

Possibilities about the design lean canvas model and its adaptation in the agile testing

Padmaraj Nidagundi

Faculty of Computer Science and Information
Technology, Institute of Applied Computer Systems
Riga Technical University
Riga, Latvia
e-mail: padmaraj.nidagundi@gmail.com

Leonids Novickis

Head of the Division of Software Engineering
Faculty of Computer Science and Information Technology
Riga Technical University
Riga, Latvia
e-mail: lnovickis@gmail.com

Abstract—Software development industry is inventing new development methodologies in last 10 years for improving the existing developing tools, process and delivering a high-quality software to end customer in short time. In recent year's waterfall development becomes less attractive in the software industry and shifted its attention towards the new software development methodologies such as agile. Agile brought the new dimension to software development and improved the development, testing process and added new challenges. There are different agile development methodologies in practice such as Scrum, FDD, Kanban, DSDM, XP, ASD, Lean, and Crystal, all these have different approaches in software development but share the same principle of the agile.

Nowadays software development process adopted a new number of software tools in the overall process of development and software testing also moved towards the more automation to deploy, validate and verify the software code as early possible. In recent years, lean canvas is used for the planning and validating the business model and this paper will bring more focus on the lean canvas model design adaptation in agile software test strategy building, test planning and guiding the test team to work fast.

Keywords—*agile software testing; agile software development; lean canvas for software testing; quality assurance; software testing*

I. INTRODUCTION

The growth of technology made software interaction to the user as an integral part of the day to day life. More humans, machine and robots depend on and work with software. The growth of software tools and technologies made software development fast and simplified. According to recent survey [9] software development companies spending more budget on the software validation and verification to make application error free before it reaches to the customer and it created the market competition with several testing tools and practices. Software development becomes more advanced, fast, agile with continuous integration, continuous deployment, and test automation. This advancement also brings the new challenges to quality assurance teams with agile methodology adopted projects. Agile software development principles are individuals and interactions, working software, customer collaboration, responding to change, quality focus, iterative, incremental and evolutionary, very short feedback loop and adaptation cycle, efficient and face-to-face communication make it more popular.

A. Scientific Novelty of Paper

Standard lean canvas is used for the evaluating the business. The lean canvas is a white board with several blocks with title names. It is simple, lightweight one-page design it shows the product design to market segmentation and market fit. This paper main contribution is to find the proper design of lean canvas and identifying the adoption in agile software testing.

Specifically:

- Finding the lean canvas design for the agile software testing.
- Improving the test planning.
- Simplifying test strategy.
- Identifying the best fit, lean canvas for the agile.
- Utilizing the lean principles in lean canvas design.
- Finding the most appropriate blocks for the lean canvas design.

B. Structure of a Paper

This paper is mainly divided into main five sections, subsection, and conclusion. Section II identifies and formulates the problem. Section III introduction design generation possibilities and methods, tools for conceptual design. IV section shows the finding intermediate possible lean canvas design elements.

II. THE PROBLEM WE TACKLE

Agile bring one side benefit and one side lot of drawbacks as a challenge's [1], especially in software testing where software must be well tested to make error free in a short time. In agile software development and testing goes most of the time with little planning. The continuing changing requirements will direct impact on the software quality.

The most known problem [2] we face in agile software testing are:

- Large software development project where software deliverables are pre-defined with milestones and testing process is difficult to calculate the time for the agile development life cycles.
- Not having a sufficient test documentation lead towards the time-consuming process of further software testing.

- In less time developer not able to write a unit test, integration test for the software components, it increases the test team challenges for testing all software components.
- Adding the new testers to projects without having a proper software product and domain knowledge leads towards the possible software errors.
- Test planning may get in the trap due to short development life cycle time and changing functionality constraints.
- Lack of software test infrastructure architecture design for the test automation can slow down the software testing process.
- According to world quality report 2016-2017 agile testing challenges are: early involvement of testing team in each phase or sprint, difficult to identifying which area of been to focus on testing, initial lack of test data and environment, less agile test experts, test automation coverage and identification and reuse of test across specifications [9].

