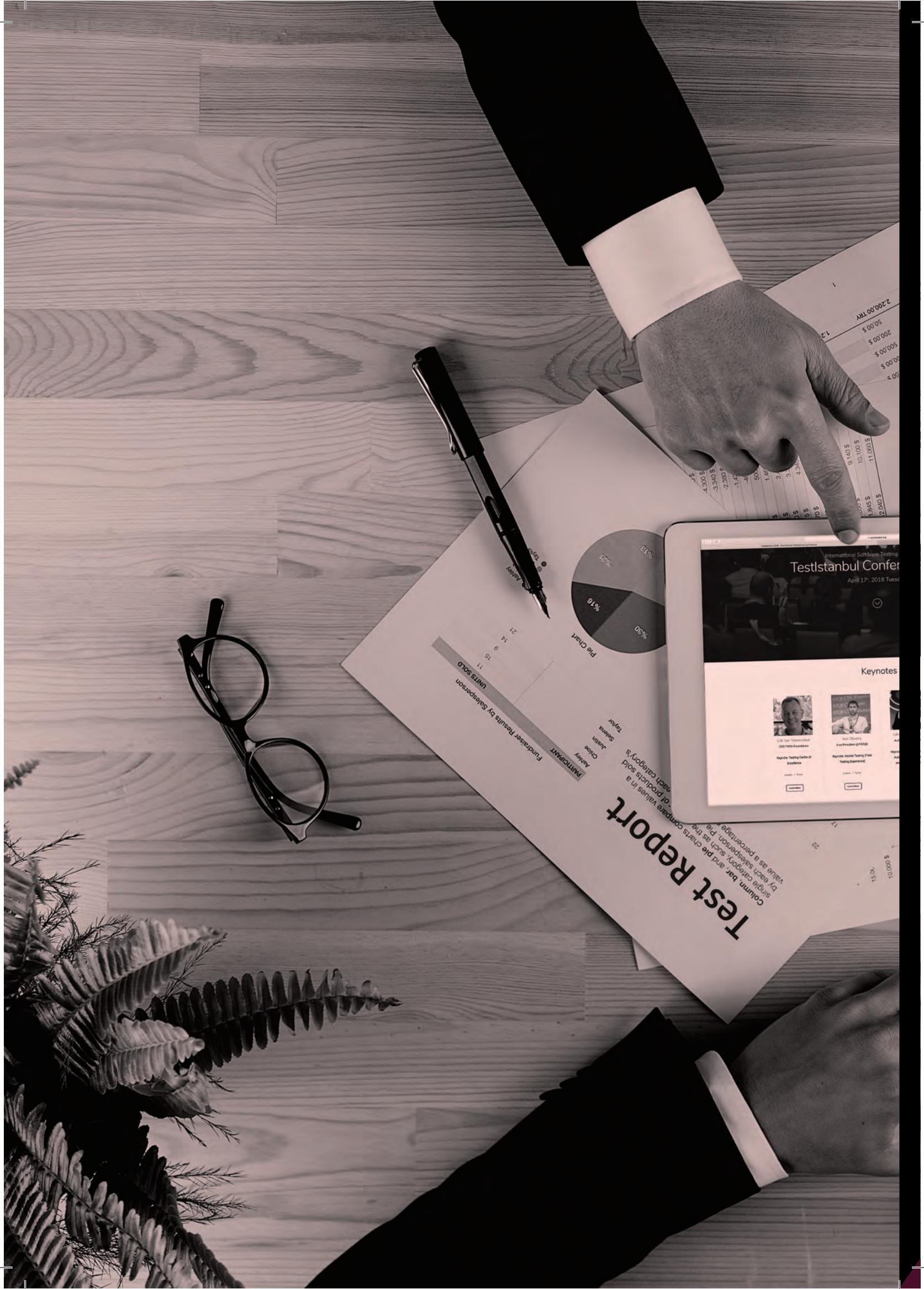


TURKEY SOFTWARE QUALITY REPORT

2018-19



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International Software Testing
Testistanbul Confer
April 17, 2018 Tuesday

Keynotes

- Dr. Van Oosterhout**
CEO TADA Foundation
Keynote: Testing Culture of Excellence
- Neil Chivers**
Vice President @PSTQB
Keynote: Mobile Testing (From Testing Experience)



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FOREWORD

As Turkish Testing Board, we are pleased to bring you the 2018-19 edition of the Turkey Software Quality Report [TSQR] which focuses on "Software Testing in General". Apart from traditional testing surveys which solely focus on the technical side of testing, we put emphasis also on the business side of testing. You will find tips and trends about software testing in terms of business perspective.

