Elevating Software Quality Role Using Angle Methodology

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***Abstract*— Software Quality is an essential part of modern research, and up till now there are insufficient mechanisms in the intellectual environment to acknowledge, measure and to enhance quality parameters. In this paper, considering agile methodologies might produce software faster as well as boost software quality so that they complete quality necessities of the product. Choosing and adaptation of any methodology depends on the type and people involved in the project. Employee behavior, their mutual relations and enthusiasm is one of factors which can critically affect success of the method implementation. So, these factors also measured all through the version of agile methodology. There is no doubt that the foundation of agile techniques is people. The motive of this paper is to introduce a best method for implementation of the agile methodology.**

Finally In this paper, every issue affecting software quality assurance has been explored, and all fixes that are feasible have been provided. Practitioners may find the conclusions of this study useful in assessing specific measuring tools and application quality characteristics.

Keywords*— *ISO, Software Quality Assurance, Traditional Methods, Agile Methodologies, Agile Adoption, Scrum

I. INTRODUCTION

The world is in the midst of a long-term change. In a world characterized by increased interactions and externalities, people, systems, and conditions change and develop at an accelerating rate. Software quality is getting a lot more attention these days, and a emphasized on the product development of high-quality software. It is a complex process that aims to create goods more quickly, better, and at a lower cost. The majority of software is created through the collaborative efforts of many designersand programmers over many years. Nobody can be entirely implicit in the end product. No matter how well-designed the techniques used to test the final product are, howcomplete the documentation is, how well-organized the methodology is, the development programs, the projectreviews, the database administration, the configuration management, no matter how advanced the tools and techniques are, it will all be for naught if the performance framework configuration isn't substantial.

Quality has great impact on acceptance and execution of software program products beneath operation. Quality has many perspectives for clients, engineers and executives. Quality standards must be achieved by using effectivequality management system.

Quality is constructed into software products through the administration and technical procedures that are well- defined and employed to guarantee: Quality, Schedule andBudget Compliance.

There are two significant methodologies toward software quality: defect management and quality attributes. The software defect management method is based on identifying and managing flaws. Defects are typically classified according to severity, and the facts in each category are used for planning. To continuously improveinnovation processes, competent application developmentfirms employ tools such as defect leakage matrices and chart. Fixed performance measurement systems, such as ISO/IEC 25010:2011, best describe the quality assurance strategy. This popular term refers to a pyramids of eight outstanding traits, each of which is made up of sub- characteristic:

- ✓ Functional Suitability
- ✓ Reliability
- ✓ Operability
- ✓ Performance Efficiency
- ✓ Security
- ✓ Compatibility
- ✓ Maintainability
- ✓ Transferability

Figure 1. Quality Traits

A good software quality model is frequently helpful in gaining a comprehensive understanding of software quality. In practice, the relative relevance of specific software qualities is usually determined by the software domain, product type, and intended usage. As a result, software characteristics should be developed for each product and utilized to guide product development.

Various technologies have been developed to improve software, which is the primary goal of software engineering. Some notable technologies are as follows:

- ✓ Definition of a requirement
- ✓ Preventing Faults
- ✓ Defect Detection
- ✓ Removal of Defects

Figure 2. Goals

Lot of projects fails flat due to the low mission maturity level so agile shows clear cut project management methodology and moved our psyche to small teams gradually delivering quality software that is required for the enterprise.

Quality has various viewpoints for clients, engineers and managers. These viewpoints are addressed precisely in a quality model that is made out of both outward and inward measures. Outward quality attributes can be estimated indirectly using inward properties of the software item. Many outward attributes are important to manager of software production and are consolidated in a structure or a quality model. In Agile Projects, we must look at the role of Quality Assurance. Agility is a software development method that allows for iteration and proper operation.

