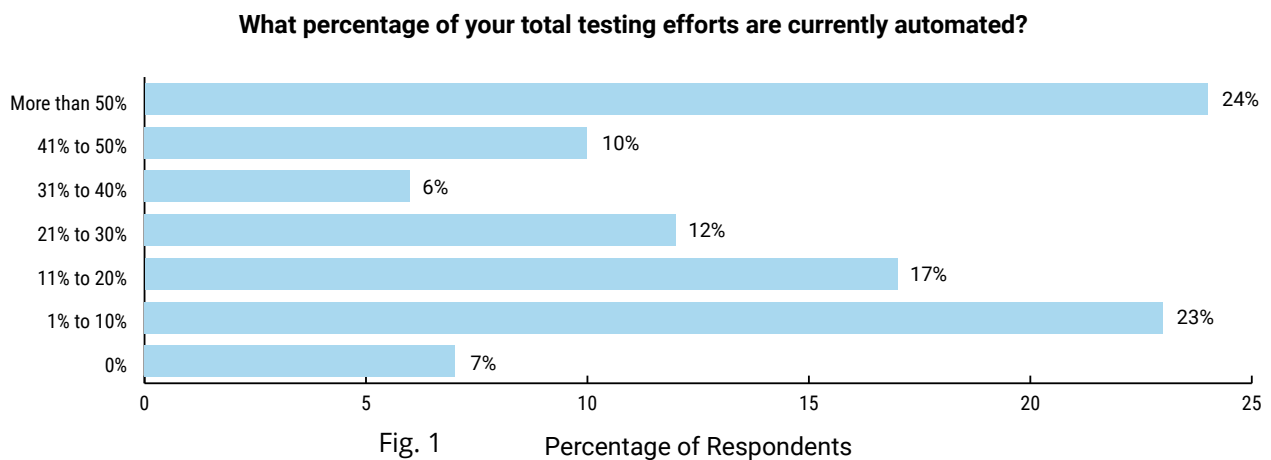
Organizations of every size now recognize the need to speed up their processes if they want to stay competitive in the marketplace. While still the best choice for some scenarios, manual testing processes are no longer sufficient on their own. Test automation is now a must-have rather than a nice-to-have.

QASymphony and TechWell Corporation partnered on a survey to measure how widespread test automation is today and gather data on how much those numbers are expected to change over the next few years. The survey also looks at how test automation is being integrated into teams; the benefits and challenges organizations face; the relationship between agile, DevOps, and test automation adoption; and the tools and frameworks organizations are utilizing for their automation efforts.

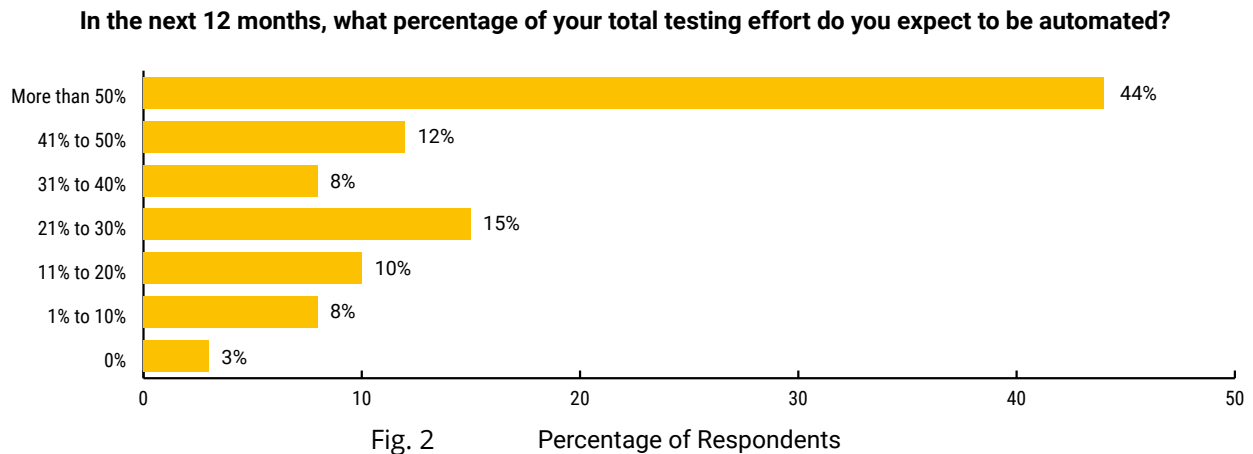
The data collected from 173 software testers, developers, QA decision-makers, and business users was analyzed with an eye toward how enterprise-level companies compare to smaller companies when it comes to implementing test automation. The results suggest differences in the rate of adoption as well as the challenges each company faces.

Current Automation Levels and Future Outlook

Survey results indicate widespread test automation adoption still has a way to go, with more than three-quarters of respondents automating less than 50% of their testing. (Fig. 1)



However, the results predict growth in automation over the next year. Almost half of respondents (44%) anticipate 50% or more of their testing efforts will be automated in the next twelve months. Automating 50% of their testing is a massive undertaking and investment for each of these organizations. It requires that a team or teams of automation engineers or business testers learn new tools to implement automation successfully. At large organizations, millions of dollars will be invested to hire new employees so they won't fall behind in time to market and development over this year. Of the organizations that do not currently automate any testing, 10% plan to start automating within the next year. (Fig. 3)



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If your organization doesn't currently automate testing, is it considering implementing test automation in the future?