The report is designed to help organizations to make paradigm shifts in their mindsets. It does not only draw a clear picture of the current situation in the Turkish market but also sets the de-facto standards and trends for future information technology [IT] projects. We hope this report will be a reference point for all decision makers.

With the help of TSQR, we are trying to lay down the foundations of a healthy discussion platform for improvement in Turkish IT market. As a conventional practice, TSQR will be presented at the opening ceremony speech of TestIstanbul 2018 [testistanbul.org], initiating a series of keynotes, presentations and discussions.

Regards,

TestIstanbul Strategy Committee



OVERALL EARNINGS

Report - English
& HITECH
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EXECUTIVE SUMMARY

According to the analysis of the answers given by the survey respondents, software testing industry is now experiencing the power of main trends in software development and engineering more and more. The main trends affecting the software testing are:

- Agile frameworks,
- DevOps,
- Continuous integration,
- Continuous delivery,
- Defect prevention rather than defect detection,
- and continuous testing.

These trends demand that software testing will be more responsive and fast. The cure for this growing need lies in the transformation of technical and organizational aspects of software testing which are:

- Shift left testing,
- More test engineers,
- More testing trainings,
- More emphasis on non-functional testing,
- More test outsourcing and consulting,
- Better utilization of test techniques,
- More effective test automation,
- More static testing and code quality analysis,
- Utilization of artificial intelligence [AI] assisted testing.

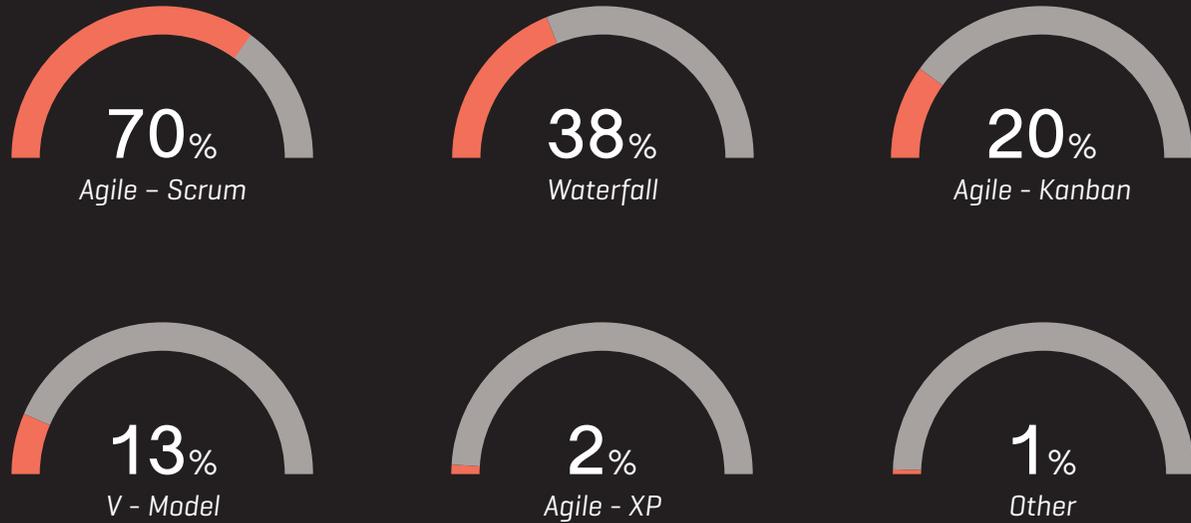
As usual, you can access the softcopy of this report, together with previous reports from turkishtestingboard.org and we are hoping to see you at TestIstanbul 2018 Conference on April 17th to discuss the findings.

QUESTIONS

- 1 WHICH SOFTWARE DEVELOPMENT LIFECYCLE (SDLC) METHODOLOGIES/Frameworks ARE USED IN YOUR ORGANIZATION?
- 2 WHICH OF THE BELOW TESTING TYPES ARE CARRIED OUT IN YOUR ORGANIZATION?
- 3 WHAT IS THE TESTER/DEVELOPER RATIO IN YOUR ORGANIZATION?
- 4 HOW DOES YOUR ORGANIZATION IMPROVE THE COMPETENCY LEVEL OF YOUR TESTERS?
- 5 WHAT KIND OF TEST ORGANIZATION DO YOU HAVE?
- 6 WHICH TEST TECHNIQUES ARE UTILIZED BY YOUR TESTING TEAM?
- 7 WHICH TOOLS DO YOU USE IN YOUR ORGANIZATION?
- 8 WHICH ACTIVITIES DO YOU USE TO FIND DEFECTS BEFORE TEST EXECUTION?
- 9 WHAT IS THE PERCENTAGE OF AUTOMATED TEST CASES YOU USE WITH RESPECT TO YOUR OVERALL TEST CASES?
- 10 WHAT WILL BE THE MOST TRENDING TOPIC FOR SOFTWARE TESTING PROFESSION IN NEAR FUTURE?