Agile is a long-lasting report-driven software development procedure and these techniques have acquired striking acceptance in the business ground. When compared to traditional development initiatives, the agile approach has two key characteristics: a) it can manage unstable needs all throughout development life cycle; and b) it obtain an advantage in shorter periods of time and under budgetary constraints. The paper is planned into five sections. Section 1 explained Introduction of Software quality and agile methodology. In Section 2, various papers have been surveyed with agile methods and issues. Section 3 described various Reasons and Benefits for Adopting Agile Methodologies. Evaluation of Methodologies against Quality Factors elaborated in section 4. Survey of an assortment of Agile Methodologies in section 5 and section 6 contains conclusion.

II. LITERATURE REVIEW

Mostly on development of a software product, deep-rootedor obsolete software processes, such as Software Development Life Cycle (SDLC), are applied. There are several models for dealing with these types of cycles, each ofwhich represents a different method to dealing with the numerous activities or activities that occur throughout the process.

As per Boehm and Phillip [24], during their first project, requirements changed by 25% or more on a regular basis. It is difficult most TSDMs to generate a comprehensive set of demands at the onset due to the ongoing updating of technology and business environments. [5].

The creators of agile techniques first convened in February 2001 for a discussion and developed the Agile Methodology Manifesto. The assembly resulted in the creation of a unique conceptual process known as "Agile Alliance." Agile methodology approaches are iterative or incremental software development strategies. Requirements and arrangements are modified and evolved in the agile development process through collaborative work and communication among associations and organizations. The agile software process promotes a quick and efficient response towards change. Some experts and scholars have examined agile development approaches.

Distinctive Researcher showed following highlights of utilizing Agile Methodologies than traditional techniques in the associations.

- Cho [5] confirmed that, in opposed to previous SDLC, the Agile SDLC does not include 'direct front' precursor requirement collection because stakeholders are frequently unable to supply all specifications are detailed enough to allow implementation to begin right away.

- F. Maurer [6] The creation of an internet system by nine full-time employees in a small corporation using XP was evaluated, and significant productivity gains were discovered when compared to the pre-XP period also improve fundamentally the manner in which programming is formed.

- According to Vijayasarathy [8], a researcher, agile approaches reduce the amount of documentation overall, andeven argue that the software itself should function as a report.

- In a systematic investigation, Tan [9] researchers discovered that personnel consistency and design similarity have an effect on the effectiveness of web applications that use incremental or incremental development.

- The main idea behind incremental development is to build a software system piece by piece, allowing the designer to benefit from what was discovered even during the production of earlier deliverables adjustments of both the framework and the framework. As a result, incremental and iterative software development is regarded as the foundationof agile systems.

- According to Uikey [10] researchers, the unplanned relationship among project team and the stakeholders nowadays generates challenges such as the development agency's inability to adapt to the framework's complicated structure and frequently changing demands, or the difficulty in hiring new employees.

- The adaptability [4] of agile approaches to ISO software improvement standards and Extreme Programming XP utilized as important agent of numerous agile strategies and exhibited in what way XP make all the more much enthusiasm since it offers some basic option in contrast to conventional software engineering principles.

The scholar Wolfgang [3] stated that probably the assistance of software products in the development process is based on two goals: the first is to provide a few techniques that aid in the creation of high-quality software; the second is to provide

a few methods that aid in the development of high-quality software.

The next step is to establish strategies that ensure a high level of quality. Juyun Cho researcher [11] said that Agile has abundant profits but organization won't bounce to agile methodologies for some reasons:

a. Agile approaches completely eliminate the need for documentation and rely heavily on unspoken knowledge.

b. Agile approaches for safety-critical projects have not been sufficiently tested.

c. Agile methodologies alone are insufficient forextremely stable project activity.

d. Agile approaches can be fruitful only with bright employees that choose a wide range of opportunities.

e. Agile approaches are not appropriate for large- scale projects.

A. AGILE MANIFESTO – 2001

The agile software development emphasizes on four core [16] values.