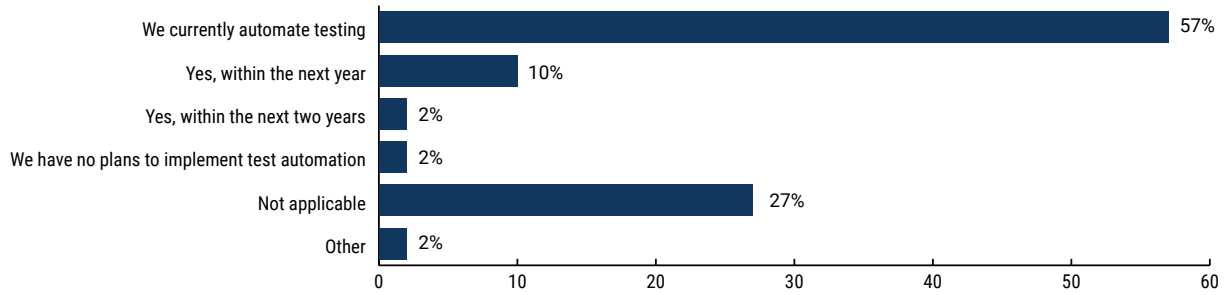
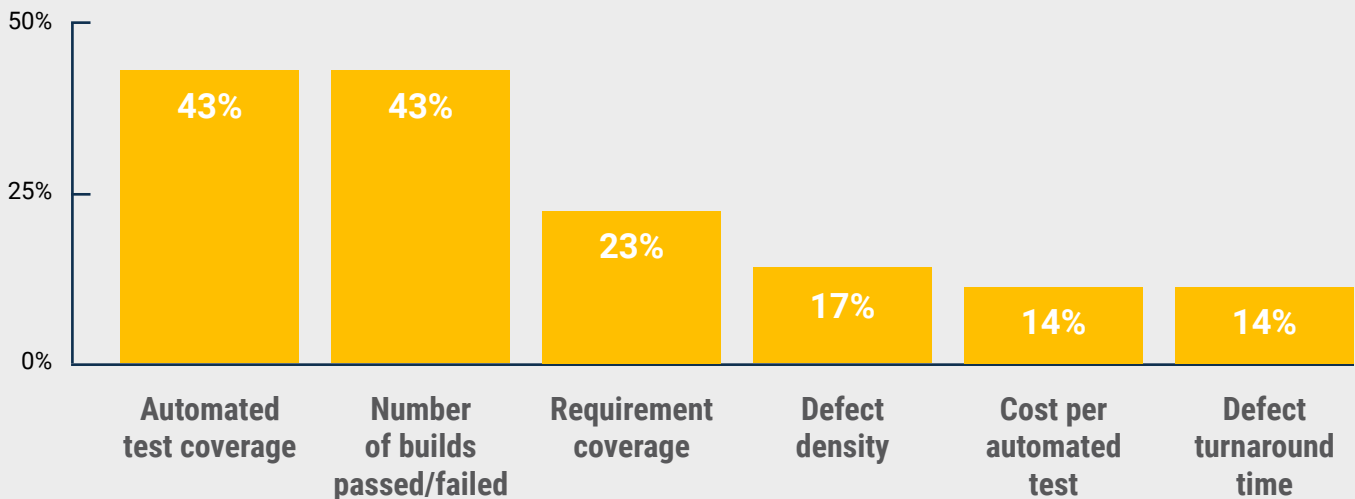


Fig. 3 Percentage of Respondents

Our survey results show that a larger company size doesn't equate to a higher rate of automation. Almost a third (29%) of mid-size companies currently automate 50% or more of their testing, while only 17% of enterprises are automating at that level. However, more than half of enterprise organizations (57%) report that they expect to have reached the level of 50% or higher automation within the next year. This is evidence that process and skill change is by far the largest hurdle in adopting test automation. Test automation tools have significantly improved; the hard part is changing the people and the processes.

How Do You Measure Success?

Top 6 Key Performance Indicators



Which Tests Are Being Automated, and by Whom?

Regression tests are by far the most frequently automated test type (86%), followed by repeated execution (46%), load (29%), performance (29%), and cross-browser (29%) testing. (Fig. 4) Most testing (63%) is still being done solely by QA, but we are seeing a rise in collaborative testing teams that include both QA and developers (27%). In a small percentage of organizations (4%), developers are responsible for most of the testing. (Fig. 5)

Which types of testing are you currently automating?