WHICH SOFTWARE DEVELOPMENT LIFECYCLE (SDLC) METHODOLOGIES/Frameworks ARE USED IN YOUR ORGANIZATION?

* multiple selection was allowed



ANALYSIS OF THE CURRENT SITUATION

In recent years, most companies are making a significant investment in Agile frameworks adoption. In general, the most common preferred Agile framework is Agile - Scrum. This fact is also clear in the survey results. Especially in software development houses, Agile - Scrum framework has taken the lead. On the other hand, operational teams or the teams who generally do their routine work prefer Agile - Kanban rather than Agile - Scrum. These teams optimize their daily workload better with Agile - Kanban. Waterfall and V-Model are still used especially in big enterprises and the companies who have regulatory software development constraints.

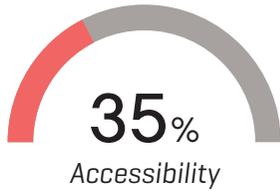
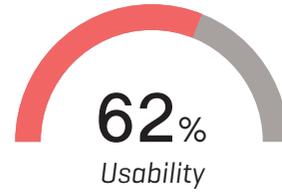
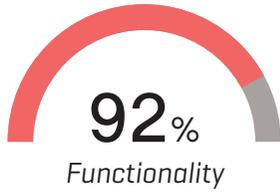
FUTURE PREDICTIONS

As it is clear from the survey results, Agile frameworks are dominating the SDLC market. More than half of the organizations have already adopted Agile frameworks and this adoption seems to increase in the next years. On contrary, traditional methodologies will continue their presence because of the regulatory constraints and the difficulties experienced in Agile transformation projects. These results also show us that in parallel to agile frameworks' adoption, agile testing will be the next wave in software testing. Test teams will invest more in agile testing methodologies and certifications.



WHICH OF THE BELOW TESTING TYPES ARE CARRIED OUT IN YOUR ORGANIZATION?

** multiple selection was allowed*





ANALYSIS OF THE CURRENT SITUATION

Results show that functional testing is carried out in the organizations with a rate of 92%. Functional testing is a black-box testing which is performed based on the specifications in order to verify that all aspects of the software are working correctly and in compliance with requirements. This result is not a surprise since many organizations perform functional testing to ensure that the system's behavior is correct before release. However, Functional testing is followed by Performance and Usability testing with the rates of 64% and 62% respectively. These tests are the kinds of non-functional testing which allow us to focus on the non-functional attributes of software systems which are not related to any specific function. Non-functional tests help on increasing the user satisfaction with the system.

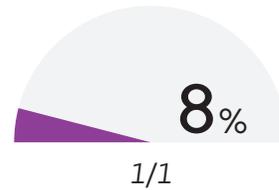
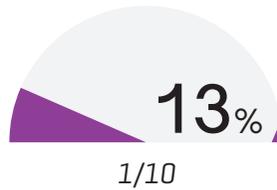
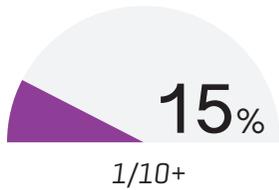
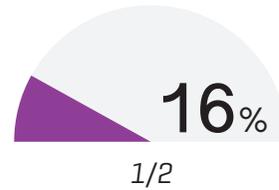
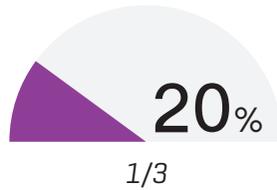
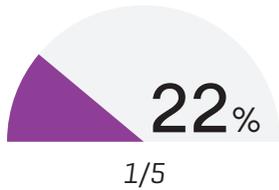
Although functionality of a system is important, thoughts and trust of users are also important since they are also affected by how well they can use the system.

FUTURE PREDICTIONS

The organizations have started putting more effort on performing non-functional testing which focuses on the readiness and quality characteristics of the system. Organizations have increased the priority of their non-functional testing efforts and are now allocating more time and budget. This trend is pushing organizations to have test engineers who are qualified in non-functional aspects of testing like performance, usability, accessibility, security etc.



WHAT IS THE TESTER/DEVELOPER RATIO IN YOUR ORGANIZATION?