Figure 3. Agile Manifesto [16]

From manifesto second, there was a fast selection of techniques, for example, Kanban or Scrum, which make an interpretation of these standards into explained handy approaches [13] to increase the efficiency of software development projects.

B. Agile Methodology Blueprint

"Agile strategies" represents a team management method and a productiveness framework that helps non-stop and incremental progress on paintings priorities, even withinthe face of modifications. APM has its origins in the agile approaches of software improvement, which includes Scrum, XP, DSDM, Cristal, etc., which are programming methodologies primarily based on adaptability to any change as a method to boom the probabilities of success of a task. Agile framework deals with an early input approach as given in figure 2.

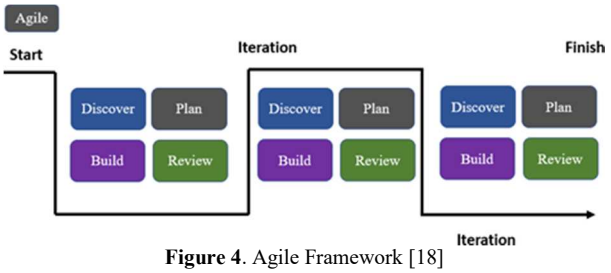

Figure 4. Agile Framework [18]

Most agile techniques try to reduce dangers in the course of the execution of an undertaking via developingsoftware in iterations, which usually closing from one to four weeks. Project each iteration is like a miniature venture of the final project, and consists of all the tasks vital to enforce new functionalities: making plans, requirements evaluation, design, coding, testing, and documentation. To survey this new situation, Agile procedures were imagined as an option in contrast to traditional project [17]. Traditional vs Agile Project Workflow is given in figure 3.

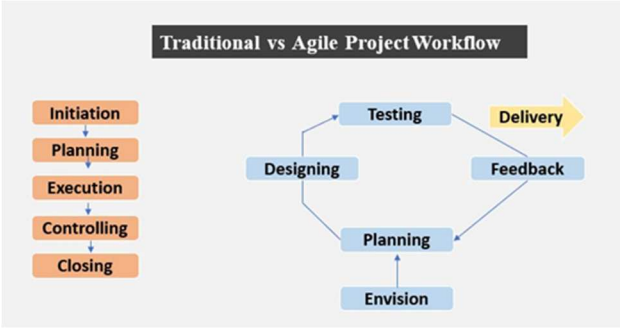

Figure 5. Traditional Vs Agile Project Workflow [17]

III. REASONS FOR ADOPTING AGILE METHODOLOGIES

In the traditional venture management, a rigid approach is followed and you pass as per the strict time table and planning leaving no room that allows you to correct your course at the manner. Whereas, the agile challenge control methodologies like Kanban, Scrum, Gantt, and so on. Let you improve your mistakes on the manner.

The 14th agile formerly conducted by CollabNet VersionOne, with an updated questionnaire sent to select customers in May of 2020. The results show [20] that the top reasons for embracing agile are still accelerating product delivery and improving the ability to manage changing priorities. Respondents indicated that reasons for adoption were fewer about reducing project cost (26% compared to 41% previous year), and more about reducing project risk (37% compared to 28% previous year).

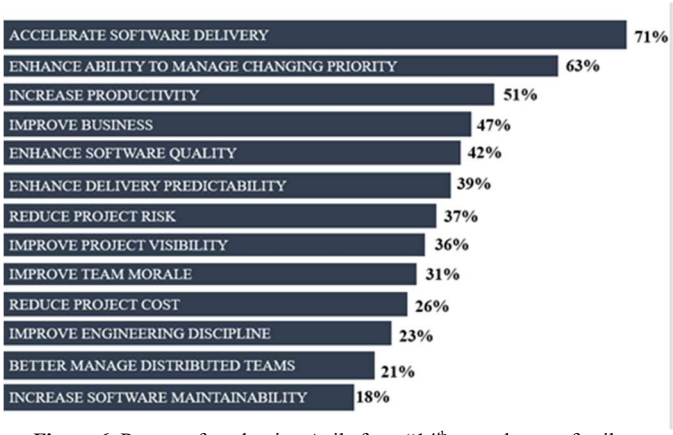

Figure 6. Reasons for adopting Agile from "14th annual state of agile survey 2020" [20]

