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Research paper



Agile Quality Management Framework in Construction Projects (AQMFCP)

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Abstract

In project management there has been a shift from traditional project management to the Agile Project Management (APM) style. The proposed Agile Quality Management Framework in Construction Projects will be built as a sequence of procedure that deals with a project from primary vision of project to the final delivery of project, will trace alignment and discover a contact between Agile and Traditional Project Management (TPM) concepts and find contact points among two of the more used Agile frameworks (scrum) and one of the more confirmed Project Management framework (PMBOK®) processes. This will result in a recognition of comparable areas between scrum and PMBOK® processes. Agile quality Management Framework is a new agile framework that covers the whole project lifecycle. The goal of the framework is to assist the project managers to adapt a more flexible approach to managing and implementing the construction project. The findings arrive that the agile project management using the Scrum methodology profits effectiveness procedures and a lower duration of process, ensuring value of quality planning and control inputs.

Keywords: *Agile, Construction Project, Scrum, PMBOK, Quality.*

1. Introduction

Construction projects are often large and complex and thus difficult to manage because there is a great uncertainty regarding them [1]. The complexity of construction projects is the main reason, why the construction industry is searching better ways of managing construction projects.

To enhance the challenging coordination, planning and control-work of construction projects, it is important to have efficient methodologies called "agile methodologies" which take into consideration that the projects are often initiated under large uncertainties.

In contrast to the traditional methodologies, the agile methodologies keep in mind that it is impossible to predict the future. supporters of agile approach think that it possible be more suitable for managing projects because it includes approaches to managing changes.

2. Research Objectives

The main objectives of this research are:

1. To find a bridge between Agile Project Management and Traditional Project Management approaches.
2. To develop a framework for the management quality of construction projects based on Agile principles.

3. Agile Project Management

"Agile is a collective term for methodologies (and practices) that have emerged over the past two decades to increase the relevance, quality, flexibility and business value of software solutions" [2], [3].

Agile project management is an iterative approach to plan and implement project processes. It is a set of tools and methods that are used in the development of software process, which are required for collaboration and integration between all parties through self-organization, planning, development and early delivery of the project. It is also the response to change [4].

Agile Manifesto reported that there are four values that Agile methods are built upon them. The value of Agile statements has been put to the right and the value of Traditional items to the left by many supporters of Agile methods [5], [6].

1. Appreciate the team members and the interaction over the tools and processes they will use for work.
2. Give priority to accessing a program that works more than to have a comprehensive or complete documentation.
3. Priority and preference are given to deal with the customer rather than negotiating the terms of the contract. So we want to consider this client part of this team.
4. Value and prefer to deal with change and interact with it to follow a specific plan.

4. Traditional and Agile Quality Management Differences

The quality approach with APM is that continuous feedback and recognition of customer changing perceptions are regarded as fundamental for delivery of quality [7].

we have summarized key aspects and differences between traditional approach and agile approach to project quality management as shown in the table (1) [8], [9].

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Table 1: Main aspects of traditional and agile project quality management approaches.

Traditional quality management	Agile quality management
Focused on delivery objectives of project	Focused on constant improvement of delivered projects
Adapts to establish requirements	Adapts to customer changing requirements
Mandatory to comprehensive documentation	Working project is important more than documentation
Monitoring progress through periodical meetings and reports	Monitoring progress through daily meetings and results
Defines criteria of working projects	Works with user stories
Reactive response to change	Proactive response to change
Sustainable development	Sustainable development
Complex solution	Simplicity is necessary
The best decision made by professional	The team gives self-organizing and freedom to choose architecture, requirement, and design
Power gives to the team leader	Power gives to the team members

5. Project Quality Management Framework

The proposed framework consists of three basic elements, as follows:

1. Project management office: it represents the basics of the methodology of the scrum as illustrated in Fig 1.
2. Group of project management process: it represents a PMBOK Guide process group (Initiation, Planning, Executing, Monitoring and controlling, and Closing).
3. Functions of project management: it represents a PMBOK Guide (Quality Knowledge Area).

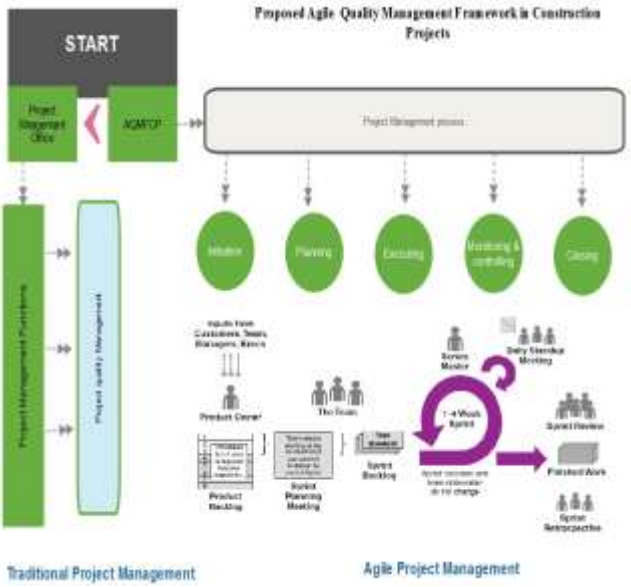


Fig. 1: Agile / Traditional –Quality Management

For quality management in the PMBOK® processes, we will determine which inputs you can receive from scrum. The input maps for each process will be graphically sketched and facilitated in some detail. The details of the proposed framework will be prepared by the researcher based on the most used agile methodology (scrum) as clarified in following paragraphs and shown in the figure (2).