ANALYSIS OF THE CURRENT SITUATION

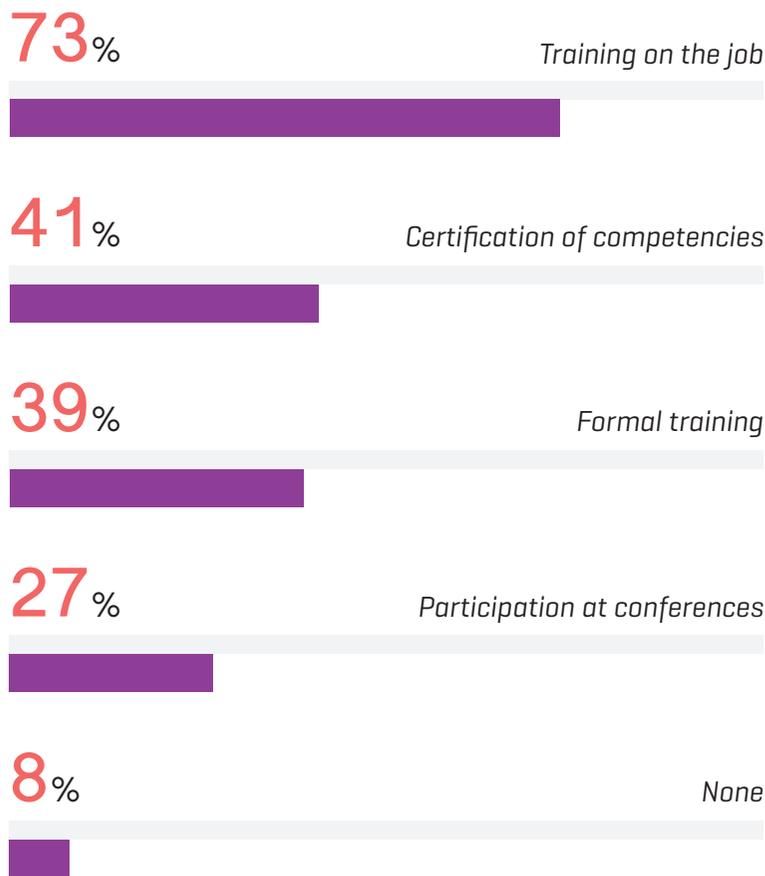
Looking at the numbers, it is observed that more than 65% of the participants are working in an environment that there are one or more testers per five developers. On the other hand, 28% of the participants are working in an environment that there is one or fewer tester per ten developers. Although the variation is based on the development lifecycle that is used, seeing that most of the respondents are working in a high tester/developer ratio environment shows the level of importance of testing. Even seeing one to one tester/developer ratio is very promising for the future of testing and the quality of the software products.

FUTURE PREDICTIONS

Looking at the current trends, more complex systems are needed by the customers in a shorter time period. This leads less time for testing than before. In that case, more testers will also be needed for the software projects. However, some of them may have to have development capabilities. In any case, there will be a need for more testing professionals in the future. Accordingly, there are three promising markets for growth: 1) Big companies will use more outsourcing in order not to increase their test engineer numbers and will transform from doing the testing to managing the testing. 2) Since there are no effective training programs about testing in the universities, training of new bees will be very important. 3) The time of delivery will be so tight that even increasing number of test engineers will not be enough to catch up with the delivery deadlines causing artificial intelligence (AI) assisted testing to be more frequently utilized.

