PractiTest | Tea Time with Testers

STATE OF TESTING™
REPORT 2024

OPENING NOTE

Welcome to the 11th edition of the State of Testing™ Report.

Since 2013, we've brought together seasoned QA professionals, software developers, technology executives, and business leaders from across the globe to share their insights into the world of software testing.

In this year's survey, in addition to the ongoing questions we track over the years, we added questions around several areas. We couldn't avoid addressing the hot buzzword of AI, and we wanted to understand its impact on the world of software testing. Another question dealt with the financial impact of QA and the metrics we use to measure our work in general.

We're honored that the State of Testing™ Report has become a trusted source of information for organizations worldwide. Thank you to all who shared their experiences and expertise to help make the survey so impactful. So dive into the report, and get a snapshot of what's happening, where things stand, and what the future holds for software testing.

- Joel and Lalit

1.
DEMOGRAPHICS AND BACKGROUND

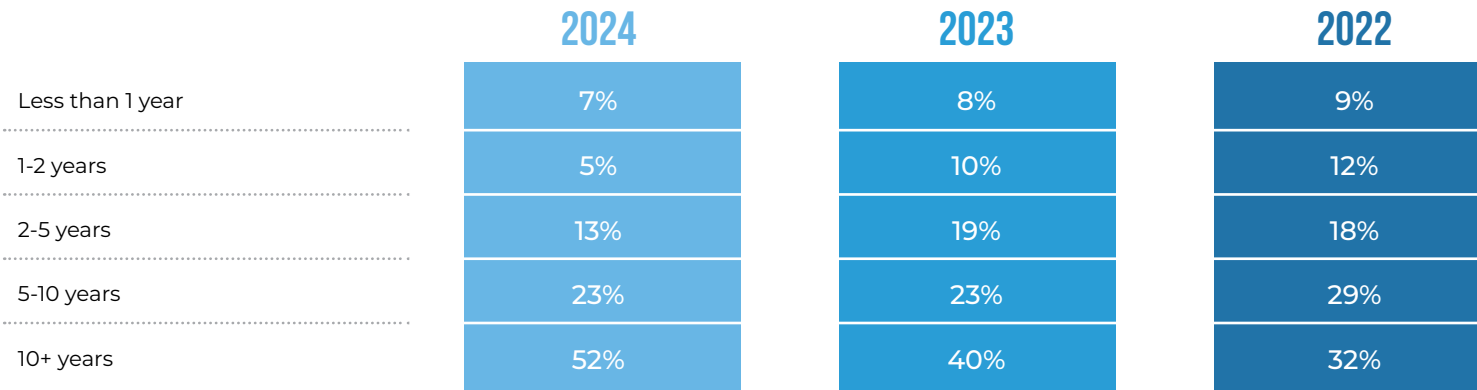*In this survey, we use the words Testing and QA interchangeably.

#1 WHAT IS YOUR CURRENT TESTING POSITION?

Which of the following most closely matches your job responsibility and title?

	2024	2023	2022
Test Leads/Managers/Directors	30%	30%	25%
Test Engineers/QA Engineers	27%	28%	31%
Tester/Test Analysts	9%	15%	14%
Other	9%	4%	7%
Automation Testers	7%	8%	11%
Developers in Test/SDET	5%	6%	4%
Consultants/Freelancer	4%	2%	1%
Test Architects	3%	1%	2%
Software Engineer/Developer	2%	2%	3%
Development Team Lead/Manager	2%	1%	0%
Project Managers	1%	1%	1%
Test Coach	1%	1%	0%

Unsurprisingly, Test/QA Engineers and Leaders remain the majority of respondents, but we saw a drop in people titled 'Testers'. In addition, we see a rise in the 'Other' category that included users with titles such as Site Reliability Engineer (SRE), Solution Architect, UAT (User Acceptance Testing) Lead, Analyst, Quality Practice Lead, and even DevRel.
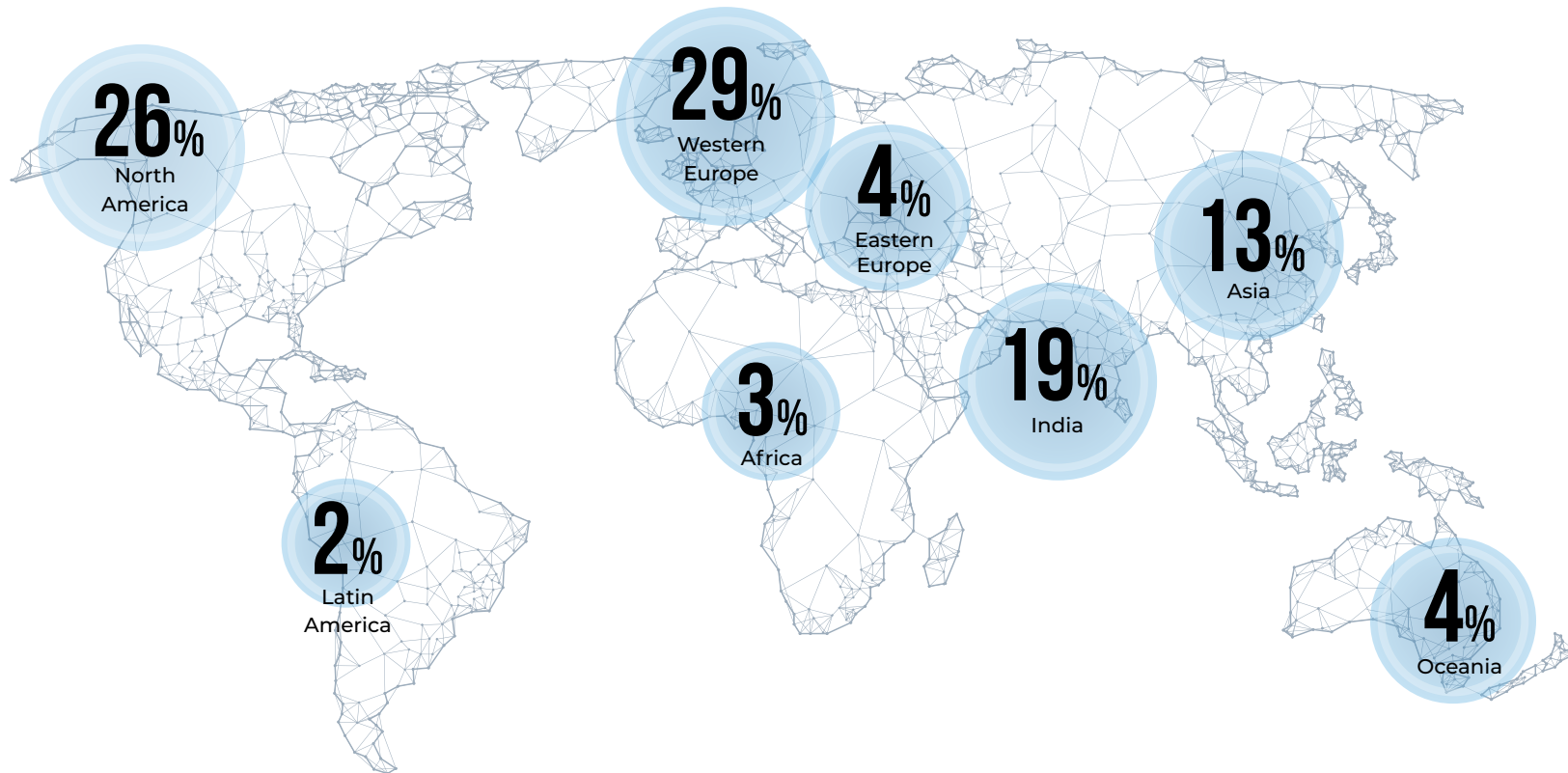
#2 FOR HOW LONG HAVE YOU BEEN WORKING IN TESTING?