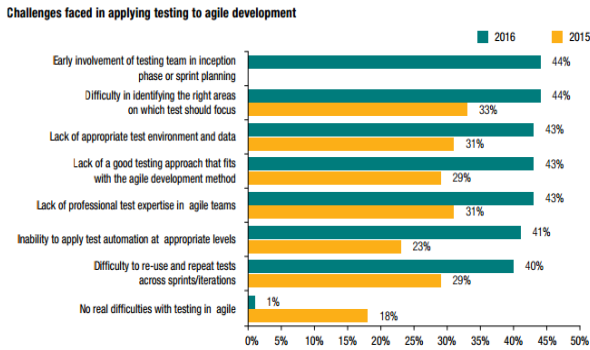


Fig. 1. Challenges faced in applying testing in agile development according to world quality report 2016-2017.

III. RELATED RESEARCH

A. Test Management Process

Test plan process crucial part is test management, having a right test plan software testing process can be simplified and well-organized will lead towards the making software error free. In agile software development life cycles, software testing always faces time constraints.

According to the IEEE 829 standards software testing [3] contain the many sub-chapters, however, this standard show the important document items must address, but it's up to the test planning process what we use out of it. In the agile test, a team must keep updating document frequently and also another side manage the testing the developed application itself. Other test management challenges such as inadequate test coverage where continues integration and frequently changing requirements. Frequent builds can break the existing code and it can halt the testing. Performance bottlenecks, security, etc. non-functional testing must be carried out the same time. For test lead managing the test document, test planning day today, training the team, providing the test estimation to the manager, improving the test automation coverage and managing the code delivery delay

from development team will become more challenging managing.

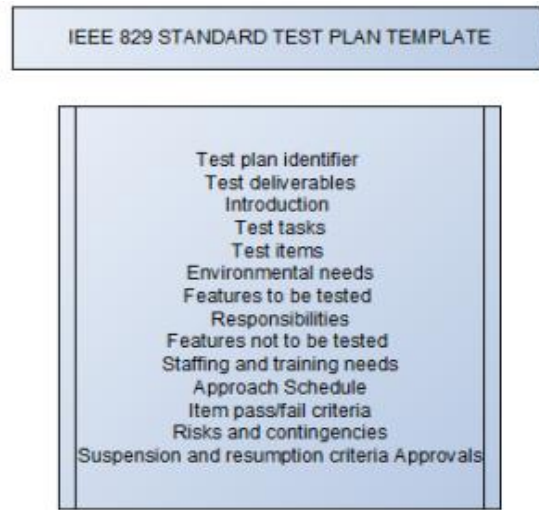


Fig. 2. IEEE 829 standard test plan template.

B. Software Testing in Agile

Traditional software development methods are well defined, well stabilized and industry also adopted them from a long time [6], [7]. However agile based software testing process related researches are still ongoing now. There is several different view of research authors in software industry methodology based software development and testing practices.

Test automation: Test automation will be achieved at different levels, beginning with writing the unit test cases and in next level integration test with API services and in final stage user interface bases functional testing that covers most things. It's also depends on how the test automation planned, however still they can add more tests such as security testing, load testing in test automation. Test automation reduces the human repeated tasks with testing and effect directly in regression testing cycles.

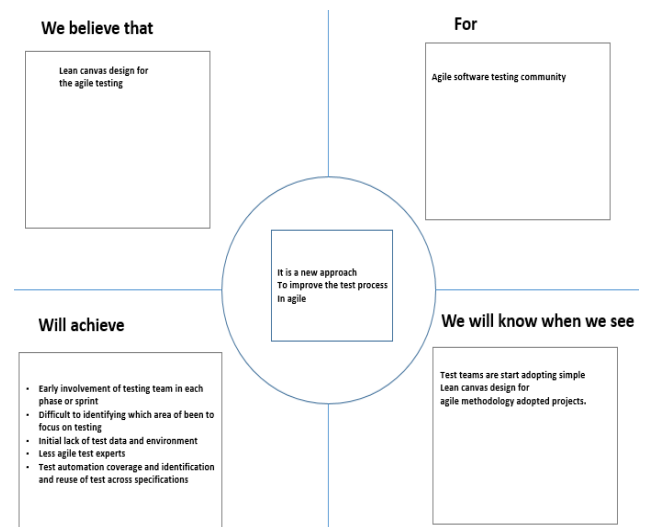


Fig. 3. Hypothesis for agile lean canvas test board.