4 HOW DOES YOUR ORGANIZATION IMPROVE THE COMPETENCY LEVEL OF YOUR TESTERS?

* multiple selection was allowed



ANALYSIS OF THE CURRENT SITUATION

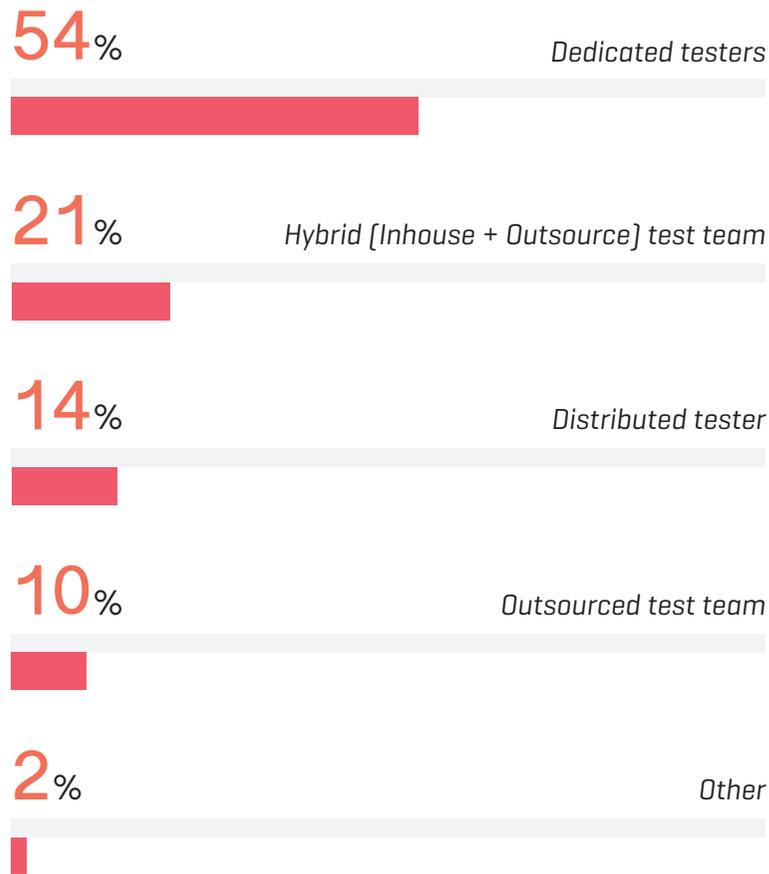
Software testers need strong analytical and problem solving skills for their success in the projects of the organizations. Therefore organizations invest on improving the competency level of the testers in many ways. Survey results indicate that, training on the job seems to be most widely used method for improving the competency level of the testers with 73% ratio. As in the other sectors, a large majority of employee learning and improving the technical and business related skills is accomplished through on the job training. Well designed training on the job programs supported by senior staff with coaching ability is one of the easy practices to arrange and manage because it takes place on the job. Additionally, testers appreciate the chance to develop knowledge and skills without ever leaving work place.

The method of directing testers to obtaining certification of competencies and giving them opportunity to get required certificates is also popular with a 41%. Formal training method seems to have a close ratio to that with a 39%. Participation at conferences also takes place in the results of survey with a 27%. On the other hand 8% of respondents remark that they improve the competency level of testers with other techniques.

FUTURE PREDICTIONS

Since the organizations are aware of the significant effect of competency level of their testers to the success of the projects within the organization and quality of the products and processes, they are increasing the investment for improving the competency level of the testers. As shown by the results of many researches conducted about employee learning and training, the organizations will continue to get benefits of training on the job for testers. In addition to this, certification programs will be enriched and new certification programs will be designed for testers because the need for professional testers on very exact specifications grows. Formal training will continue to be popular but they will be more interactive and evolve to workshops for new generation of testers. International and local testing conferences will continue to provide opportunities for learning process and educational and networking potentiality for participants. Testers and organizations should have realistic expectations of what they will gain or how they will learn the required information and use it. It will increase the benefits provided. Furthermore, online trainings, online forums, workshops, and shared experiences will be a more popular way to improve the competency level of the testers.

WHAT KIND OF TEST ORGANIZATION DO YOU HAVE?



ANALYSIS OF THE CURRENT SITUATION

According to the results, tester engineers are more likely to be seen as a part of business competency just like business analysts. Dedication, staying as a test team, is overwhelmingly preferred, rather than hybrid or any other organizational model. It presents numerous advantages like test engineering expertise, ease of rotation and so on, but also some disadvantages too. Lack of business know-how, multi-tasking and switching costs are just a few examples.

At this point, hybrid organizations take a step forward combining advantages of dedication and distribution. In hybrid organizations, it is more likely testers develop themselves both on vertical and horizontal axis. On vertical, thanks to existing test team, they are still coached and led for their expertise area, testing. On horizontal side, they become a part of team and get familiar about projects beginning from the early days of SDLC.