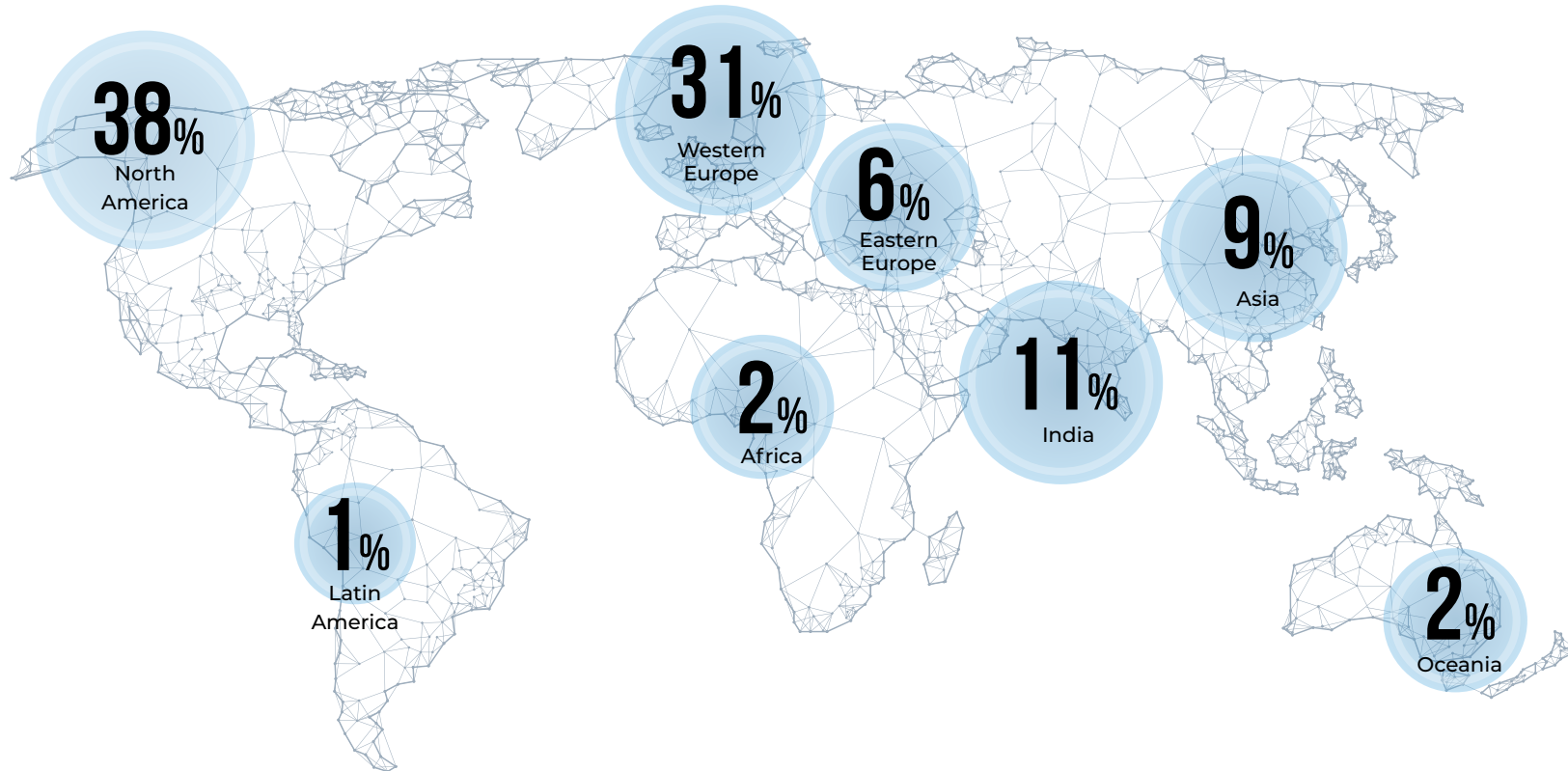|	2024	2023	2022
Less than 1 year	7%	8%	9%
1-2 years	5%	10%	12%
2-5 years	13%	19%	18%
5-10 years	23%	23%	29%
10+ years	52%	40%	32%

23+ years of experience

This year, we see a spike in respondents from experienced testers with 10+ years of experience. These numbers support the trend we saw in previous years, where testing is no longer perceived as a stop on the way to other professions and people remain working in testing for a longer period.

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#3 WHERE DO YOU LIVE AND WORK?

26% North America

29% Western Europe

4% Eastern Europe

13% Asia

3% Africa

19% India

2% Latin America

4% Oceania

Similar to the findings of previous years, we see that QA is a global profession spanning the globe, with a strong presence in Western Europe, North America, and India. This year, a smaller percentage of respondents came from Latin America compared to previous years, which is yet to determine if this sets a trend or just a measurement gap.

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#4 WHERE IS YOUR COMPANY'S HEADQUARTERS LOCATED?

38% North America

31% Western Europe

6% Eastern Europe

9% Asia

2% Africa

11% India

1% Latin America

2% Oceania

This year, we added a new question that addresses a common scenario of offshoring, where employees are working for a company that is headquartered in a different country. We can see that the data supports this for India, where 18% of employees are located, but only 11% of companies are headquartered, with North America being the offshoring country. This comes as no surprise when taking into consideration the numbers we share about annual income across the various regions.

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#5 WHAT IS YOUR ANNUAL INCOME FROM TESTING AND TESTING-RELATED ACTIVITIES?

Select the approximate value converted into US Dollars (gross amount, including salary, bonus, and perks if any)

	0-1 years	1-2 years	2-5 years	5-10 years	10+ years
India	$10K or less	$10K or less	$10K - $30K	$30K - $50K	$80K - $130K
Western Europe	$30K - $50K	$30K - $50K	$50K - $80K	$50K - $80K	$80K - $130K
Eastern Europe	$10K or less	$30K - $50K	$10K - $30K	$50K - $80K	$50K - $80K
North America	$30K - $50K	$50K - $80K	$80K - $130K	$130K - $160K	$130K - $160K
Asia	$10K or less	$10K or less	$10K - $30K	$10K - $30K	$80K - $130K
Latin America	$10K or less	N/A	$10K - $30K	N/A	$50K - $80K
Africa	$10K or less	$10K or less	$10K - $30K	$30K - $50K	$50K - $80K
Oceania	$10K - $30K	$10K - $30K	N/A	$50K - $80K	$130K - $160K

#6 WHAT IS THE SIZE OF THE R&D OR IT ORGANIZATION IN YOUR COMPANY?

Consider all development aspects in your company, including programmers, operations, testers, managers, etc.