(Respondents could select more than one answer)

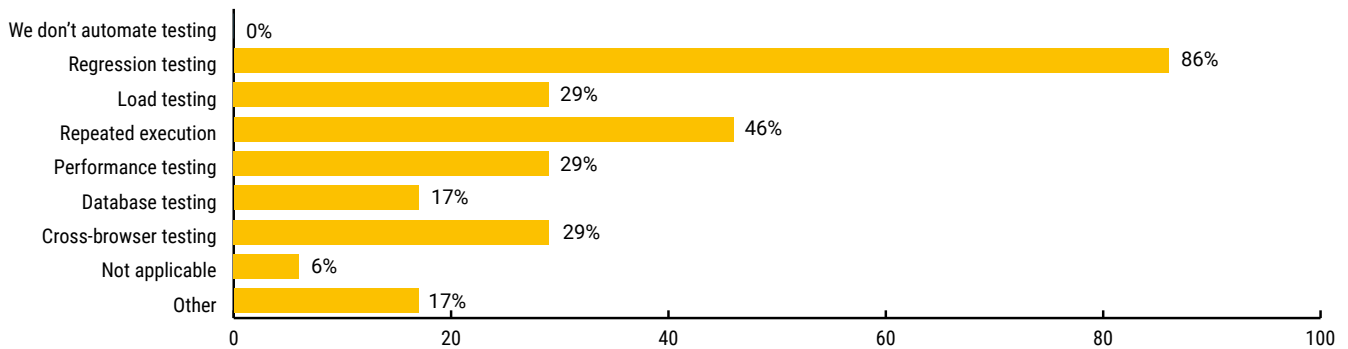


Fig. 4 Percentage of Respondents

Who performs most of the testing at your organization?

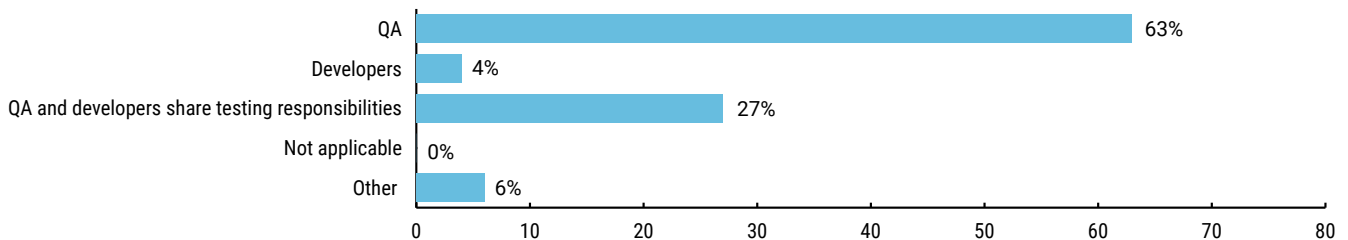


Fig. 5 Percentage of Respondents

“Some of us would like to implement automated testing, but we have no budget or support from upper management.”