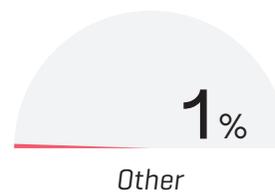
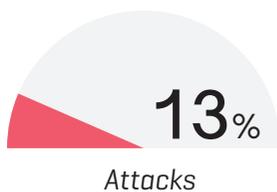
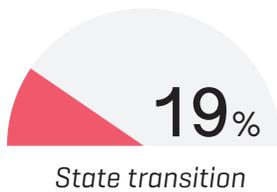
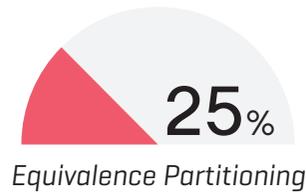
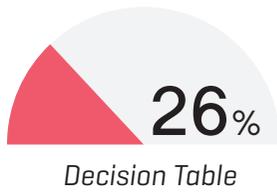
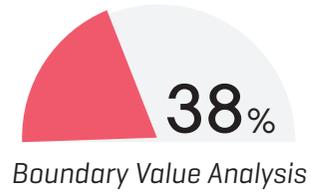
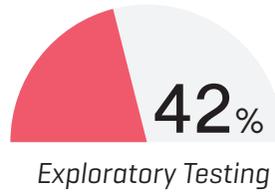
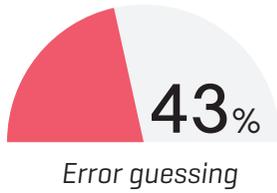
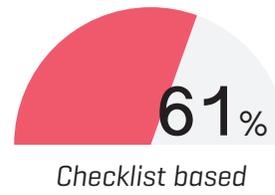
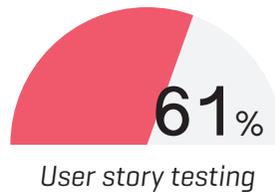
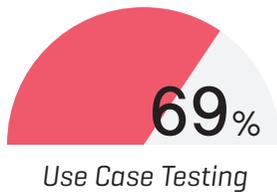
FUTURE PREDICTIONS

Hybrid organizations are expected to take the lead within a few years. It might seem complicated and challenging in the beginning, but benefits are quite convincing not only from organizational, but also from financial perspective.

Consequently, outsourcing also will be on the rise in the next few years. Even companies that pay attention to keeping their valuable business know-how inside, will certainly require more outsourced resources to manage demand fluctuations. In addition to that, new economy companies believe the power of expertise and are getting test consultancy services. So those companies are tending to outsource their testing tasks and focus more on their core business competencies.

6 WHICH TEST TECHNIQUES ARE UTILIZED BY YOUR TESTING TEAM?

* multiple selection was allowed



ANALYSIS OF THE CURRENT SITUATION

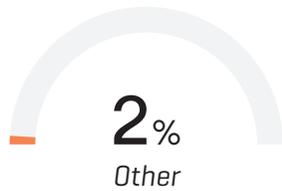
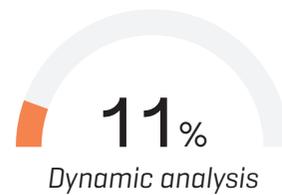
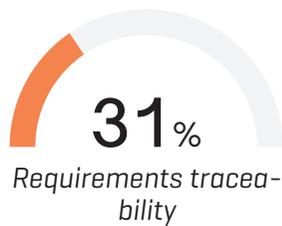
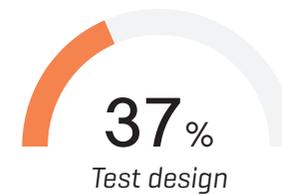
Survey results show that majority of test teams currently apply foundation level, specification-based test techniques like use case testing. The high percentage of user story testing technique is an indicator of agile adoption in all industries. Low percentage of decision and statement coverage test techniques shows that test teams have not well utilized white-box test techniques yet. As the maturity level of test organizations continues to improve, the utilization of advanced level techniques such as classification tree and pair-wise techniques is expected to increase.

FUTURE PREDICTIONS

In recent years the number one agenda item of executives is digitalization. New technologies such as big data, IOT, robotics and artificial intelligence are becoming a part of products and services in finance, telco, automotive, FMCG and almost all other industries. This fast progress in digital technologies will bring new challenges to testing teams. They will have to apply new test strategies and techniques to mitigate new kinds of risks that they haven't experienced before. For instance, testing a system that can be learned by itself thanks to neural networks and deep learning algorithms will necessitate new test techniques that embody advanced mathematical models.

WHICH TOOLS DO YOU USE IN YOUR ORGANIZATION?

* multiple selection was allowed



ANALYSIS OF THE CURRENT SITUATION

Applications of artificial intelligence [AI] assisted testing, continuing trend in the adoption of DevOps, increasing test automation, shortening release schedules, and the lack of time for testing increase the usage of defect tracking, test management, performance testing, and test execution tools. Most of the test documentation and manual testing are replaced with the new generation testing tools.

FUTURE PREDICTIONS

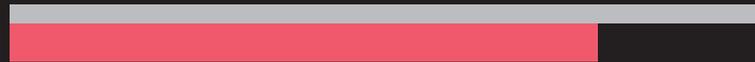
Each day software testing is getting more challenging. Within tight deadlines, market's huge demand for high-quality products has shifted the role of testing from defect detection to defect prevention. Thus, code review, unit testing, and static & dynamic analysis are expected to increase driving the need for more tool support.