2024

- **13%** 1 to 10 employees
- **12%** 11 to 30 employees
- **11%** 31 to 50 employees
- **10%** 51 to 100 employees
- **22%** 101 to 500 employees
- **32%** 501+ employees

2023

- **8%** 1 to 10 employees
- **13%** 11 to 30 employees
- **11%** 31 to 50 employees
- **14%** 51 to 100 employees
- **20%** 101 to 500 employees
- **34%** 501+ employees
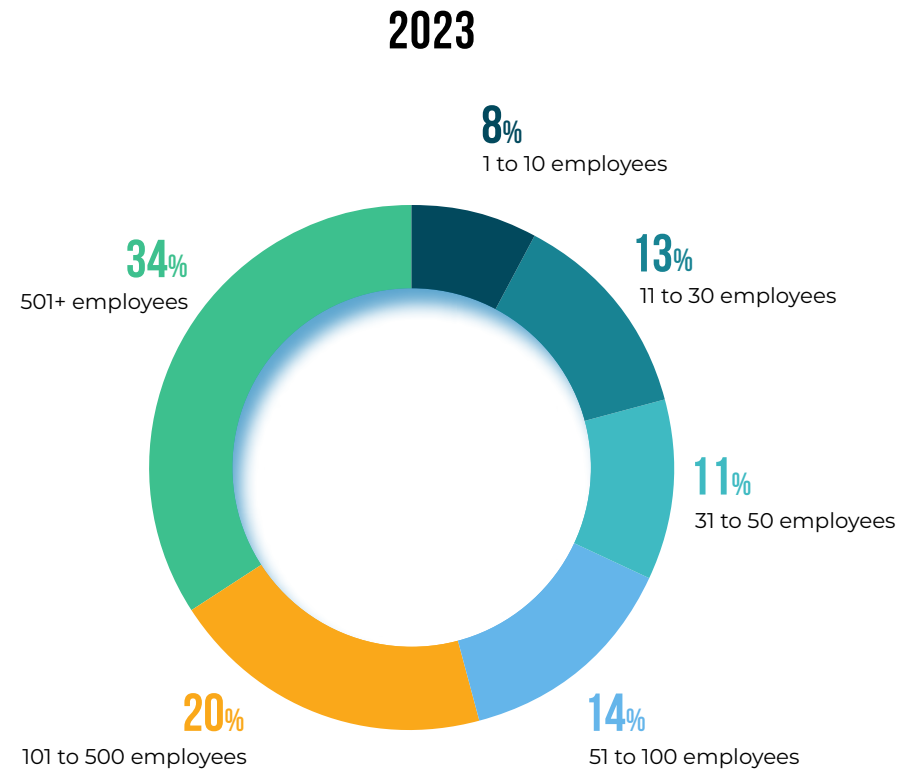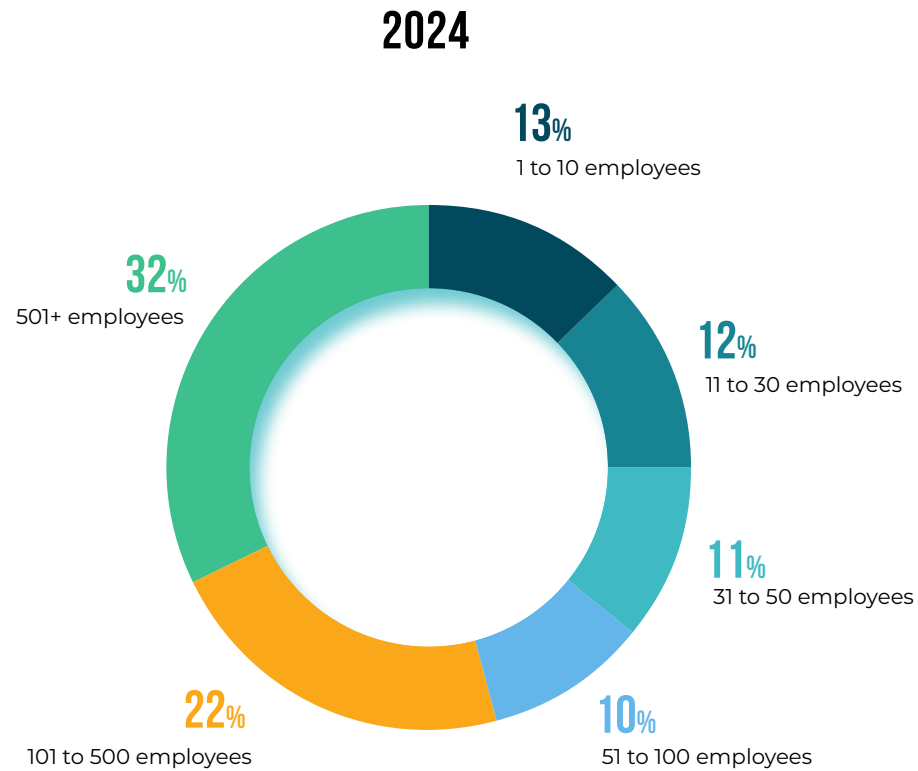
#7 HOW MANY TESTERS WORK IN YOUR ORGANIZATION?

If there is more than one team, count them all.

I'm the only one
- 9% 2024
- 9% 2023
- 8% 2022

2 - 5 Testers
- 22% 2024
- 31% 2023
- 39% 2022

6 - 15 Testers
- 14% 2024
- 24% 2023
- 23% 2022

16 - 50 Testers
- 24% 2024
- 16% 2023
- 14% 2022

51 + testers
- 31% 2024
- 17% 2023
- 12% 2022

Other
- 6% 2023
- 4% 2022
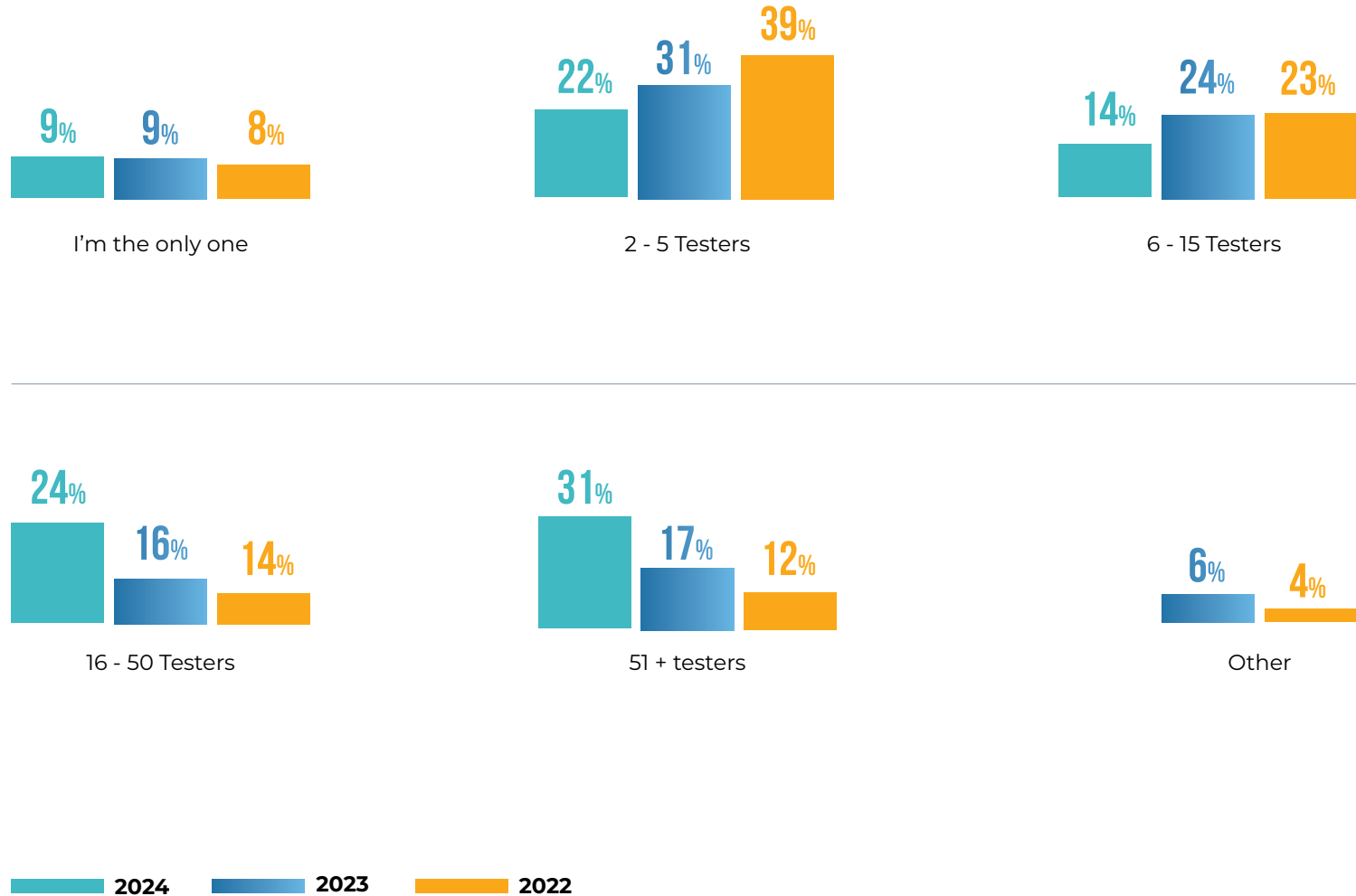
2024 **2023** **2022**

2.