Nature inspired [21] and optimized frameworks [22] havealso been developed. Striking discoveries detailed for the agile survey 2020 year incorporate [23]:

- Report shows that 60% of Respondents have improved speed to market and 55% are scheduling to implement Value Stream Management.
- Respondents also show that agile adoption has increased 33% in response to COVID-19

A. Major five reasons for Adopting Agile Methodologies

Respondents were asked why their teams adopted agile methodologies and techniques. Figure 5 shows the most responded benefits in the survey.

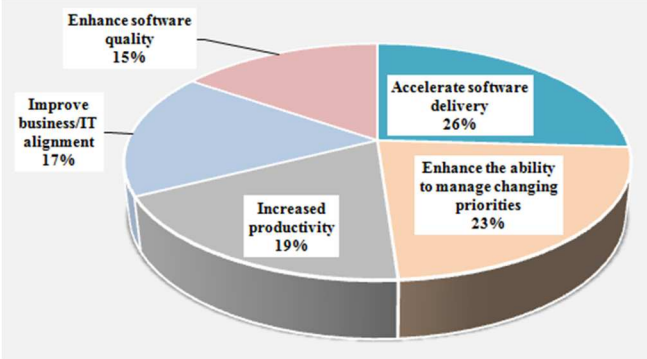

Figure 7. Five reasons for adopting Agile Approach since "14th annual state of Agile survey 2020" [23]

B. Quality Assurance Parameters in Agile Approach

Table 1, outlines different quality parameters followedin agile development. Individually quality parameter is assessed in many agile methodologies. A few organizations use a combination of techniques to meet a variety of quality criteria. Analyzing methodology revealsa few procedures that should be followed in order to obtaingood quality.

TABLE I. QUALITY ASSESSMENT PARAMETERS

Quality Parameters	Definitions
Accuracy	The system's ability to execute inaccordance with a set of specifications.
Validation and Verification	The ease with which the system can betested.
Extendibility	A scheme that is easily adaptable tochanging new requirements.
Re-usability	Software made up of components that can be used to build a variety of applications.
Efficiency	The capacity of a system to impose as minimum demands on hardwareresources as feasible, such as memory, communication bandwidth, and processing time.
Portability	The simplicity with which the software product can be installed on various platforms for hardware and software
Timeliness	Release the programme before or on theexact date when the users require it.
Integrity	How successfully the software safeguards its programmes and data from unauthorized access.
Performance	The system's performance is defined byits low resource use and the mean time of failure and recovery is shorter, and the response time is shorter.
Ease of Use	The software's ability to be learned andused by people from all walks of life.
Maintainability	The ease with which the software can bemodified to correct defects or fulfil newrequirements
Cost Effectiveness	The system's ability to be completedwithin a specified time frame.
Robustness	Appropriate proposed system inscenarios not addressed by the specifications, in addition to accuracy.
Compatibility	Software made up of pieces that can beeasily combined with others.

C. Benefits of Adopting Agile Methodologies

When Agile is scaled across an organization, everyone experiences the benefits.

- Agile lets team self-organize into the best designs and a sense of accountability grows
- Faster development diminishes the danger ofdeliverables and success rate increases.
- Agile practices give designers a more grounded feeling of proprietorship and morejoyful at work.
- Agile prioritizes relationships, even in controlled businesses or procedure overwhelming situations.
- Less formality implies developers are more inline with clients, which leads to customer satisfaction.
- Agile can morph to meet an organization's specific needs.