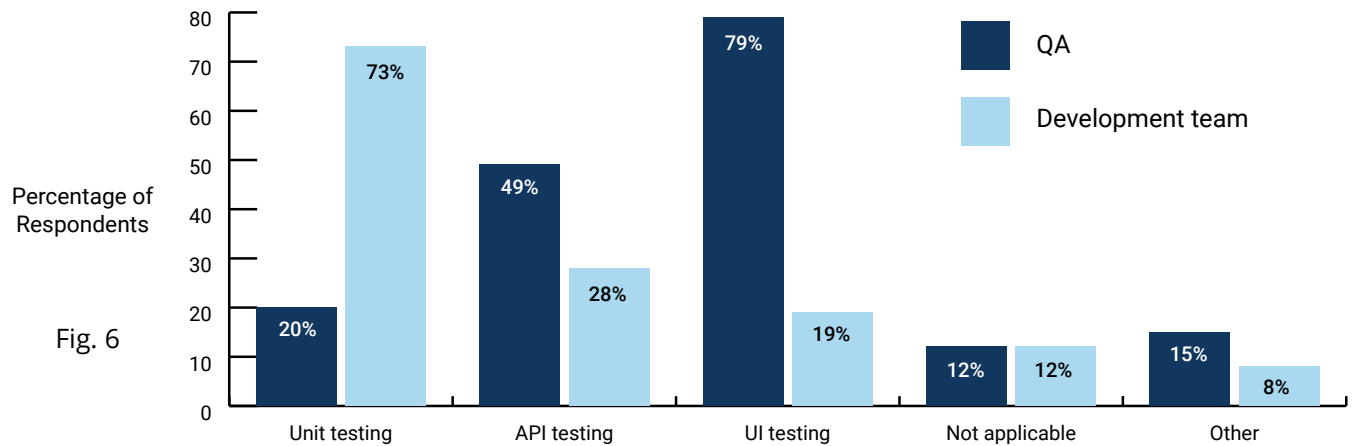
—Systems analyst/QA tester

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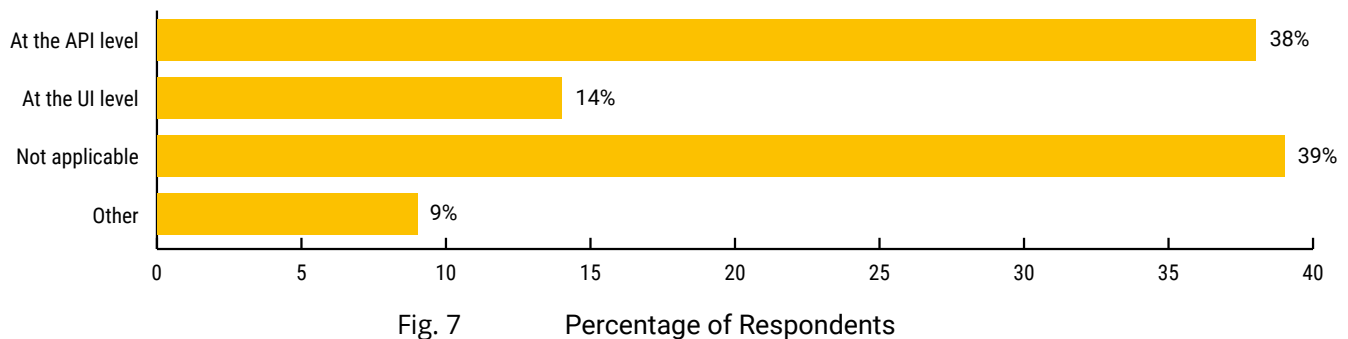
Our survey looked at whether there was a difference in the kinds of testing QA teams and development teams are doing. We found that QA teams do most of the UI testing (79%) in many organizations, while dev teams perform the bulk of the unit testing (73%). (Fig. 6) Development teams also frequently contribute to automated testing efforts at the API level. (Fig. 7)

Which types of automated testing are your QA and Development teams primarily performing?

(Respondents could select more than one answer)



Beyond unit level testing, where do developers tend to contribute to automated testing the most?



Test Automation: Love It or Hate It?

Survey respondents weigh in on their test automation experiences

"Test automation improves your ability to determine stability of code build and readiness for deeper testing."

—Automation consultant

"We are not at the point yet where our testing cycles have been significantly reduced—obviously we are automating the wrong things, or not automating very efficiently."

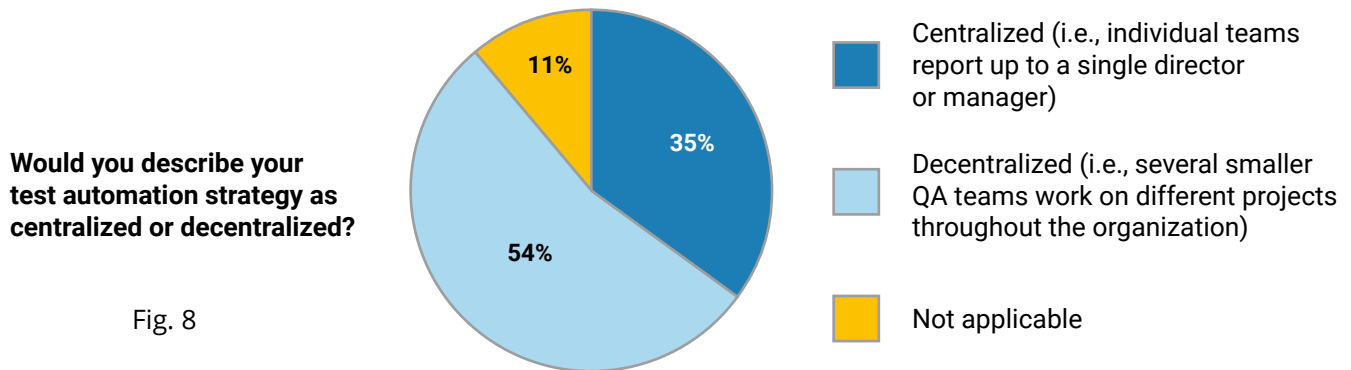
—QA team lead

"We haven't automated enough to see significant improvements as of yet, but have high expectations as we roll out more widespread automation."

—QA analyst

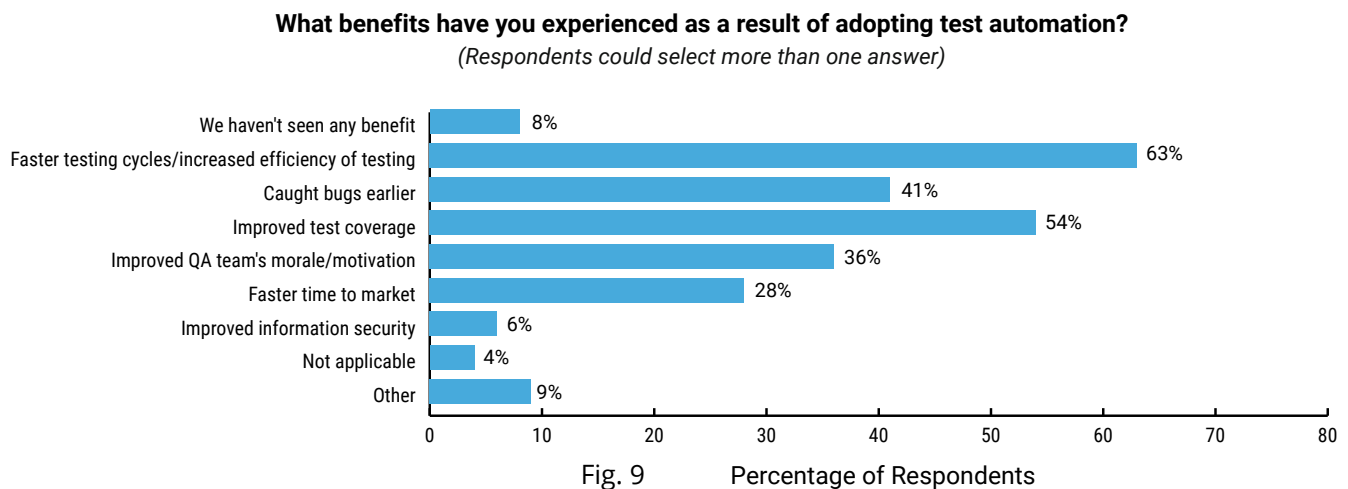
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We were also curious how test automation strategies differ among organizations. More than half of respondents report that their organization's test automation strategy is decentralized, in that several smaller QA teams work on different projects, while 35% have a centralized automation strategy where the individual teams report to a single manager. (Fig. 8) We also found that 61% of mid-size companies follow a decentralized automation strategy, compared with 47% of enterprise-level companies.