METHODOLOGIES AND PROCESSES

#8 WHICH DEVELOPMENT AND TESTING MODELS OR PRINCIPLES DOES YOUR ORGANIZATION FOLLOW?

You can choose more than one.

	2024	2023	2022
Agile or Agile-like (Scrum, Kanban, XP, etc)	92%	91%	86%
DevOps	45%	50%	38%
BDD (Behavior Driven Development)	26%	23%	19%
TDD (Test Driven Development)	23%	18%	18%
Waterfall or waterfall-like (e.g. V Model)	21%	23%	17%
We have our own unique model or principles	12%	2%	13%

18% 2023

23% 2024
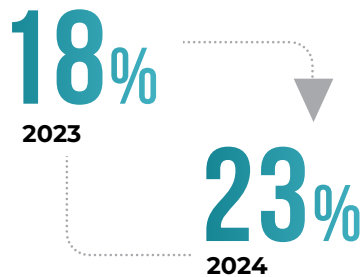
One interesting finding from this year's results is the rise of TDD (Test Driven Development) from 18% last year to 23% this year. This is strong support for the Shifting left approach, when tests are written before the actual code, alongside the ongoing increase in BDD adoption (19%, 23%, and then 26%), indicating that the "all team testing" approach is growing in traction and that R&D teams are adopting it, as well. It is also worth noting that 21% of companies still report working in the Waterfall model, indicating both its relevance in some industries and the long time it takes for full adoption of a change such as the transition to agile.

#9 ARE TESTERS PART OF THE CI/CD PROCESS?

Yes, we are an active part of defining and maintaining the process

48%
40%
38%
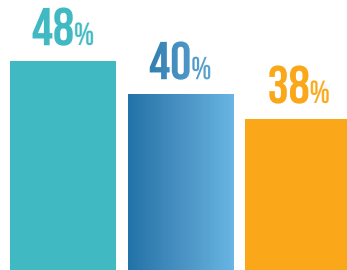
Yes, we have access to reports and use them as feedback for our testing

20%
19%
17%
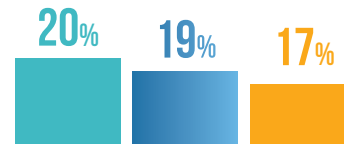
No, we get the reports but we don't do much else with them

7%
8%
9%

No, we know there is CI/CD but we are not part of this process

15%
17%
18%
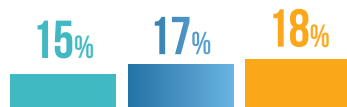
We do not have CI/CD or we are not part of it

10%
13%
13%

Other

N/A
3%
5%

2024   **2023**   **2022**

Continuing with previous years' trends, more and more testers take an active part in the CI/CD process with now just under 50% involved in the definitions and maintenance of the process. The number of people who reported their organization doesn't deploy CI/CD is down to 10%, and we expect to see this number further decrease in the coming years.

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#10 HOW MUCH OF YOUR TESTING PROCESS IS DONE BY NON-DEDICATED TESTERS?

In many organizations, other team members also participate in formal testing, e.g., Developers, Product Owners, Support, and End Users.

All the testing is done by dedicated testers only

18%   19%   18%

Less than 10%

33%   34%   34%

Between 10% and 50%

34%   33%   36%

Between 50% and 75%

11%   9%   7%

All testing is done by non-dedicated testers

4%   4%   4%

Other (please specify)

N/A   1%   1%

■ 2024   ■ 2023   ■ 2022
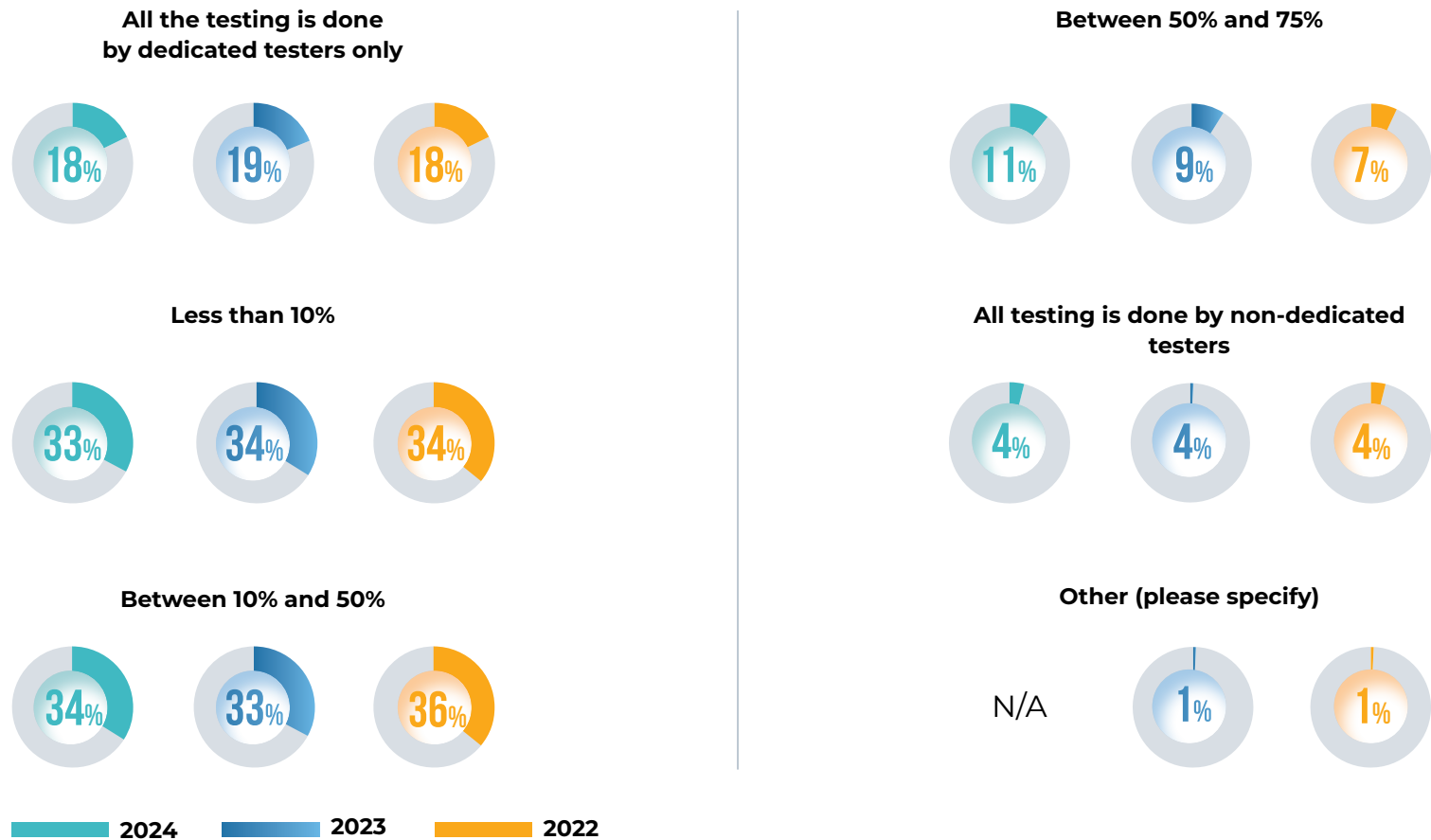
#11 HOW CONFIDENT ARE YOU IN WRITING AUTOMATED TESTING?