Regression testing: In this phase, tester runs the test cases against the features introduced in the cycle. Regression testing helps to identify the new changes effected previous functionality in the correct way or not, if not then possible bugs are identified and reported to developers.

Continuous integration: In this phase software is deployed and delivered after testing in different environments such as test environment, pre-production, or production.

A tester as a team member and testing approaches: In agile, the tester is an integral part of the team and follow the agile principles to full fill the team needs in term of software verification and validation the software with a collaborative approach.

In agile, a tester has less time for test planning and tester must be ready for the new challenges and more flexible to work with the rapid application requirement changing. The tester may need to review his test approach time to time against changing software features.

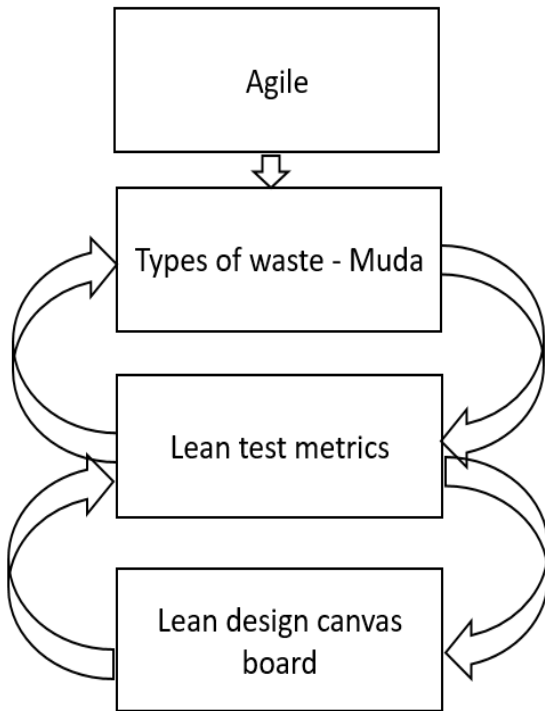


Fig. 4. Overview on design process of lean canvas board for agile testing.

IV. AGILE TESTING PROCESS WASTE IDENTIFICATION USING LEAN PRINCIPLES TO DIAGNOSE RIGHT TEST METRICS

Agile waste that directly effects to software quality in term of software errors to end customers. Let's consider lean principles [4], [10] with agile software testing try to identify different metrics.

- Transport – In agile testing, the tester must stay ideal when nothing tests and not able to work on test documentation due to constantly changing requirements. Agile more focused on avoiding the long documentation of software testing.

- Inventory – If test teams are distributing environment then it's important to focus on the learning one to one helped by video conferences, voice online conferences, and pre-recorded sessions instead of spending time on reading documents or self-educating.
- Motion – Changing requirement in agile also affect test planning and scope, it's necessary to work at least some level of focused scope to avoid the software testing failures.
- Waiting – In agile also sometimes software not delivered in time, so tester needs clear guideline what he can do more and contribute to teamwork.
- Overproduction – In testing sometimes, simple functionality also gets a lot of bugs due to lack of skilled developers, in such situation tester must stay ideal for the new software version release with bug fixes.
- Over Processing – It may be due to lack of test planning or test tools used for test automation and bug reports.
- Defects – It is reoccurring bugs in the testing process and re-fixing them again and again.

Prototype for agile testing process waste identification



Fig. 5. Overview on design process of lean canvas board for agile testing.

