ISSN No:-2456-2165

# Techniques for Quality Control Incorporated into the Production of Agile Projects

Gowtham S
Junior Analyst
Aosta Software Technologies, India

**Abstract:- To make a brilliant idea an innovative product, tools and design methods are the basis for the initial trend in quality control. The typical start-up is agile manufacturing. We proposed a PDCA-inspiring tool that combines quality strategies and innovation strategies so that developers can guarantee quality at any point in the product lifecycle following an investigation on an agile technique and the methods used to guarantee quality at any stage of the product development cycle and on the outcomes of the agile process.**

***Keywords:-*** *Agile, Life Cycle Models, PDCA.*

## I. INTRODUCTION

There are numerous meanings and aspects and case studies in the history of the word quality. Consistency in all forms has played an important role in both corporations and small businesses in recent years. Protocols, protocols, tools and strategies are promoted in order to ensure standardization and quick implementation, so that organizations can incorporate consistency into their daily lives.

But it is interesting to see the connection between the quality control and controlled product during their life cycle. The agile approach and fusion of quality ensure quality goods and services is also relevant.

Our paper discusses key quality concerns, project management and agile development, as well as integrating new quality management and innovation instruments to ensure improved performance in an agile manufacturing environment.

## II. LITERATURE SURVEY

At the end of the 13th century the quality of the goods that were originally produced and constructed according to the specifications of the manufacturing companies and plants were made part of modern business goals, when craftmen started becoming labor unions known as enterprises.

Different quality tooling techniques have also been built through the multiplication of quality and quality processes[1][2]. There are many approaches to this topic in the classification of currently existing quality services, one which is central to the "seven primary qualitative methods," also known as the 7 QC tools. In the 1950s, in Japan, Kaoru Ishikawa invented seven Queen's weapons, inspired by seven well-known Benkei weapons[3]. They are also referred to as "The Seven Basic Quality Methods," as they can be used to solve complex qualitative problems by anyone with basic statistical training[4]. The following elements are: Chart Control[5], Pareto Map, Histogram, Chart Control, Diagram Cause and Effect. Carpinetti [6] argues for the key techniques: QFD, Failure and Impact Analysis (FMEA), Six Sigma, 5S, DOE and Regulation of the Statistical Process (SPC). After 1977, the JUSE adopted the most important approaches and strategies for quality improvement: Affinity map, Link diagram, Data Factor Analysis, Tree Chart, Arrow chart [6]. Some discuss quality classification methods based on their insights: quality tools, for example: flow diagrams, diagrams of causes and effects, multivotes, affinity diagrams, life cycle management approach [7]. The reactive, constructive approach in classifying quality instruments is also a view in which quality instruments are divided into: Reactive instruments: tree collection, arrow choices, key element analysis (1), diagrams, histographies and lists of controls — link[8],[3] Reactive tools: partnerships, affinities and affinities.

It is safe to say that a range of major changes and stages have occurred in its development with the introduction of the Agile Techniques. Agile research is focused on research such as those carried out by Abrahamsson, HighSmith and Cohen as a reactive alternative to traditional, outdated approaches to project management [10][9]. Unfortunately, this approach only emerged from Agile in recent years, but it was longer agile. Larman and Basili[12] stated in their papers that they used iterative and progressive methods from the 1970s. Chiranjeevi Aradhya [11] describes critical safety of avionics systems using agile.

In his paper, Beck[13] stated that the model of Waterfall was first created to help and evaluate the needs of the user. The Waterfall model was aimed at resolving the shift in requirements by setting fundamental requirements and making no adjustments, but the requirements could not be defined in the first place, as practitioners had noticed [14]. Incremental and iterative methods have been implemented to address consumer needs to enhance the Waterfall model, but the concept of overlapping changes has also been adopted, in order to minimize development times while maintaining its key characteristics [15]. Before the

production process starts, specifications are often acknowledged but divided into parts known as increments. Templates that help to modify the requirements and manage risks, which aim to minimize the amount of time allocated, are currently being implemented. Every such increase is overlapped by a multipurpose effect that saves time. Although progressive development is intended to minimize the time it has been allocated for development, there are models that increase the management of changes in needs and risks.