23%	20%	15%	15%	14%	13%

Very confident   **Completely unconfident**
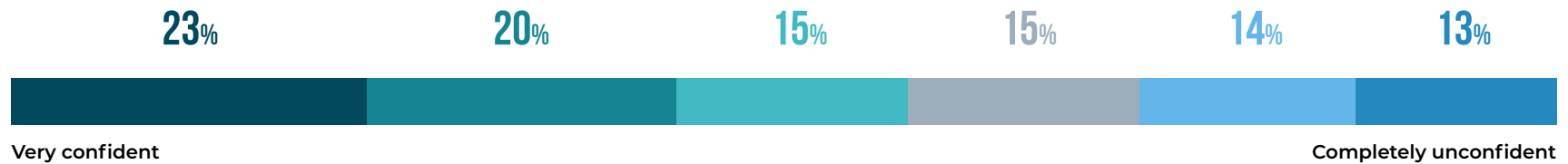
This is a new question that we have added to this survey, and the answers here should raise a concern to testing leaders and L&D teams when 42% of respondents don't feel comfortable in writing automation scripts. As automation will continue to grow, this reskilling is required to maintain competitiveness for both employees and hiring companies.

#12 HOW MUCH HAS AUTOMATION REDUCED YOUR MANUAL TESTING?

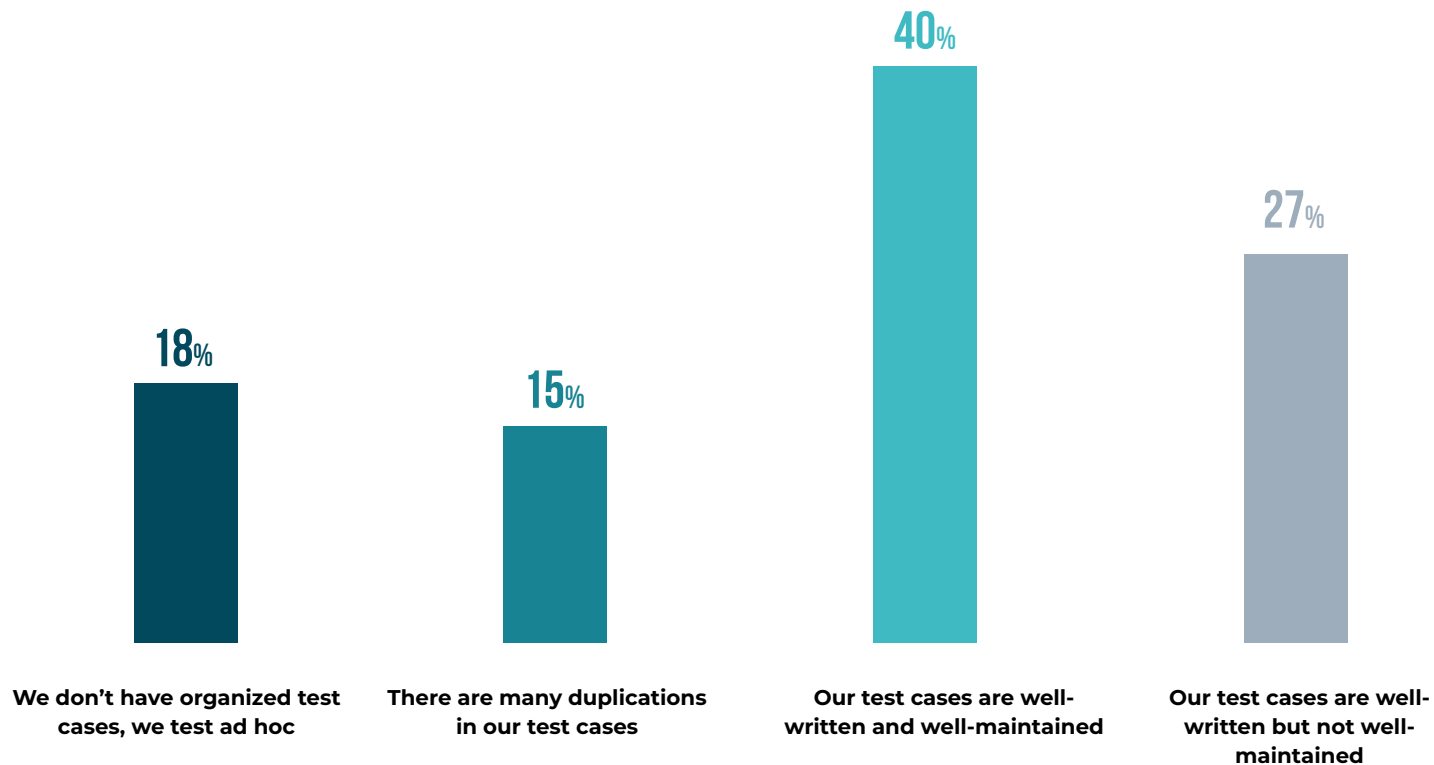|	2024	2023
Automation has replaced all our manual testing efforts	2%	3%
Automation has replaced about 75% or more of our previously manual testing efforts	19%	18%
Automation has replaced about 50% of our previously manual testing efforts	30%	25%
Automation has replaced about 25% or less of our previously manual testing efforts	22%	26%
We have automation but it has not replaced any of the manual testing efforts	18%	26%
We do not have automation.	9%	9%

> Similar to last year's results, the findings here provide additional support to our belief that automation, despite its many advantages, is not close to replacing manual testing when only 2-3% report that it has completely replaced manual testing. One interesting finding this year is that fewer organizations report that it hasn't replaced manual testing at all. This is an ongoing process where some of the repeated manual testing activities will undoubtedly be replaced, but as 9% or organizations still report that they don't have automation, we anticipate that the dream of a fully automated testing world will not become a reality in the near future.

#13 DOES YOUR ORGANIZATION INVEST ENOUGH IN ENSURING THAT TEST CASES ARE WELL-WRITTEN?

18% We don't have organized test cases, we test ad hoc

15% There are many duplications in our test cases

40% Our test cases are well-written and well-maintained

27% Our test cases are well-written but not well-maintained

One interesting finding that can be seen here is that in 60% of organizations, test cases are not well-written and maintained. In some cases, the issue stems from many duplicated test cases, while in others, maintenance is the root cause of the issue.

3.
TOOLING

#14 YOUR TECH STACK: WHICH TESTING-RELATED TOOLS DOES YOUR ORGANIZATION USE TO SUPPORT THE QA PROCESS?

Please name them (e.g., bug trackers, task management, automation, etc.).

Jira 42%

Se 22%

POSTMAN 18%

We received a long list of tools of all types: bug trackers, task and test management tools, automation tools, as well as knowledge sharing tools.

Unsurprisingly, Jira stood up as the most mentioned tool, with 42% of respondents reporting using it. Next on the most frequently mentioned tools were Selenium and Postman, with 22% and 18% respectively.

Azure DevOps also appears to be commonly used with 8% of respondents. On the other hand, some other respondents indicated that they are not using any tools or using Excel spreadsheets.

#15 HOW EFFECTIVELY DO YOUR TESTING TOOLS SUPPORT YOU IN YOUR TASKS?