A. Identifying Appropriate Test Metrics for Lean Canvas Board

Using the lean principles, we already identified different several test metrics from the different “scrum” software development method. In software testing, key metrics work like an indicator of the lean canvas white board to ensure that software development & testing projects get completed on time. Most of the time software testing team leads or managers must monitor and understand the software quality. It helps them to team efforts and helps to set a long and short term goals.

In figure 6, we used scrum project example and extracted several possible rough data as an input. These can be further added or may be removed from the process according to the project goal, final processed data will help to determine KPI.

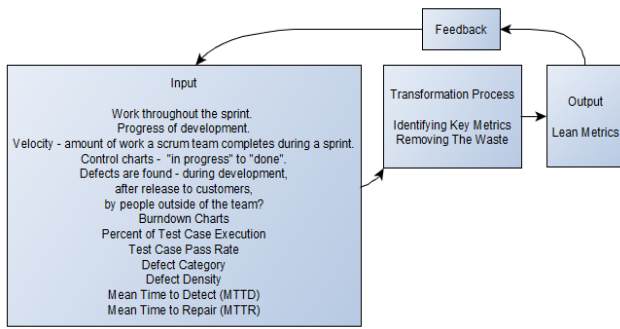


Fig. 6. Transformation process to find the agile lean test metrics.

Although key metrics names are not stable on lean board, we can optimize and rename according to the subject.

B. Design Lean Canvas Board Using the Design Principles

As we understand from section 3, about possibilities design using idea generation to conceptual tools [5]. The key idea is to make a design of the appropriate lean canvas board that addresses the solution for the testing planning to guess initial bugs. While creating the lean canvas design for agile it is import to consider how the design approach creates alignment with the continues changing requirements or scope of the testing. It's also necessary to take team member input to improve the design. In our prototype design try to address the testing level specific test plans, test deliverables, testing scope, goals/objectives, test case, responsibilities, risks, defects, test environment, test metrics/KPI issues.

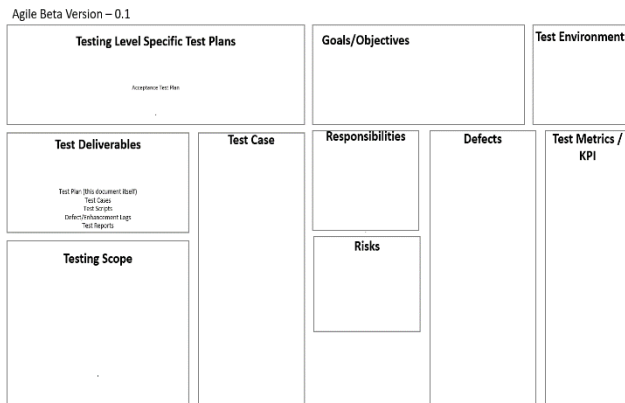


Fig. 7. Prototype agile lean canvas design board for testing.

The main aim of lean canvas board for testing is to make sure its design is simple, there must be a way of improvement and focused on continuous improvements.

V. CONCLUSION AND FUTURE RESEARCH

This paper study explains the new possible approach for the design of lean canvas model and adaptation possibilities agile software testing. Till today lean canvas used in business idea validations & creating strategy only, but further, it can also adaptable to the agile software testing.

In next step to continue research, still must do following activities.

- Needs to identify with different agile software methodologies and testing possibilities with lean canvas.
- To carry out a lean canvas design experiment with the agile software testing process.
- Identifying the optimized metrics for the design of the lean canvas for the test process.
- Developing new algorithms those help to diagnose right test metrics.
- Develop related models and methods.
- Develop an appropriate design for the lean canvas board using the design principles.
- Developing tools and framework to design lean canvas board this can fit into different agile software development and testing process.

This new approach suggested in this paper emphasizes on the utilization of lean canvas model adaptation in the agile software testing. Author wish is to generate more new ideas from this introduction research article and possibly all ideas extracted from this paper for further research. It is an endless research about agile software testing to identifying possible adaptation of the lean canvas board to overcome the lack of testing approaches.

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