Benefits and Challenges

As with any major undertaking, test automation comes with its share of benefits and challenges. Faster testing cycles is the most cited benefit (63%), followed by improved test coverage (54%) and catching bugs earlier (41%). (Fig. 9)



“Automation is brittle, flaky, and takes more time than just running manual tests. Manual tests also ‘check’ more scenarios than automation can. Manual testing is faster feedback with an ever-changing product.”

—QA manager

The major challenges reported by survey respondents include finding staff with the appropriate skill set (55%), shifting organizational mindset to embrace test automation (43%), and creating data sets for automated tests (43%). (Fig. 10)

What challenges have you experienced with test automation?

(Respondents could select more than one answer)

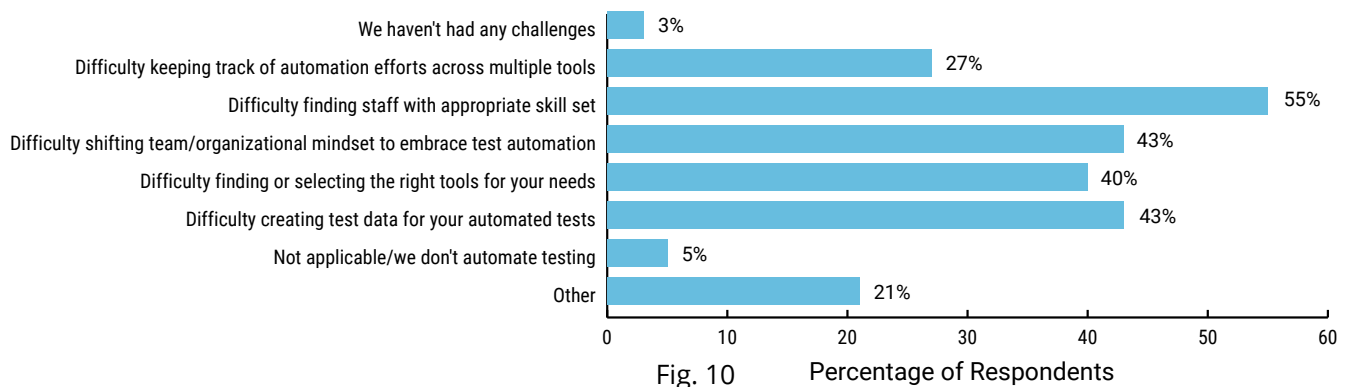


Fig. 10 Percentage of Respondents

Random Finding:

66%



of respondents say functional automation is the most valuable for reducing manual testing efforts

Test Automation Was Born out of Necessity

Mainstream acceptance of agile methodologies has significantly changed the role of the tester. [1] The iterative nature of agile, and the growing popularity of DevOps and its reliance on continuous integration and delivery, necessitate a shift from primarily manual testing to at least some level of automated testing. Our survey found that 72% of organizations are automating testing, 76% have adopted agile methodologies, and 55% are using DevOps practices. (Fig. 11)

Which of the following practices has your organization adopted?

(Respondents could select more than one answer)

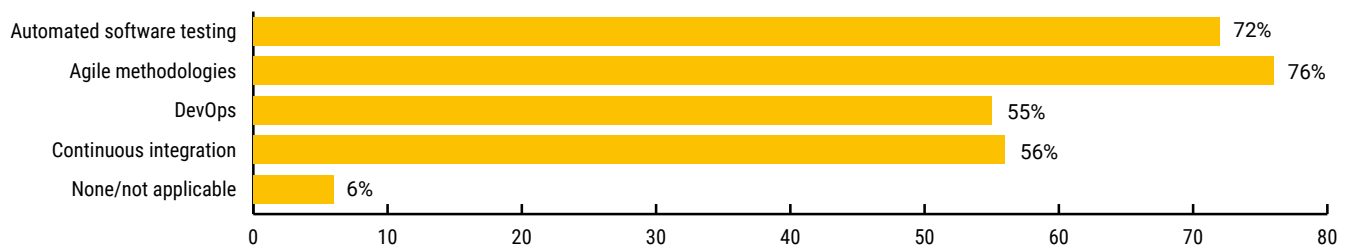


Fig. 11 Percentage of Respondents

The level of DevOps adoption varies widely, with 23% of respondents currently using DevOps on 1% to 10% of projects and 20% using DevOps on at least half of their projects. (Fig. 12) Our survey found that small companies have the highest and lowest rates of DevOps adoption, with 27% employing DevOps on more than half of their projects and 21% not using DevOps at all. At the other end, 13% of enterprise-level companies implement DevOps on more than half their projects, and only 10% haven't started using DevOps.