Please rate the following statements on a scale of 1-5, where 1 means it didn't support at all and 5 means it supports a lot.

Automation Tool

7% Not at all
8% Not very effectively
42% Very effectively
43% Somewhat effectively

Test Management

8% Not at all
14% Not very effectively
40% Very effectively
38% Somewhat effectively

Load Testing

18% Very effectively
28% Not at all
35% Somewhat effectively
19% Not very effectively

Monitoring Tools

15% Not at all
25% Very effectively
17% Not very effectively
43% Somewhat effectively

Among the various testing tools, automation tools are leading in their efficiency of supporting testing tasks, with 85% rating them as effective with an equal split between somewhat effective and very effective. Test management tools are also perceived as effective, with 78% of respondents rating them as supporting their tasks. On the other hand, close to 50% of respondents - 47% to be exact - don't consider load testing as supporting their task. This might make sense as in some occasions, load is managed separately from performance testing.

4.

THE IMPACT OF DEVOPS & AI ON SOFTWARE TESTING

#16 HOW HAS THE ADOPTION OF ITERATIVE MODELS IMPACTED SOFTWARE DELIVERY IN YOUR AGILE/ DEVOPS EXPERIENCE?

	STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
Our team is more organized and stable	3%	3%	21%	48%	25%
Increased release of features and functionalities	3%	3%	20%	49%	25%
Improved overall testing levels	4%	4%	19%	49%	24%
Enhanced involvement of non-testers in testing	3%	15%	26%	39%	1%
Reduction in serious bugs escaping into production	3%	7%	22%	45%	23%
Improved collaboration with customer-facing teams	3%	6%	27%	39%	25%

#17 HOW FREQUENTLY DOES YOUR TEAM IMPLEMENT THE FOLLOWING DEVOPS PRACTICES?

Please rate the following statements on a scale of 1-5, where 1 means never and 5 means all the time.

	NEVER	RARELY	OCCASIONALLY	FREQUENTLY	ALWAYS
Team responsibility for product development, deployment, and production monitoring	6%	7%	15%	43%	29%
Inclusion of instrumentation for monitoring in User Story development	12%	17%	26%	26%	19%
Clear definition of testing scope pre- and post-production deployment	8%	7%	25%	40%	20%
Comprehensive testing covering deployment, migration, and potential rollback processes	9%	12%	25%	32%	22%
Planning varied deployment strategies based on feature type and associated risks	8%	13%	25%	35%	19%
Close monitoring during deployment, assessing system stability	8%	11%	23%	29%	29%
Implementation of monitoring and alert systems for production issues	8%	12%	18%	33%	29%
Involvement of testing team in production monitoring for swift issue resolution	12%	18%	23%	27%	20%
Utilization of feedback and metrics from production monitoring in planning and development of functionality and tests	12%	11%	27%	31%	19%

We find it encouraging that a significant number of respondents have in place policies and practices focused on quality aspects of the products once they are deployed into Production. This is the basis that allows testers to be more selective on the aspects tested pre-deployment vs. those that will be "tested" in production.

Still, it is interesting to see that although organizations show this trend towards monitoring systems while in deployment and once in production, the testing teams are not always part of these important processes. This reflects a need for deeper involvement in this important quality aspect of our Products lifecycles.

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#18 HOW ARE YOU USING AI TOOLS AS PART OF YOUR TESTING PROCESSES?

I Am Not Using AI Tools for Testing

60%

Test Case Creation

25%
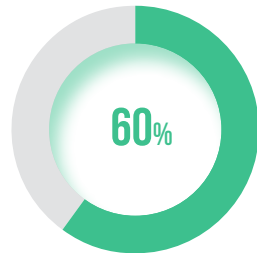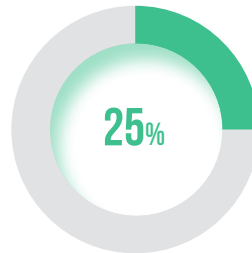
Test Case Optimization

23%

Test Planning

20%

Other

7%
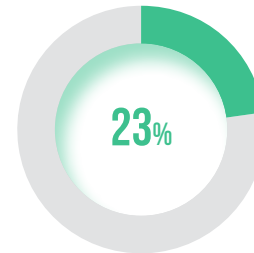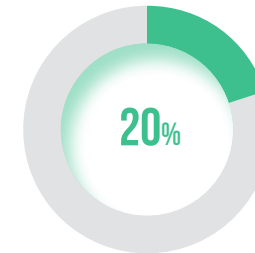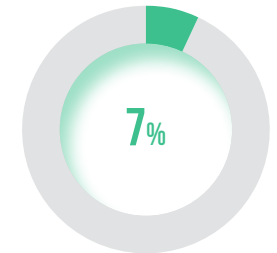
With AI being one of the most frequently used buzzwords, it is somewhat surprising to see that 60% of respondents reported that they are not using AI tools for testing (and we allow ourselv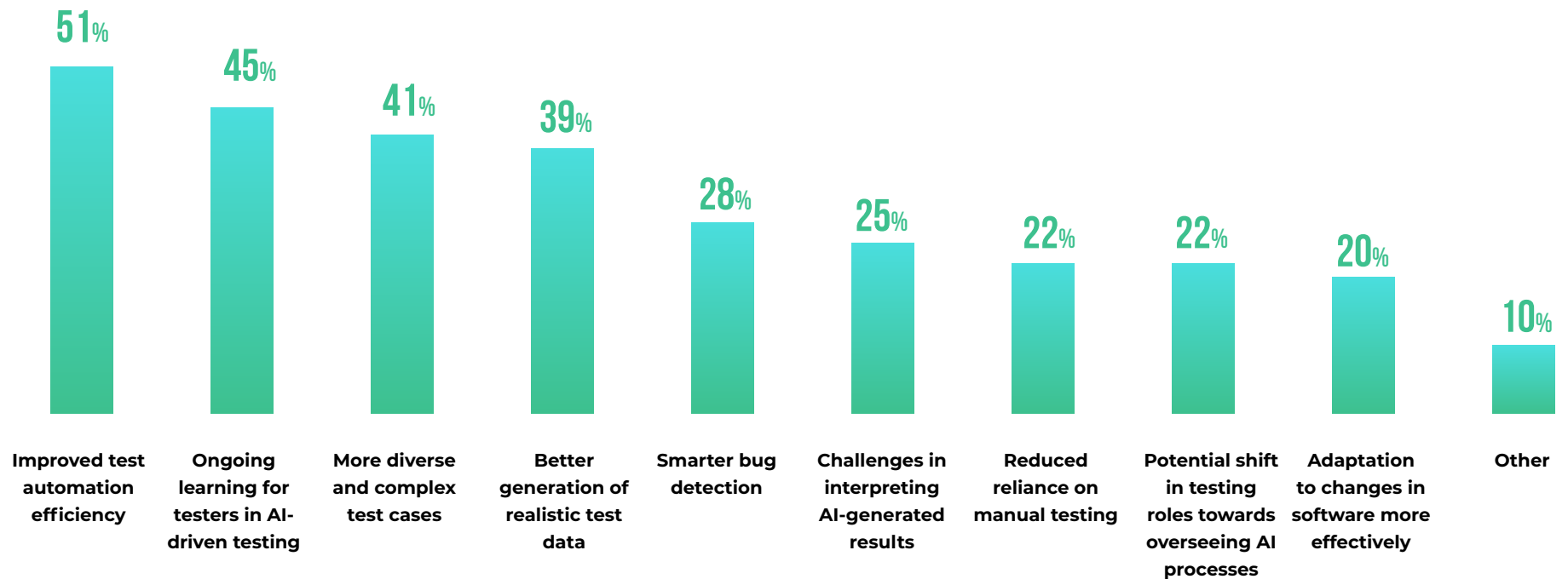es to add: for now). When used, AI assists companies in all stages of their testing process, from test case creation to optimization, and test planning, in that order of frequency.