## III. LIFE CYCLE MODELS AND AGILE METHODS

The project length and steps to complete are the life cycle of the project. The following considerations must be taken into account in terms of the life cycle of a project: the way of work to be performed, the anticipated success and participants. Five phases span the life cycle of a project management:

1. Project initiation: feasibility assessments will be carried out with a clear description of the project scope to decide more specifically whether the project is initiated or not. A charter or project initiation document (PID) sets out the intent and specifications of the project.
2. Project planning: project goals are identified at this level, targets are established, resources are allocated and the estimates are given. Some documentation at this point includes: Work Breakdown Structures (WBS), Gantt Charts and comments on the scope.
3. Project management: deliverability achievement, assignment of resources, management and execution of project managers, reporting system creation, completion and following up of activities, and, where applicable, project plan review. Management of Projects: The aim of this step is to ensure success and results are accomplished in compliance with the objectives identified and project managers use resources such as essential performance measures.
4. Project Performance: For a particular evaluation of the data, 2-5 KPIs (key performance indicators) should be chosen. The Budget and the checking if the project is already within the budget are another important factor at this point.
5. Closure of Project: This process takes place when items are produced and all activities completed. Evaluations would then be done to see what was incorrect and accurate in setting up the project, and to support the team members.

The cycle of life also known as the Device Development Life Cycle (SDLC) consists of six rather than five phases: iteration/component, design, transition/removal, output/retirement phase, design phase in Agile [13].

1. Design phase: business opportunities are defined during this phase, viability of project is assessed and feasibility studies are carried out.
2. Implementing / Warm up: process of funding and support, collaboration with project purpose principles stakeholders, team building, model structures and project forecasts.
3.Construction phase: The team maintains a close relationship, sets project goals as well as guarantees quality, results are ready to be tested at the end of each sprint and results are monitored and timed.
4. Transitional stage: a transition period for the "End Game" often appealed to when the approach was created, the final testing was done, the report was produced and the protocol was now in place. The consumer and team work - in the event that a product has flaws and planning - is additional tasks.
5. Implementation phase: At this point, everything concentrates on maintaining and allowing users to adapt and use the system (can include help desk activities). Operational staff at this level is responsible for operation and control of the system.
6. Remission: The retirement stage will aim to eliminate pollution from the manufacturing chain, especially due to the emergence and replacement of new outdated systems, while other reasons exist: the system either does not become obsolete or is no longer financed by the market.