WHICH ACTIVITIES DO YOU USE TO FIND DEFECTS BEFORE TEST EXECUTION?

** multiple selection was allowed*

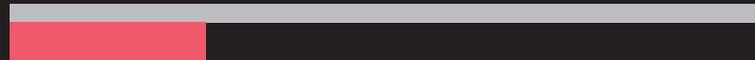
78% *Review of the analysis documents/requirements*



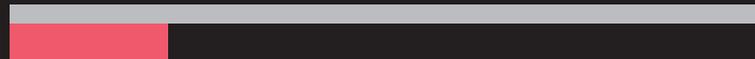
48% *Review of the design documents*



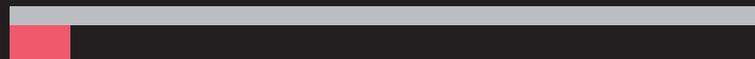
26% *Review of the source code*



21% *Static analysis tools*



8% *None*



ANALYSIS OF THE CURRENT SITUATION

Static testing is a software testing method that involves examination of the program's code and the associated work products [e.g. requirements, user stories, use cases, database models, low/high level design documents and etc.], but does not require the program be executed. From the survey, it is observed that the most commonly used method for static testing is the review of analysis documents. Almost half of the respondents also indicated that they are reviewing the design documents, whereas more than 25% are reviewing the source code.

In addition to above, around 20% of the companies are using static analysis tools for detecting defects in the source code in the forms of;

- A variable with an undefined value
- Inconsistent interface between modules and components
- Variables that are declared but never used
- Unreachable code (or) Dead Code
- Programming standards violations
- Security vulnerabilities and,
- Syntax violations.

Surprisingly, just 8% of the respondents declared that they are not conducting any kind of static testing. With more than 90% of companies engaging in it, static testing seems to be evaluated as a viable option, but still not executed in formal or structured ways.

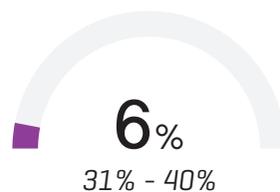
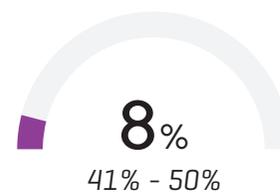
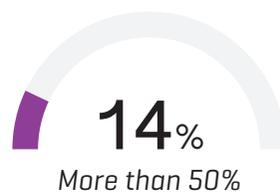
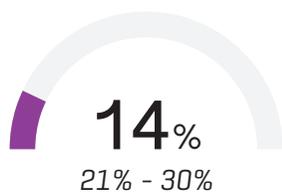
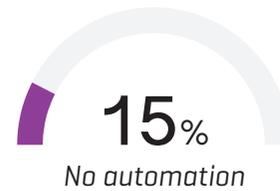
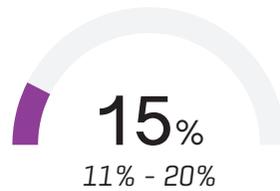
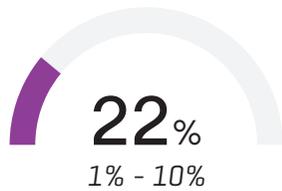
FUTURE PREDICTIONS

As it is widely known and accepted that the cost of a defect found during dynamic testing is about 10-20 times the cost of one found in static testing; many organizations still assume the time that would be spent on static testing would be better spent on design or coding or dynamic testing. Since the information technology [IT] world is nowadays talking more and more about defect prevention rather than defect detection; the principals of shift-left testing couldn't be more important.

Based on the several researches done on software quality, where lines of code in the entire world is doubling every two years and more than 90% of data today was produced within the last two years, companies should adopt more structured processes to detect defects earlier in the lifecycle and should have formal static testing methodologies in place. In the near future, companies will be using more formal static testing methods as technical review, audit and inspection that could involve more trained people and include more structured/formal procedures.



WHAT IS THE PERCENTAGE
OF AUTOMATED TEST CASES
YOU USE **WITH RESPECT**
TO YOUR OVERALL TEST CASES?



