Quality Aspects of Static Testing in Agile Development

Hafsa Shareef Dar

Department of Software Engineering

University of Gujrat

Gujrat, Pakistan

hafsa.dar@uog.edu.pk

Abstract- **The purpose of this paper is how to improve agile development in Pakistan software houses using Static testing. In agile software development as we know development is iterative so testing is a continuous process that occur at every iteration. The associative nature of agile development requires a verification of code at every phase where developers communicate with customers to discuss functionality, requirement specifications and requirement changes for later development phases. Static testing convey quality to software development by reviewing the code for consistence analysis for accuracy. In agile development, static testing ensures that each component is consistence and complete before merging into the software as a whole. Bugs and defects are found and amended by the developers proactively, permitting more opportunities to be spent on further development instead of reworking. By conducting survey and gathering data from different agile developers and software houses it is analyzed that static testing is beneficial for agile community. A framework will be proposed for implementation static testing in agile development in Pakistan. Software developer can inspect the code and analyze it during development so that it will minimize documentation and reduced the testing time to improve quality throughout the development and delivery of product. In Pakistan where there is lack of expertise and advance opportunities static testing will enhance the efficiency and output of agile development to improve the quality of product. Static testing also helps in reducing cost of dynamic testing to enhance the agile development in Pakistan.**

Index Terms—**Static testing, Agile development, Software testing, Testing role in agile.**

I. INTRODUCTION

The expert point of every software developer and a product organization is to convey the most extreme likely results to their clients with-in time and spending plan. Agile development is playing a very important role in the software development of a country. This paper focuses on the problems arise due to the ignored software testing techniques in Pakistan software houses that can enhance to software development. [1] Due to issues like cost, unavailability of expertise and lack of standards, Pakistan software market is far behind than any other markets in Asia. We aim to discuss static testing techniques in agile development and seek to propose a framework that is acceptable to software houses in Pakistan.

Other countries are very advance in agile development while Pakistan is far behind in software development adopting agile methodology. Agile development in Pakistan can be improved by adopting static testing.

Static testing is an important part of software testing. It is just a dry run of the code through inspection, code review and walkthroughs. [1] Static testing is to find the human faults and defects that later convert into crashes. It is supposed that if faults are stopped at earlier stages, then there will be fewer chances of software failures. Static testing intends to inspect code from every point of view. Hence, increasing coder's efficiency and reducing faults.

Our study aim is to find how static testing can improve the agile development. We will study further by taking case from Pakistan software houses and this will be survey based. Results are expected to be in form of framework that could be implemented for further analysis.

II. BACKGROUND

A. Literature Review

As we notice, software development improvement is extending. Software has integrated into numerous different fields, and is turning out to be more mind boggling. New software development approaches are evolved, as agile methodologies [1].

There are different approaches to software development, keeping in view the cost, time and resources required.

Main focus of Agile Methodology was to deal with the difficulties of:

      1. Evolving requirements
      2. Customer involvement
      3. Deadlines and budget
      4. Miscommunication [2]

As per a survey, given in [3], 41 % of development projects have now embraced agile methodology, and agile techniques are being utilized on 65 % of such projects.

Agile model is the extension of Waterfall Model. It contains iterations rather than phases. Each iteration contain a working code program [2]. It is a type of fast prototyping with small team.

As shown in Figure 1, the simple agile method life cycle:
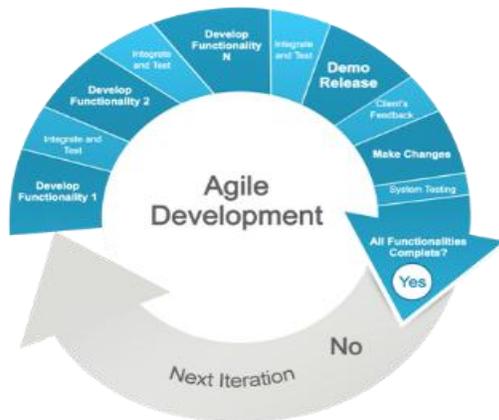

Fig 1: Agile Method Life Cycle

Software development in agile methodology focuses on frequent release and direct involvement of customer.

Some of the factors that should be communicated well in agile teams are discussed in [4]:

1. Agile concepts and techniques help the best firm to be better
2. There is more to success than implementing agile concepts and techniques
3. Most firms still have a long way to go to become more agile

As examined in [5], there are a few constraints of agile software process:

1. Restricted support for distributed development environments
2. Constrained support for subcontracting
3. Constrained support for building reusable artifacts
4. Constrained support for development involving large teams
5. Constrained support for developing safety-critical software
6. Restricted support for developing large complex software

The author further claimed that some features of software development project can profit from agile method while others can profit from a less agile or more anticipative approach [2]. Agile method was designed to increase efficiency with extra pressure on developers. They can't afford the time and effort required for manual testing [6].

B. Testing Techniques

Software testing is a critical segment of SQA.
Numerous associations are spending up to 40% of their assets on testing.

Testing is defined in [8], "a process of executing a program with a goal of finding errors."

Software testing is separated into two general classes::
    1. Static testing
        a. Walk troughs
        b. Inspection
        c. Code review
        d. Desk checking

2. Dynamic Testing
    a. White box testing
    b. Black box testing
    c. Grey box testing

Static testing is the review of the code from others. In this test code is not executed, we just read the all code and dry run it.

Testing is a sub part of Software Quality Assurance which is a systematic process of checking to see whether a product or service under development is meeting specified requirements [2].