## IV. INTEGRATING AGILE FRAMEWORK QUALITY CONTROL AND INNOVATIVE TOOLS

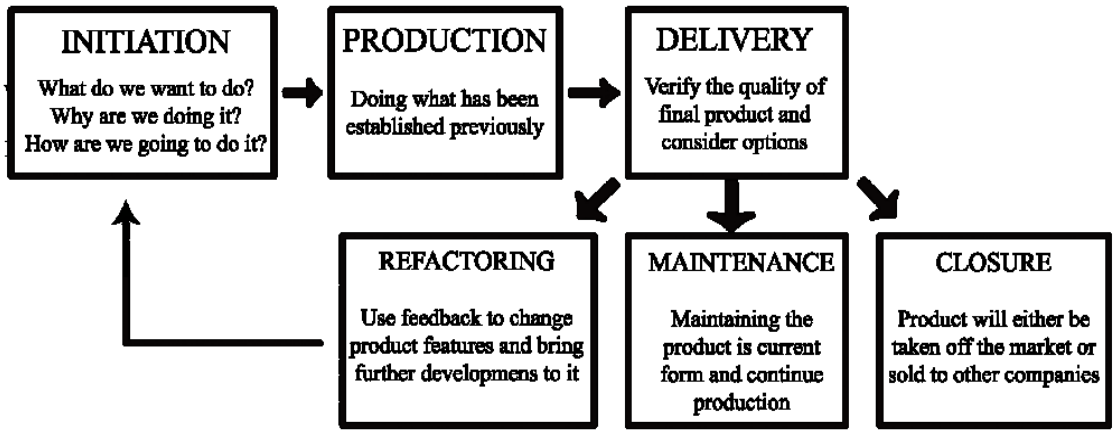


Fig 1: System Development Life Cycle for Agile Project

We have also suggested a new approach to the agile project management life cycle based on all research and the above and focused on the common Plan Do Check Act (PDCA). Similarly, we have only 4 phases in our model: start, build, deliver and repair.

In the initiation process the following tasks are performed: development of a business model, proposal for value, crowdfunding, market research, expected sprints and launches, choice of the right team members and minimum details. The development process focuses on tasks such as: execution and completion of missions by sprints; ongoing tracking, reporting and surveillance of stakeholders and customers.

The final version of the product is delivered to the general public and to stakeholders during the development process, receives input and determines the direction of the product. This phase is critical because it affects the future of the product as shown in figure 1. After completion of the process, there are three possible choices: end, maintenance or refactoring. We thought that restoration was the alternative and closer to the truth to this article.

Factoring optional: The refactoring process, which blends progress with product delivery and enables the team to take decisions flexibly, is likely to be the most critical stage in agile development. Taking their thoughts into account, the team answers customer suggestions and decides what to do next.

The primary objective of this method is to determine what is needed to change the present product before deciding. The creation process starts after the first stage of activation has been completed. In the agile development team environment, this cycle can be replicated as much as possible.

## V. RESULTS AND DISCUSSION

In three start-ups, the model proposed was used to track and report the performance, improvements and disadvantages that occupe Vitraly, Check4Green and Timetrak. The implementation process and the results we have achieved to date will be presented at each stage of the system development cycle. Vitraly is a smart business that makes it a normal mirror and a "double-agent" custom mirror. In addition to the restoration of the whole planet, it also displays widgets like clock, calendar, quotes, weather and so on.

Two physicists, two programmers and an economist sponsored the product. As was the case with two other start-ups, Freedcamp has been used as a free project management tool for Vitraly's project management. In this connection the team was created and the beginning members were invited to join the group of Vitraly project. The team held a brainstorming session that combined this approach with Random Feedback techniques during the starting process, which helps users to find so many correlations between related objects. And, even though the team already built an intelligent mirror understanding of these features and the product's strengths during informal conversations and experiences. The definition was not explicit. Multiple smart mirror features should be demonstrated during brainstorming, such as outside temperatures, customized posts, alarm settings and the display of widgets without a display, power savings, etc. All of these roles have been defined and translated into user history and tasks for every team member by each product owner. The team observed that it was little inspired to place the ideas on the Freedcamp website during the brainstorming sessions, even though they were then put on the panel to take time and little use. The owner of the product noticed this on the website following some recommendations and then worked for the scrum master and delegated them to the staff, indicating the time limits and resources allocated to them. The customers had subsequently clarified their needs. At this point, the team uses the 40-20-10-5 approach method to better and quicker illustrate the business model. This approach demonstrates that a person should describe a problem in up to 40 words. When discussing it they should reduce it to 20, 10 and five words. That is why the problem is rooted and solved.

In addition, during the development process, the product owner tracked how certain tasks were performed in real time, when they were timed properly, and the Kanban List was used to view the Freedcamp Platform task. Every time the new widget has been launched, it was published more directly to the public to collect and change the views of the end user. Freedcamp was not supported and changes in customer requirements and product functionality are not documented only as new tasks but only when old tasks have been completed and/or removed. In any case, this platform cannot be used to calculate the time a task takes if end user adjustments have an effect.