What percentage of projects in your organization have adopted DevOps?

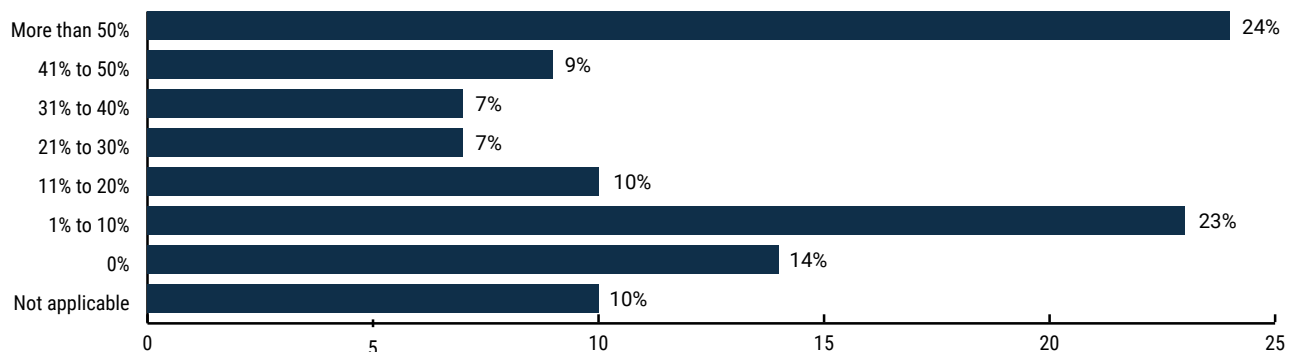
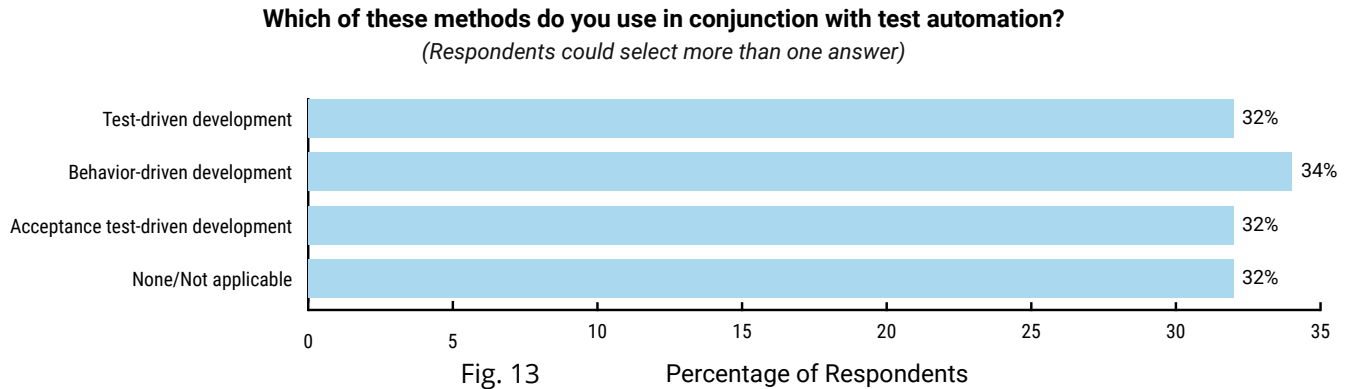


Fig. 12 Percentage of Respondents

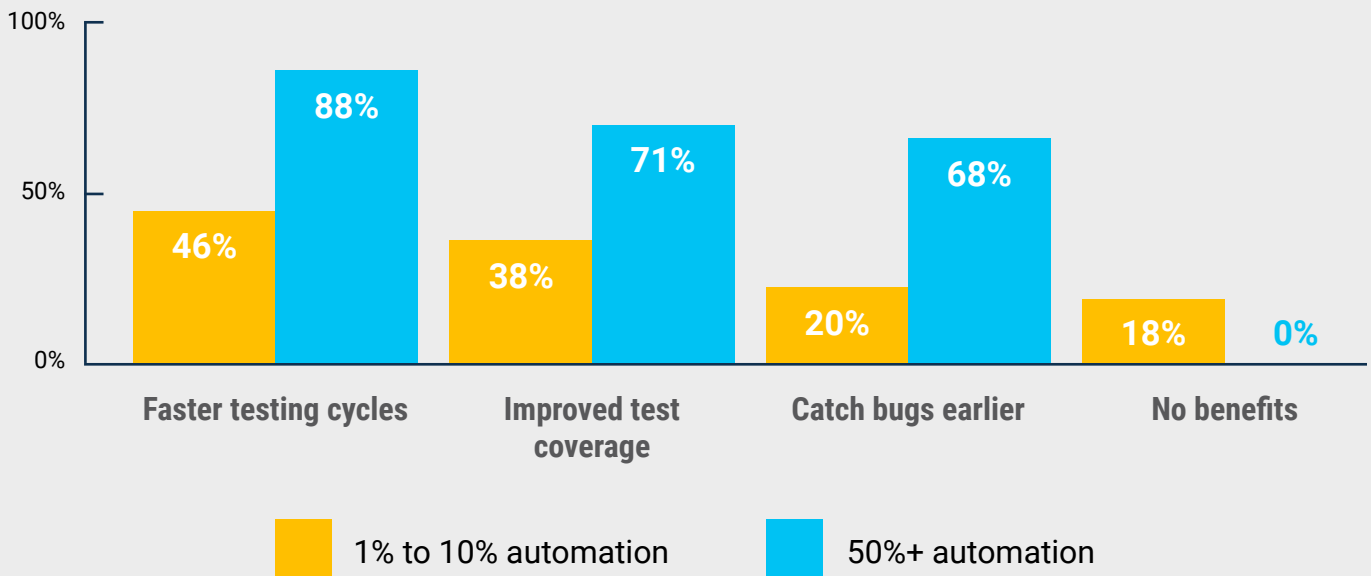
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We found that DevOps is not the only new trend among our respondents. Our survey found that 34% of respondents use behavior-driven development, 32% use test-driven development, and 32% use acceptance test-driven development. (Fig. 13)



