Industry survey: Software testing and quality

Jussi Kasurinen, Satya Jaya Aparna Pasi, Ossi Taipale, Riku Luomansuu, Mika Mäntylä, Jari Vanhanen, and Juha Itkonen

The scope of the survey is organizational units and their main software products.

General information of the organizational unit

1.   Interview

Date	
Place	
Interviewer	
Interview started	

2.   Respondents

Name	Occupation	Responsible for development/testing/both

3.   Company

Name	
Organizational unit (OU)	
Industry sector	

4.   Personnel, methods, and automation

Number of employees in the whole company?	
Number of SW developers and testers in the OU?	
Percentage of automation in testing?	
Percentage of agile (reactive, iterative) vs plan driven methods in projects?	
Percentage of existing testers vs resource need?	

5.   Please, estimate the distribution of the turnover in your OU.

Percentage of the turnover	0 -20%	21 -40%	41 -60%	61 -80%	81- 100%
Product: Customized product (based on a product kernel)	○	○	○	○	○
Product: Uniform product kernel in all deliveries	○	○	○	○	○
Product: Product family composed of distinct components	○	○	○	○	○
Product: Standardized online service product (e.g. product/service prov.)	○	○	○	○	○
Service: Training and consulting	○	○	○	○	○
Service: Subcontracting	○	○	○	○	○
Service: System integration	○	○	○	○	○
Service: Installation service	○	○	○	○	○

Service: Self service (e.g. service/service provider)	○ ○ ○ ○ ○
Other, specify	○ ○ ○ ○ ○

Processes and tools

6.   Please, estimate how the following claims describe your software development.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Software development	1	2	3	4	5
We like to transfer knowledge more by face-to-face conversation than by documents as the primary method of knowledge transfer.	○	○	○	○	○
Progress of the software is more important than thorough documentation.	○	○	○	○	○
Business people and developers work daily together in the projects.	○	○	○	○	○
Our process is able to cope with late changes in requirements, design, and technical platform.	○	○	○	○	○
We prefer more individuals, collaboration, and interaction than processes and tools.	○	○	○	○	○

7.   Faults in your products can cause (please, select all suitable points)
☐ irritation and dissatisfaction
☐ disturbance in the normal operation of the organization or a person
☐ remarkable economical losses
☐ interruption in the normal operation of the organization or a person
☐ loss of human life/lives
☐ other, specify

8.   Please, estimate following claims concerning your software testing.
When the claim is not applicable leave the scale empty.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Testing	1	2	3	4	5
Our software correctly implements a specific function. We are building the product right (human examination).	○	○	○	○	○
Our software is built traceable to customer requirements. We are building the right product.	○	○	○	○	○
Our formal inspections are ok (document to be inspected).	○	○	○	○	○
We go through checklists (req., func., tech., code).	○	○	○	○	○
We keep code reviews.	○	○	○	○	○
Our unit testing (modules or procedures) is excellent.	○	○	○	○	○
Our integration testing (multiple components together) is excellent.	○	○	○	○	○
Our usability testing (adapt software to users' work styles) is excellent.	○	○	○	○	○
Our function testing (detect discrepancies between a program's functional specification and its actual behavior) is excellent.	○	○	○	○	○
Our system testing (system does not meet requirements specification) is excellent.	○	○	○	○	○

	1	2	3	4	5
Our acceptance testing (users run the system in production) is excellent.	○	○	○	○	○
We keep our testing schedules.	○	○	○	○	○
Last testing phases are kept regardless of the project deadline.	○	○	○	○	○
We allocate enough testing time.	○	○	○	○	○

9. Please, estimate following claims.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

New testing standard ISO/IEC 29119	1	2	3	4	5
Quality is built in development.	○	○	○	○	○
Quality is built in testing.	○	○	○	○	○
Our test policy is excellent (principles, approach, and high-level objectives).	○	○	○	○	○
Our test strategy is excellent (a reusable set of guidelines for all projects).	○	○	○	○	○
Our test management is excellent (strategizing, planning, monitoring, control, and reporting of testing).	○	○	○	○	○
Our test execution is excellent (testing within a particular level of testing (e.g. unit, integration, system or acceptance) and/or type of testing (e.g. performance testing, security testing, functional testing).	○	○	○	○	○

10. Do you follow a systematic method or process in the software testing (e.g. TPI, or standard, or your own specified process)?

☐ No

☐ To a certain extent; which one   [   ]

☐ Yes; which one   [   ]

11. The available testing tools, if any

Tool	Description/Experiences/Recommendation	In-house	Vendor

Customer participation

12. Please, estimate your most important customer's participation during specification phase of the development.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

Specification	1	2	3	4	5
Our most important customer is a member of the project team and responsible for the definition of the system.	○	○	○	○	○
Our most important customer takes part in the project management schedules and progress reports for the development of the system.	○	○	○	○	○
Our most important customer develops and evaluates the budget for the system.	○	○	○	○	○

13. Please, estimate your most important customer's participation during design phase of the development.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

Design	1	2	3	4	5
Our most important customer is a member of the project team for user interface design.	○	○	○	○	○
We develop a prototype for our most important customer.	○	○	○	○	○
Our most important customer defines system controls and security procedures.	○	○	○	○	○
Our most important customer defines and reviews technical designs.	○	○	○	○	○