ANALYSIS OF THE CURRENT SITUATION

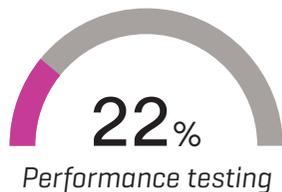
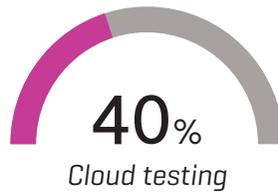
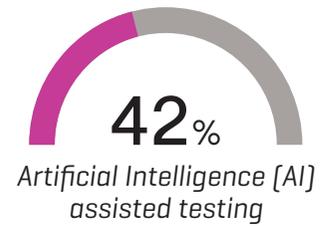
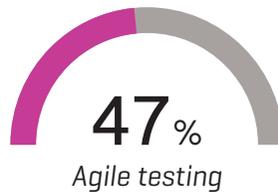
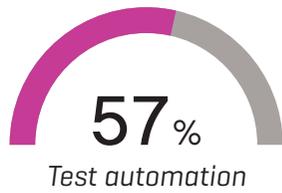
Agile is becoming more common both in Turkish software development market and in all over the world. Organizations need smart test automation tools to improve quality and deliver successful products and services. As software deployment cycle moves more quickly in Agile, test activities are needed to execute more frequently, and should be fast enough to provide feedback to the team. This drives the need for more test automation in all aspects. In parallel to this trend, almost 75% of the survey respondents indicate that they are utilizing test automation.

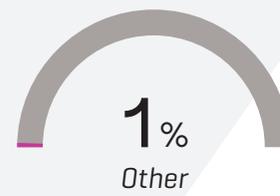
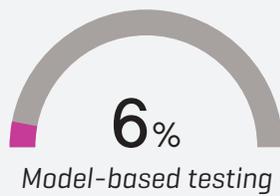
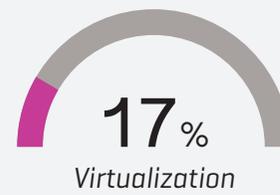
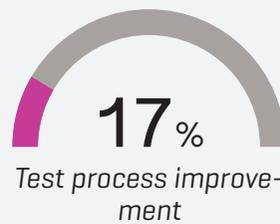
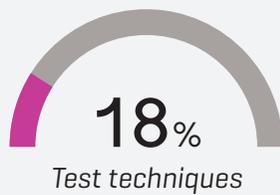
FUTURE PREDICTIONS

In the future, digitalization in business keeps software industry to become more qualified and faster in terms of testing activities. Automation of software testing is the answer for this increasing demand. We are likely to see that test automation will cover more percentage of test cases than it does now. In parallel to that, test automation industry will be pushed to serve better tools. On the human resources side, software testers are expected to improve their skill set to write test automation codes.

10 WHAT WILL BE THE MOST TRENDING TOPIC FOR SOFTWARE TESTING PROFESSION IN NEAR FUTURE?

** multiple selection was allowed*





ANALYSIS OF THE CURRENT SITUATION

Increasing adoption of agile frameworks and DevOps concepts like continuous testing, continuous integration, and continuous delivery make test automation and agile testing as the first and second most important trending topics respectively. Exponential growth in computational power and available data catalyzes artificial intelligence[AI], thus making the AI assisted testing as the third most important trending topic in Turkish software testing market. These trending topics are followed by mobile testing and cloud testing.

FUTURE PREDICTIONS

Although top three trending topics are expected to be the same in near future, we expect a slight change in their rankings where AI assisted testing will be the most important topic followed by test automation and agile testing. This is mostly due to the fact that advancements in AI will make AI assisted testing more available, cheaper, and easier to implement.



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ABOUT



Turkish Testing Board (TTB) is the regional body representing and supporting software testing professionals in Turkey. The TTB was constituted in Istanbul in September 2006 as a non-profit organization and a member of the International Software Testing Qualifications Board (ISTQB).

TTB is responsible for certification of testing professionals to the standards and syllabi laid down by the ISTQB. TTB also acts to generate public awareness of the economic and risk mitigation benefits that professional software testing practice offers.

www.turkishtestingboard.org



TestIstanbul is the largest conference in South East Europe and Middle East on software testing. TestIstanbul introduces the region not only to the advancements in software testing but also to the advancements in other streams of SDLC like business analysis, design, development and usability. With its almost 400 participants from all over the world every year, TestIstanbul creates a healthy discussion and networking platform for IT professionals and organizations.

www.testistanbul.org



ISTQB is a global, non-profit organization responsible for enabling test professionals, through globally accepted software testing certification standards to support their career development. As of June 2017, ISTQB® has administered over 740,000 exams and issued more than 535,000 certifications in over 120 countries world-wide. The scheme relies on a Body of Knowledge (Syllabi and Glossary) and exam rules that are applied consistently all over the world, with exams and supporting material being available in many languages.

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