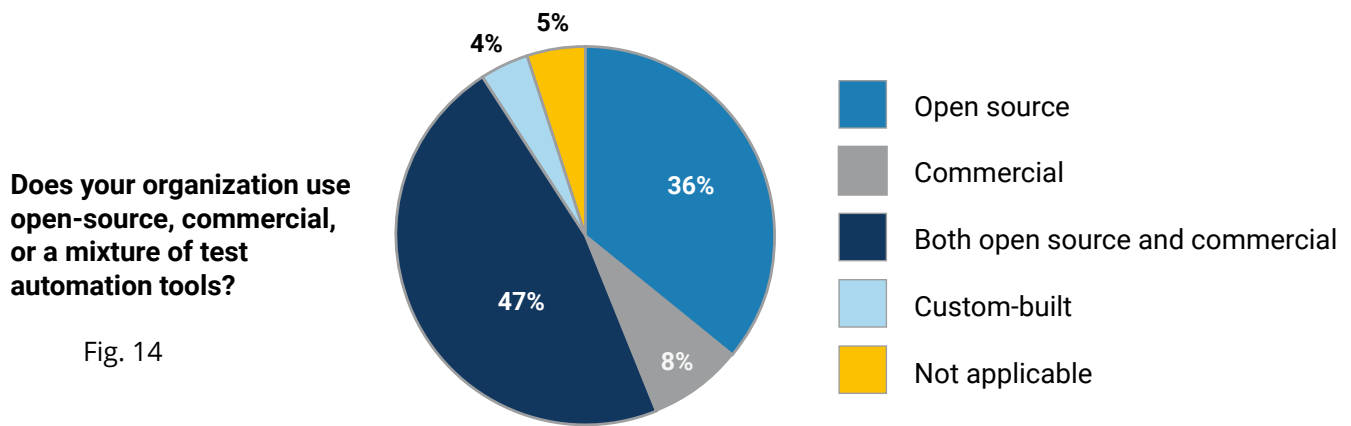
Does Maturity Matter?

How test automation benefits compare at early-stage versus advanced-stage adoption



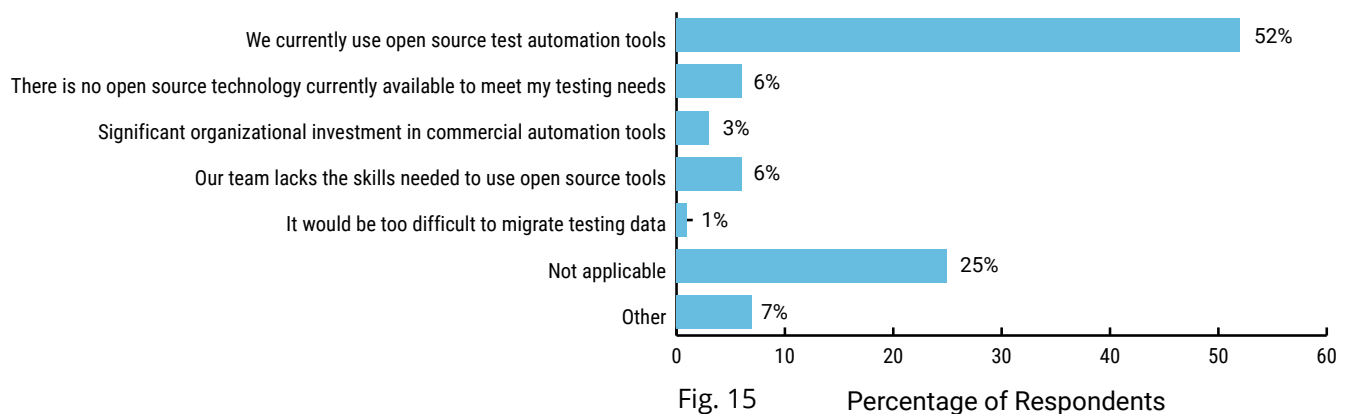
Test Automation Tools and Frameworks

All these tests aren't going to automate themselves, so we wanted to find out what tools and frameworks are the most popular. A large portion of respondents are using a mixture of open source and commercial tools (47%), while 36% rely solely on open source tools. (Fig. 14)



A small percentage of respondents (8%) exclusively use commercial tools. We asked those who aren't using open source tools why they aren't using them. The answers included "open source tools don't meet current needs," "it's too hard to migrate the test data," and "team members lack the appropriate skills." (Fig. 15)

If you aren't currently using open source test automation tools, what's preventing you from doing so?