IV. Evaluation Of Methodologies Against Quality Parameters

Table 2 compares the quality assurance characteristics obtained from the various approaches studied in distinct processes.

TABLE II. Assessment Of Procedures Against Quality Constraints

Quality Parameters	XP (extreme Programming)	Scrum	Feature driven	RUP
Accuracy	User Testimonies	Meetings to review	Customers helped create feature lists.	Interviews with stakeholders during the start-up phase
Validation & Verification	Testing at the unit level	Testing & evaluations	To Inspect	Acceptance - testing
Extendibility	Simple design	Prioritization	Simple design & versioning system	UML Design
Re-usability	OO design pattern	Current design	OO Plan	Designing with UML
Efficiency	Programming in pairs	Meeting with the team	Ownership of a class code	Modeling with UML
Portability	Practices in OO design	Practices in OO design	Support for configuration management	Architecture based on components
Timeliness	Iterative and incremental development	Iterative aspect	Development that is iterative	Development that is iterative
Integrity	OO design patterns	Patterns for OO designing	Ownership of a class code	UML Modeling
Performance	Product ionizing phase	Sprint Phase	Ownership of a class code	OO design pattern
Ease of use	Simple design	Simple design	List of features	UML Model
Maintainability	The design is straight forward	Well-suited with current system	Controlling versioning and OO design	UML agreements
Cost Effectiveness	Iterative development	Iterative development	Iterative design aspects that can be reused	With OO design iterative development is possible
Robustness	Basic OO design	OO design	OO design	OO design
Compatibility	Inherited the OO design	OO design	Version control	Inherited the OO design

V. Survey Of An Assortment Of Agile Methodologies

Scrum is an iterative incremental framework for overseeing complicated work (together with new product improvement) usually used with agile software program improvement. Scrum and related variants keep on being themost widely recognized agile methodologies utilized by respondents' associations.

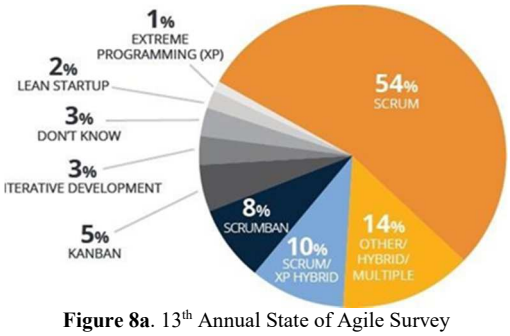

Figure 8a. 13th Annual State of Agile Survey

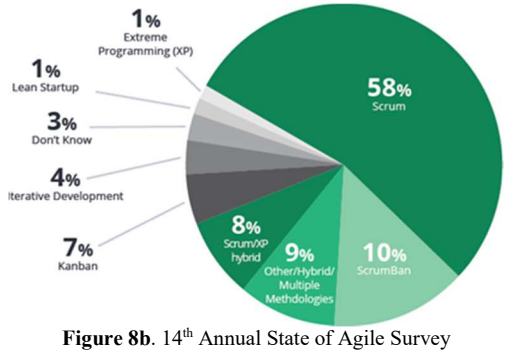

Figure 8b. 14th Annual State of Agile Survey

VI. Future Scope

In future, we aim to explore the utility of cloud services in the area [26]-[28]. Also, we aim to explore the necessity of artificial intelligence [29]-[30], especially deep learning strategies [31]-[32] in this area

VII. Conclusion

There is no one of a kind formula for success in software development field. If any enterprise is utilizing agile for software program development, it is extremelyimportant to follow each specification, practices and procedure that is endorsed by that method. This research provides a useful tool for calculating agile approaches in the context of quality management factors. Quality assurance in agile approaches is also a new area of study.

In this paper, the author brings into focus that Agile approaches are great methodologies that appear to be a response to frequent changes in the market and demonstrate key strengths of scrum methodology such as its idea based on a short development process, high customer satisfaction, and a rapid adaptation to change.

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