#19 HOW DO YOU ANTICIPATE GENERATIVE AI IMPACTING YOUR TESTING?

51% Improved test automation efficiency	**45%** Ongoing learning for testers in AI-driven testing	**41%** More diverse and complex test cases

Bar chart values:

- 51% — Improved test automation efficiency
- 45% — Ongoing learning for testers in AI-driven testing
- 41% — More diverse and complex test cases
- 39% — Better generation of realistic test data
- 28% — Smarter bug detection
- 25% — Challenges in interpreting AI-generated results
- 22% — Reduced reliance on manual testing
- 22% — Potential shift in testing roles towards overseeing AI processes
- 20% — Adaptation to changes in software more effectively
- 10% — Other

With Gen AI all around us this year, it has an impact on software testing. More than 50% of the respondents expect it to improve test automation efficiency, while others predict it will create more diverse and complex test cases, and a better generation of realistic test data, which will result in smarter bug detection. In addition, this will generate ongoing learning for testing professionals to help them adapt.

5.

THE BUSINESS IMPACT OF TESTING

#20 IS YOUR ORGANIZATION MEASURING THE COSTS OF BUGS THAT OCCUR DURING PRODUCTION AND THOSE THAT ESCAPE DETECTION?

30%
Yes

50%
No

20%
I don't know
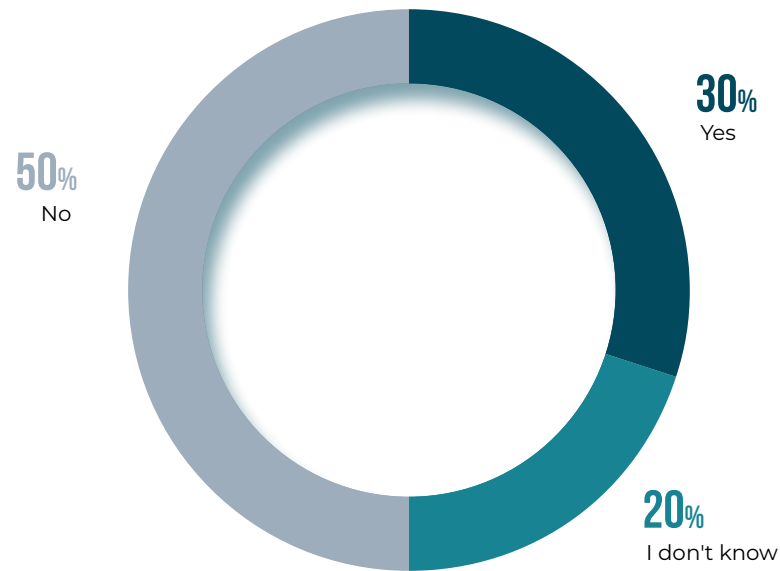
For many years, testing was considered a cost center, and thus, occasionally was not granted the respect it deserves. The results here might provide a partial indication of the reason why. Every organization strives to release bug-free software to meet its customer expectations. However, 50% of organizations do not measure the costs of defects escaping into production. Understanding the financial impact of testing can contribute significantly to the QA profession's perception.

#21 WHICH METRICS IS YOUR TEAM MEASURED ON?

50%	48%	43%	27%	19%	18%	9%	12%
Defects Metrics	Test Coverage Metrics	Test Execution Metrics	Escaping Defects Rate	Test Effectiveness Metrics	Net Promoter Score	Test Economics Metrics	Other
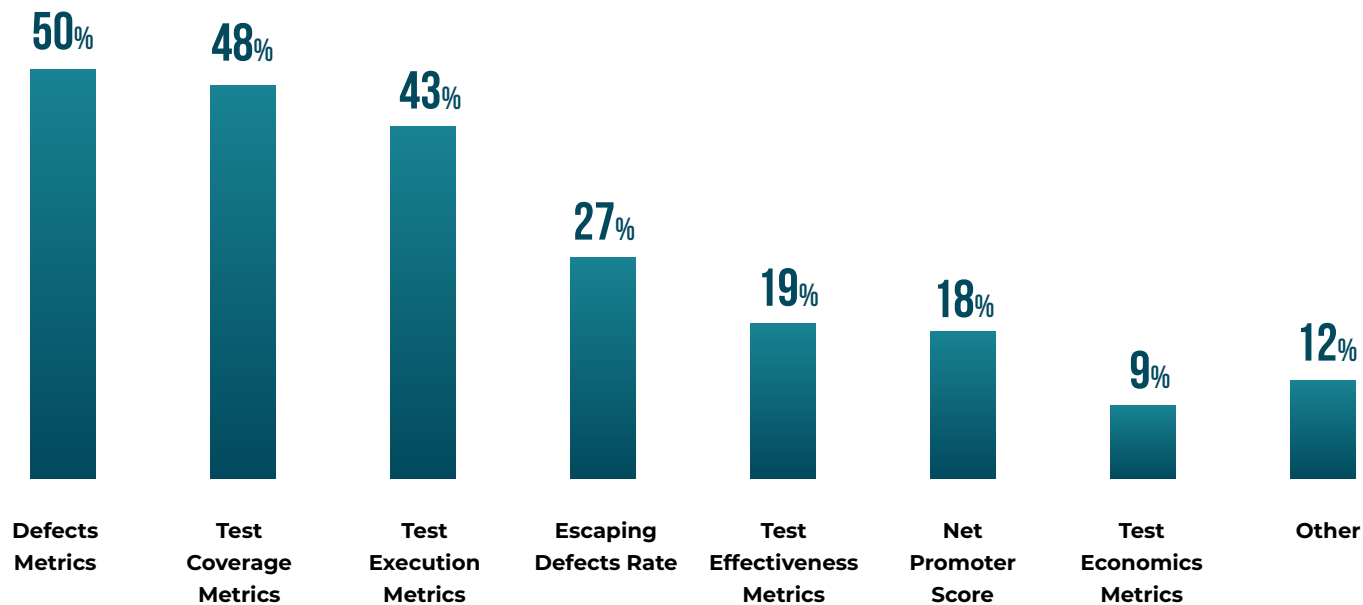
Although we saw in the previous question that the cost of bugs in production is not being measured in 50% of the cases, this doesn't mean that QA metrics are not being used. The most common metrics are defect and test coverage metrics, which are indeed on the basis of the actions taken by QA professionals, covering requirements and ensuring these are deployed without defects.

#22 DOES TESTING HAVE A SAY REGARDING RELEASE READINESS?