C. Problem Statement

The problems of Pakistan software Houses are different than any other countries, like less expertise. There is unavailability of local rules and standards, low currency value and less labor cost. Software houses in Pakistan are not ready to spend money on code inspections by large teams, formal technical reviews, documentation and auditing.

This research starts to find the answer of question: "How to improve quality of agile development by adopting static testing?"

In this research, we are using static testing techniques with agile method to accommodate testing in Pakistan software market.

In Pakistan people feel hesitate to spend too much money for the testing of soft wares.

D. Research Questions

How to improve agile development by adopting static testing in Pakistan agile market?

Is static testing beneficial to improve agile development in Pakistan agile market?

E. Problem Analysis

By reviewing the literature, we observe that agile development work with [1] regular customer feedback, changing requirements and iteration phases. They waste less time on documentation of code and reviewing it. Dynamic testing is used to check the functionality and defect detection. But for fault detection static testing is not much in practice. In Pakistan software houses, where testing is still like a new born baby, only black box testing is focused. Code inspection, desk checking and walkthroughs are like the farthest corner of the world.

III. METHODOLOGY

Static testing is not commonly used in agile software houses in Pakistan, they are just doing experiments with quality. In agile method, dynamic testing is focused in some software houses that shifted from conventional development to agile methods. The method to conduct our research is survey based. The audience of this survey is selected agile based software houses in Pakistan. The analysis of this survey will provide the guidelines to propose a framework, to adopt static testing in agile methodology, and will be acceptable to Pakistan agile market.

IV. RESULT/FINDINGS

About 50% of software houses in Pakistan are using static testing in agile development while other are unfamiliar with the use of static testing in agile, they are using only black box testing. Only 80% of agile developers find the static testing is beneficial for development and improve the efficiency of product before delivery. It is analyzed that static testing can be done in agile development without large documentation which is the basic requirement of the agile methodology.
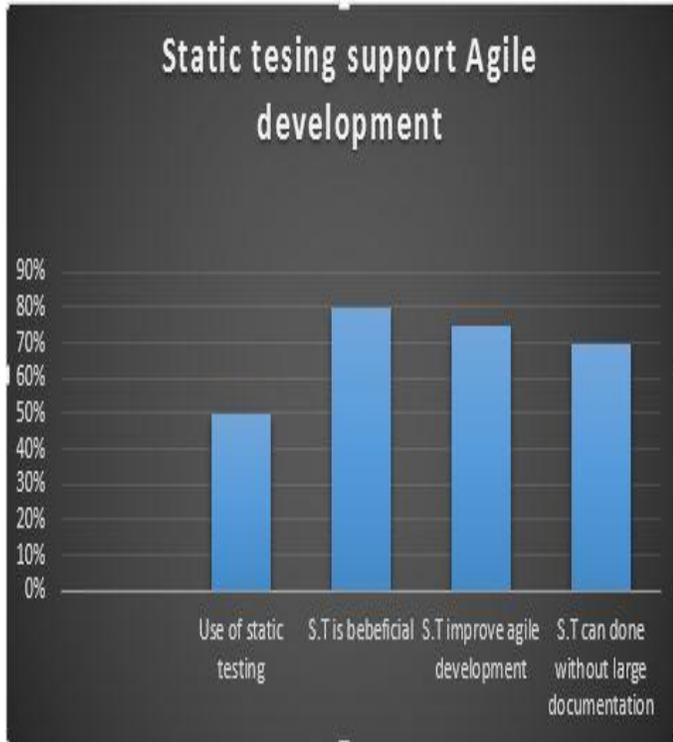
Fig. 2: Analysis of survey

V. CONCLUSION

In Pakistan where there is lack of expertise and advance opportunities static testing will enhance the efficiency and output of agile development to improve the quality of product.

Static code analysis will improves project perceptibility by rapidly giving an appraisal of the quality of your code while Dynamic code examination is more confused in that it inspects the executing code for problems. Static testing also helps in reducing cost of dynamic testing to enhance the agile development in Pakistan.

Software developer can inspect the code and analyze it during development so that it will minimize documentation and reduced the testing time to improve quality throughout the development and delivery of product. Static testing confirms that the product's code meets principles in light of standards and best practices that the software development has settled upon. Logical errors in main components of the software can

lead to a protracted fix, especially for newer or less familiar developers.

In future, we expect academic and practitioners to implement and evaluate out framework in various Pakistan software houses.

VI. REFERENCES

[1] S. H. O. Malik Hneif, "Review Of Agile Methodology In Software Development," *IJRR In Applied Sciences,* Vol. 1, No. 1, Oct, 2009.

[2] M. U. A. J. A. S. Hafsa Shareef Dar, "INFLUENCE OF STATIC TESTING IN AGILE DEVELOPMENT:," *Sci.In.T(Lahore),* P. 4, 2014.

[3] Sarena, "An Introduction To Agile Software Development," June, 2007.

[4] Forrester, "Agile Software Develpoment And The Facors That Drives Success," *Forrester Research,* September, 2012.

[5] B. R. Dan Turk, "Limitations Of Agile Software Process," 2003.

[6] Coverity, "Development Testing For Agile Environments," Nov 2011.

[7] I. Jovanovic, "Software Testing Methods And Techniques," May 2008.

[8] Guide To The Software Engineering Body Of Knowledge, "Swebok – A Project Of The IEEE Computer Society Professional Practices Committee," 2004.

[9] http://searchsoftwarequality.techtarget.com