14. Please, estimate your most important customer's participation during testing phase.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

Testing	1	2	3	4	5
Our most important customer develops test specifications.	○	○	○	○	○
Our most important customer evaluates test data specifications developed by us.	○	○	○	○	○
Our most important customer reviews results of system test done by us.	○	○	○	○	○
Our most important customer conducts the system tests.	○	○	○	○	○

15. Please, estimate your most important customer's participation in general cntrl.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

General control	1	2	3	4	5
Needed new features are paid by our most important customer.	○	○	○	○	○
Our most important customer reviews project management schedules and progress reports made available by us.	○	○	○	○	○
Our most important customer provides domain training to us.	○	○	○	○	○
Our most important customer's employees are evaluated by their own management in our collaboration projects.	○	○	○	○	○

Quality vs customer - supplier relationship

16. Please, estimate the following claims.

Scale: 1=fully disagree, 3=neutral, 5=fully agree

Relationship to the customer	1	2	3	4	5
Our most important customer has experience on the area of business.	○	○	○	○	○
Our most important customer has power on the area of business.	○	○	○	○	○
Our most important customer has strict contractual agreements.	○	○	○	○	○

	1	2	3	4	5
Our most important customer has requests and suggestions.	○	○	○	○	○
Our most important customer co-operates and communicates excellently with us.	○	○	○	○	○

17.   Please, estimate the following claims.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Trust	1	2	3	4	5
Our most important customer is concerned about our welfare and best interests.	○	○	○	○	○
Our most important customer considers how their decisions and actions affect us.	○	○	○	○	○
We trust our most important customer.	○	○	○	○	○
Our most important customer trusts us.	○	○	○	○	○

Software quality

18.   Do you have a quality system certificate or a capability-maturity classification (e.g. CMM, SPICE, ISO-9001)?

○ No
○ Yes; which one _____

19.   Please, estimate following claims concerning quality attributes of your software. When the quality attribute is not applicable leave the scale empty.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Claim	1	2	3	4	5
The functional stability is excellent. Our software is suitable for functions it is developed for (appropriateness).	○	○	○	○	○
The reliability is excellent. The availability, fault tolerance, and recoverability of our software are excellent.	○	○	○	○	○
The performance efficiency is excellent. Our software consumes a reasonable amount of resources and time.	○	○	○	○	○
The operability is excellent. Our software is useful and usable according to the users (ease of use).	○	○	○	○	○
The security is excellent. The security issues (malicious access, use, modification, destruction, or disclosure) have been taken into account.	○	○	○	○	○
The compatibility is excellent. Our software is compatible with relevant software or components.	○	○	○	○	○
The maintainability is excellent (e.g. modifications after delivery).	○	○	○	○	○
The transferability is excellent. Our software can be transferred to another platforms.	○	○	○	○	○
The installability is excellent. Our software can be installed (first time) with relative ease to the operating environment.	○	○	○	○	○
The updateability is excellent. Our software can be updated (after first installation) with relative ease to the operating environment.	○	○	○	○	○

20. Please, estimate the following claims related to your software.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Claim	1	2	3	4	5
We have identified the most important quality attributes.	○	○	○	○	○
We have prioritized the most important quality attributes.	○	○	○	○	○
We have documented the most important quality attributes.	○	○	○	○	○
We have communicated the most important quality attributes within our OU using some other way than documentation.	○	○	○	○	○
We follow regularly through measurement the achievement of the most important quality attributes.	○	○	○	○	○

21. How many percent of the development effort is spent on testing?

22. Please, estimate following claims concerning problems.
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Problem	1	2	3	4	5
Complicated testing tools cause test configuration errors.	○	○	○	○	○
Commercial testing tools do not offer enough hardware support.	○	○	○	○	○
It is difficult to automate testing because of low reuse and high price.	○	○	○	○	○
Insufficient communication slows the bug-fixing and causes misunderstanding between testers and developers.	○	○	○	○	○
Feature development in the late phases of the product development shortens testing schedule.	○	○	○	○	○
Testing personnel do not have expertise in certain testing applications.	○	○	○	○	○
Existing testing environments restrict testing.	○	○	○	○	○

23. Please, estimate following claims concerning enhancement proposals?
Scale: 1=fully disagree, 3=neutral, 5=fully agree

Proposal	1	2	3	4	5
Fault database hepls in observing testing process.	○	○	○	○	○
Test report automation decreases testers' work load.	○	○	○	○	○
New features are not allowed after a set deadline to help test planning.	○	○	○	○	○
Test results should be open for all process groups.	○	○	○	○	○
Products should be designed to promote testability.	○	○	○	○	○
Testing strategy helps in avoiding unnecessary testing.	○	○	○	○	○
We should have dedicated testers.	○	○	○	○	○
Development of testing environment makes testing more efficient.	○	○	○	○	○

24. **Name and explain the three most significant factors how customer affects software quality in projects (in descending order).**

1.

2

3

25. **Name and explain the three most efficient tools or methods of test automation (in descending order).**

1.

2

3

26. **Name and explain most important advantages and disadvantages of outsourcing in development and testing.**

1.

2

3

Future research and reporting

☑ Please send us the summary report of the research

Contact information

Name	Occupation	Contact information (e-mail)

Comments

Interview ended