6%
I don't know

13%
No

81%
Yes
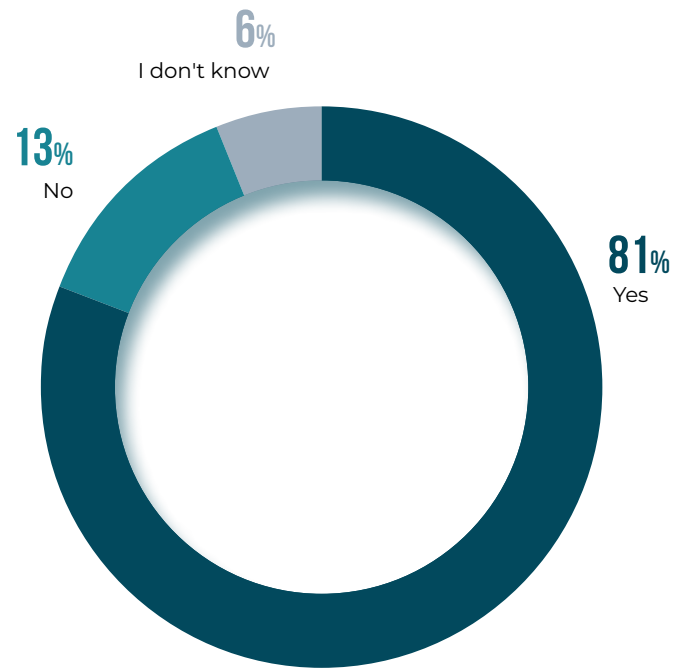
The results here are more positive regarding the importance that the QA role plays in organizations. In 81% of the cases, testing teams have a say regarding readiness for release. Suppose you belong to the remaining 19%, and in particular to the 6% who reported that they don't know. In that case, we encourage you to ask and take and be proactive, even in cases when you might not have enough seniority to alter such a decision (yet).
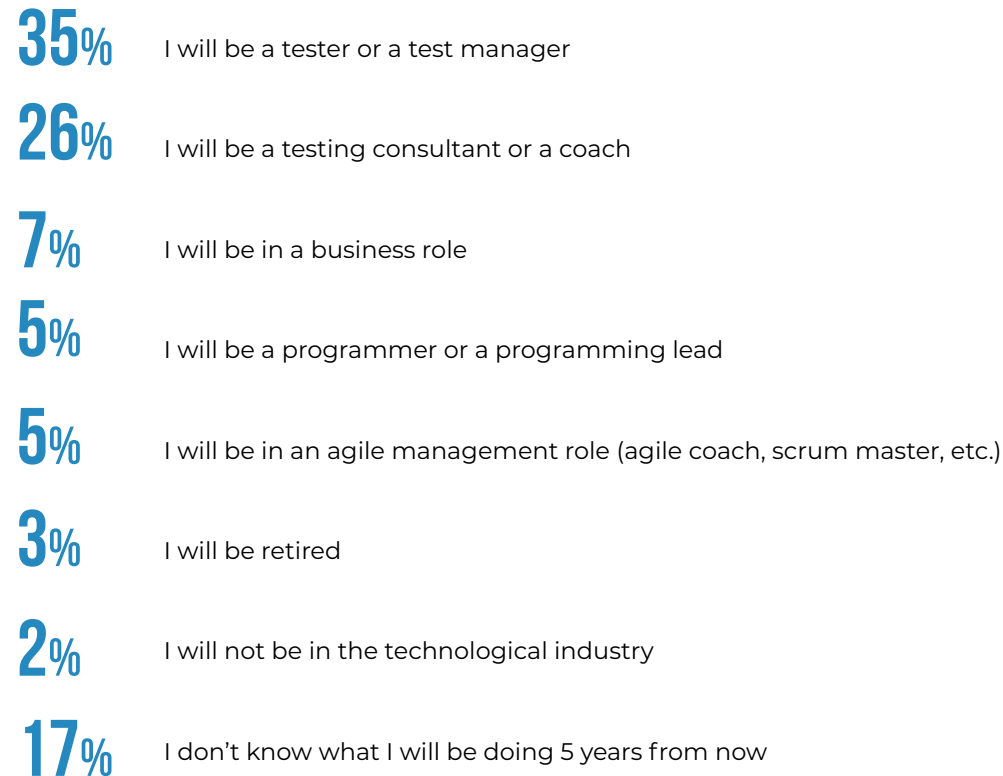
6.
PERSONAL PERSPECTIVE

#23 WHAT ARE THE TOP 5 SKILLS AND KNOWLEDGE AREAS THAT TESTERS NEED TO THRIVE IN TODAY'S TESTING INDUSTRY?

	2024	2023
Communication skills	59%	69%
Functional testing automation and scripting	47%	55%
Test automation patterns, principles, practices	46%	59%
API testing	41%	55%
Agile methodologies	32%	49%
Programming skills	31%	50%
Test / Experiment Design	30%	63%
Performance and load testing	21%	28%
Machine learning testing / AI	21%	7%
Web technologies and testing	20%	39%
Mobile technologies and testing	17%	23%
Security testing	16%	18%

	2024	2023
Data analysis	15%	24%
Coaching / Training skills	13%	24%
Customer facing skills	12%	19%
Microservices testing	11%	22%
"Ops" (Operations) skills	10%	20%
Enterprise software and process testing (ERP, CRM, BI, etc.)	8%	6%
Big data testing	6%	5%
IoT testing (Internet of Things)	5%	4%
Business, Marketing, Sales skills	4%	6%
Embedded systems and testing	4%	5%
Other	4%	
None of the above	2%	

Communication skills remained at the top of the list of required skills to succeed in the role of QA, but dropped from 69% last year to a little over 58% this year. Test experiment/Design, which was perceived as very important in last year's survey (63%), dropped by more than half to only 30%. A sharp rise was in the area of machine learning and AI, which spiked from 7% to 21% this year. We believe that these numbers will continue to rise in the coming years.

#24 WHERE DO YOU SEE YOURSELF 5 YEARS FROM NOW?

35%   I will be a tester or a test manager

26%   I will be a testing consultant or a coach

7%   I will be in a business role

5%   I will be a programmer or a programming lead

5%   I will be in an agile management role (agile coach, scrum master, etc.)

3%   I will be retired

2%   I will not be in the technological industry

17%   I don't know what I will be doing 5 years from now

It's nice to see in the results here that 61% of respondents intend to work in the testing domain 5 years from today, either as a tester, test manager, testing consultant, or coach. We appreciated the honesty shared by 17% of respondents who simply answered that they don't know. Considering the number of unexpected events that occurred during the past 5 years, this answer is completely understandable.

#25 WHAT CHANGES WOULD YOU LIKE TO SEE, AS A TESTER, THAT COULD IMPROVE YOUR ABILITY TO PERFORM YOUR JOB EFFECTIVELY?

What are the main challenges you currently face concerning people, your organization, and the industry?

When we reviewed the answers here, 3 main themes came to light.

QA AND TESTING APPRECIATION.

Some quotes worth mentioning include:

- "Lack of support & experience from org's engineering leaders with quality engineering and testing"

- "I'd love to have more support from my organization. Right now it seems that no one cares about QA."

- "I would like to see testing receiving the same respect as developing and the continued drive in the testing community to develop our profession."

MORE TIME TO STUDY

- "Have a little more time for study and keep me up-to-date"

- "More support to testers from management to provide free hands into testing, more time and motivate towards learning new technologies to improve scope."

- "Reinventing with relevant skills" "programming skills"

AI ADOPTION

- "Testers should embrace new Technology like AI, No-code, and Low-code."

- "More focus on data engineering skills as well as skill ups on automation tooling and AI across the testing domains."

- "Better integration between AI tools and business intelligence software like Jira"

FINAL NOTE

After 11 years, we've seen a lot of change. Technological advancement, testing trends, and business goals have shifted. One thing that hasn't is consumer demand. It has remained the driving force behind the most powerful and widely used software applications across the spectrum of industry.

This year showed an increase in support for the shifting left approach and BDD testing. The number of testers who are part of a large testing team grew, and more testers took an active part in the CI/CD process.

But there is work to be done. Automation is growing, yet a high number of testers lack confidence in writing automation scripts. QA managers will need to put efforts into reskilling their teams to help remain competitive. Testers will need to strengthen these skills in order to be sought after and elevate their careers.

With so much hype around AI (and for good reason), 60% reporting that they are not using AI tools for testing was a surprise. Companies may want to rethink this given the growing focus on AI-powered capabilities. Change is already on the horizon, as the report revealed 21% rated AI & ML one of the top skills testers need to thrive in the field.

As software continues to advance and grow in complexity, software testing and quality assurance work will need to support these complexities in tandem.