When the product is done, the distribution process begins – via a crowdfunctioning method, both the raising of funds for the further production and generation of the products and the retention of high input from crowdfunding customers. As the people liked the concept, but agreed to improve it more slightly, the team accepted to underwrite its refactoring process and determine what to sell in addition to the widgets and arrangements that they might adapt to a mobile phone. In the development cycle of this project, Freedcamp has proven to be a short term like the other two: Check4Green and Timetrak. The development team had to use a combination of quality control and the above-mentioned innovative instruments to meet these gaps and achieve its developed goals.

## VI. CONCLUSIONS

Offer us a much more realistic system development cycle inspired by the implementation and monitoring of the Plan-Do-Check-Act cycle, in view of Agile's principles, especially the one relating to less documentation and less useful working codes. As an agile product generated by a team stops and develops during and after development before a customer is shipped, it can be looped multiple times instead of providing a set start and end. The PDCA cycle

has helped build a model that describes more closely and in alignment with the Agile Manifesto itself the life cycle of the agile development environment.

In order to use this model for a project, each stage of the development process must be identified and then the next steps taken to each item are taken. During the initiation stage: PERT chart; benchmarking; kano; experimental design and flow charts. The quality tools can be applied. We should have: brainstorming; random inputs and expenditures in terms of innovation capital.

Approaches for production include: Gantt Chart; QFD; Arrow Chart; Eight fields and imaginative devices are: lists of kanbas, lists of starbas, fans and lists of spaghetti. Value devices such as: check sheets, diagrams, FMEA, Clever and innovation devices such as: Plus, Minus, Brainstorming; Triz and 5 Why's are circulated. Refactoring was the latest optional step. Innovative approaches have been employed for multidisciplinary applications, such as Six Think Caps, Future Wheels, Forced Relations, Process 40-20-10-5, etc. All is like this: Option of the matrix.

Moreover, we have introduced innovative strategies for and stage of development taking into account the polyvalence of innovation provided by agile trends, in order to be in line with the theory of development and easily tailored to and agile development team. The combination of a conventional quality management tool combined with new advanced techniques used to address problems and to guarantee quality enables quality assurance during production cycles to be managed and distributed.

## REFERENCES

[1]. P.B.Crosby, Quality is Still Free: Making Quality Certain in Uncertain Times (McGraw-Hill,1996)
[2]. K. Liang, Mod.Appl.Scient, 4, 9 (2010)
[3]. K. Ishikawa, Introduction to Quality Control (Springer Netherland, 1989)
[4]. A.Q. Press, Seven Basic Quality Tools (ASQ Quality Press, 2010)
[5]. R.H. Fouad, A. Mukattash, JJMIE, 4, 6 (2010)
[6]. L. C.R. Carpinetti, T.Buosi, M.C. Gerólamo, Business Process Management Journal, 9(4), 543-554 (2003)
[7]. Chiranjeevi Aradhya. "Utilizing lifecycle management system approach, boost airworthiness certification of software-centric avionics systems" International Journal Of Advance Research And Innovative Ideas In Education Volume 7 Issue 1 2021 Page 1583-1589
[8]. D.Cohen, M.Lindvall,. P.Costa, Advances in Computers, 1-66 (2004)
[9]. P.Abrahamsson, O. Solo, J.Ronkainen, J.Warsta, VTT technical Research Centre of Finland
[10]. (2002)
[11]. J.Highsmith., Agile Software Development Ecosystems, (Addison-Wesley Longman Publishing Co., 2002).
[12]. Chiranjeevi Aradhya, "Safety Critical Systems and Agile Methodology For Avionics Software Development", International Journal of Creative Research Thoughts (IJCRT), ISSN:2320-2882, Volume.8, Issue 12, pp.2461-2468, December 2020
[13]. C.Larman, V.R.Basili, IEEE Computer Society 36 (6), 47-56 (2003)
[14]. K..Beck, Extreme Programming Explained: Embracing Change, (Addison–Wesley, 1999)
[15]. K.Beck, Embrace change with extreme programming, 70–77, (IEEE Computer, 1999)
[16]. A.Cockburn, Cutter IT Journal, 6–12 (2002)