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Almost half of small companies (46%) report using open source tools exclusively. Enterprise-level companies tend to vary their tool sources, with 20% using open source only, 50% using a mix of open source and commercial tools, and 10% having their tools custom-built.

When it comes to which specific automation tools and frameworks are in demand, we discovered clear favorites. Among automation tools, Selenium (73%), Cucumber (33%), and Appium (24%) lead the pack. (Fig. 16) The popularity of Cucumber is not unexpected given that, as noted above, 34% of respondents have adopted behavior-driven development. Among automation frameworks, JUnit (36%), TestNG (22%), and NUnit (19%) are seeing the highest usage. (Fig. 17)

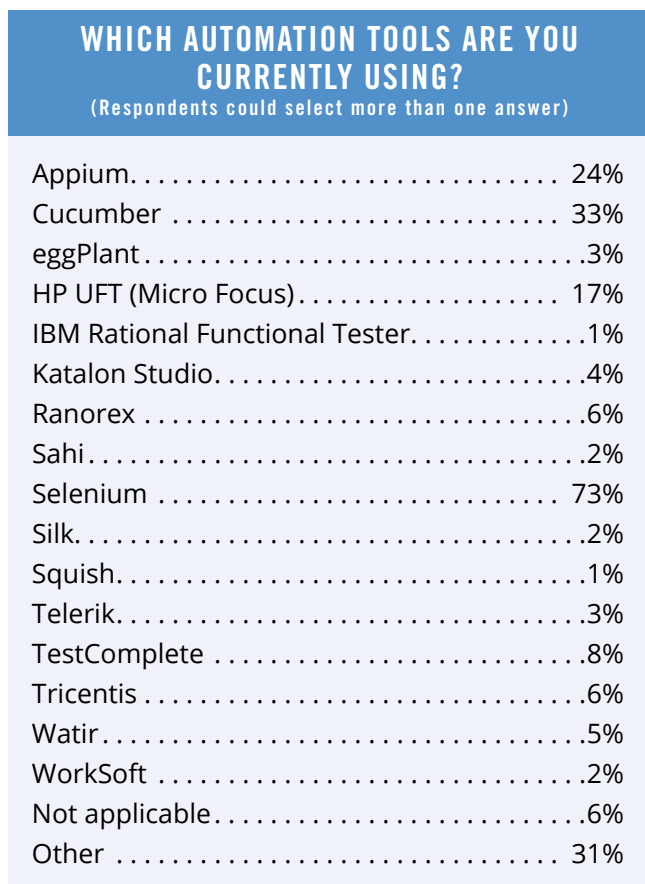


Fig. 16

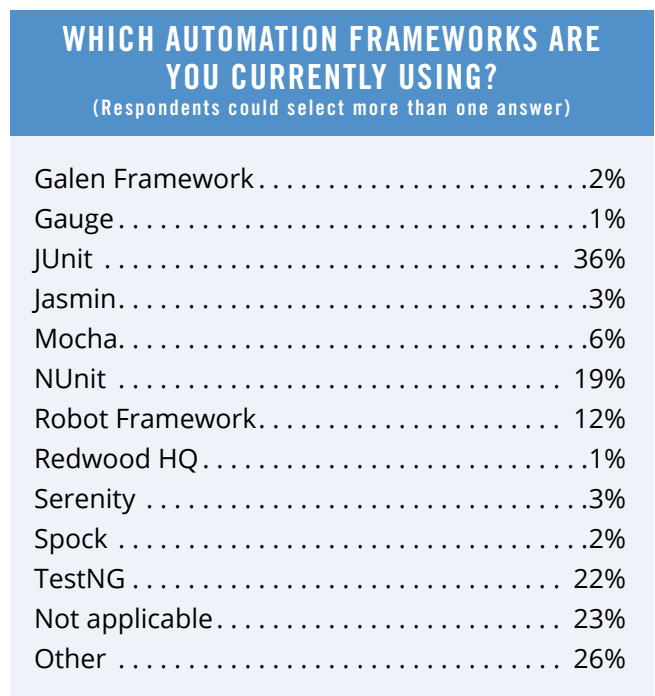


Fig. 17

“We don’t use automation to ‘reduce’ manual testing; we use it to augment it and allow our human testers to focus on new functionality and high-value testing work.”

—Automation consultant



Conclusion

Test automation is a necessity in today's fast-paced development environments. Whether you work for a tech company or a highly regulated government entity, if you aren't automating your testing now, you soon will be. As the survey results show, over the next twelve months, test automation efforts are going to continue to gain traction.

While manual testing and automated testing continue to find their balance, we are seeing a growth in collaborative testing teams, as well as an increasing number of developers doing testing and testers learning technical automation skills. [1]

In order to fully benefit from test automation, there will need to be a major cultural reset in many organizations. Managers and test teams will need to communicate openly about the realities of automation to dispel long-held misconceptions. Faster test cycles, improved test coverage, and higher-quality software do not come without a cost.

As agile and DevOps become commonplace practices in many organizations, development cycle times are only going to get faster. A push to implement test automation now will save your organization frustration (and money) later.

References

[1] TechWell Corporation, [State of the Software Testing Profession Survey Report](#)