Project quality management includes processes for planning, managing and monitoring project quality requirements to meet stakeholder objectives [10], [11].

Project Quality Management supports ongoing improvement activities for the benefit of the implementing institution. The project quality management consists of (3) processes to ensure the planning, implementation and control of quality requirements

In Scrum, "quality is the ability to finish project or deliverables to meet the acceptance criteria and fulfill the expected Work Value by the customer" [12], [13].

Quality is conformance to requirements. scrum, with its iterative and progressive approach, have some practices of quality assurance. Repeated deliveries, feedback, collaboration with customer and repeated reviews are some of the agile quality management practices specified in scrum model.

Agile methods require repeat and review quality steps throughout the project in lieu of at the end of the project.

To facilitate repeated and incremental delivery, agile approach concentrate on small work batches, combining elements of project deliverables as possible. systems of small batch aim at uncover conflicts and quality matters earlier in the project life cycle when the whole change costs are lower.

scrum has particular practices related project requirements of quality. From the Definition of Done to Sprint Reviews for Validity and Sprint Retrospectives for persistent improvement.

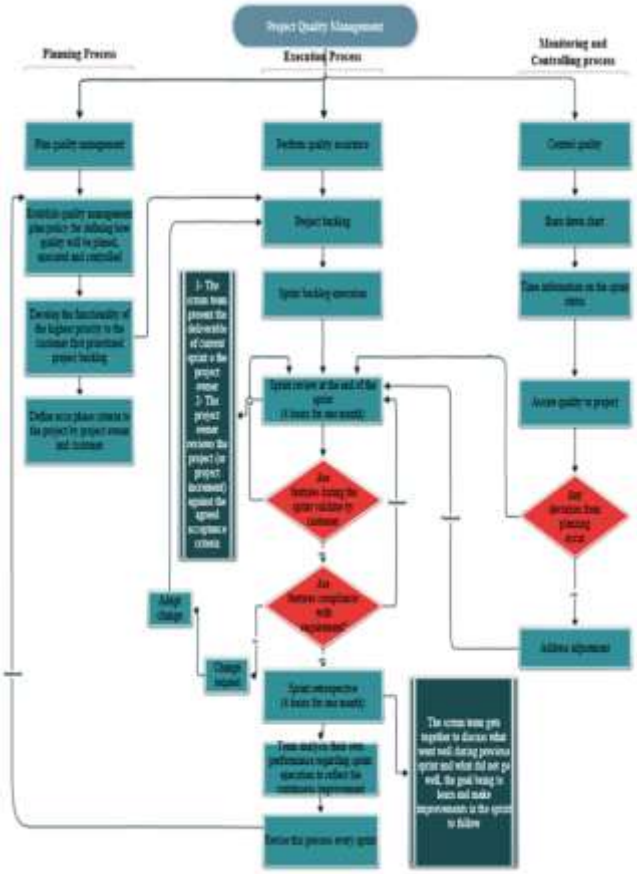


Fig. 2: agile quality management flow chart

Quality management plan will require to receive all the information necessary to determine how quality will be planned and implementation and controlled. One of the scrum principals is to improve the functionality of the top priority to the customer. Develop less attention features are in next Sprints or can be ignored according to requirements of the customer. This method gives the Team of Scrum the required time to concentrate on the quality of primary functionality.

Assurance Quality requirements of project are done by the iterative and incremental Sprint, which imposes the development of cycles sorting with effectiveness and fast feedback.

Perform Quality Assurance will get the information that implies to the implementation of activities aligned with the assurance of quality practices of the cycle of scrum.

The Sprint Review meeting at the end of each Sprint is a checking by the customer of the features during the Sprint. The meeting will imply compatible to requirements, and will also identify possible adaptations needed or additional work add to the Product Backlog (Change Request).

Within the Sprint Retrospective, the Team will analyze their own performance regarded the Sprint implementation. This exercise reflects the significance of continuous development through the Sprint cycle, and outcome in assurance activities quality for future Sprints. This process should be revised at every Sprint.
In Quality Control, will need to receive in this process the Sprint Burn down chart. This will supply real information of time on the state of t activities in sprint. Amendment should be addressed if variation occurs from planning.
Quality refers to whether a project works, and whether it fulfills the project stakeholders' needs. Quality is an ingrained part of APM. All twelve agile principles either directly or indirectly encourage quality. Those principles follow:

(1) Most priority is to the customer needs.
(2) Welcome changing requirements.
(3) Deliver working frequently.
(4) Business individuals and designers must cooperate daily.
(5) Projects Built around inspired team.
(6) Face-to-face discussion.
(7) Working project is the essential proportion of progress.
(8) Agile approach encourage sustainable improvement.
(9) Continuous awareness to technical excellence and best design promote agility.
(10) Simplicity
(11) Self-organizing teams.
(12) At uniform interims, the team considers on how to become more efficient, then modify its behavior accordingly.

6. Plan, Do, Check, Act (PDCA) Cycle

The Plan, Do, Check, Act- Cycle also defined as the Deming cycle or Shewhart Cycle [1]. Both the Deming cycle (PDCA) and Scrum Cycle are iterative methods that concentrate on continuous development. Fig. (3) shows the steps of the PDCA Cycle and their tailoring with various processes Scrum methodology.

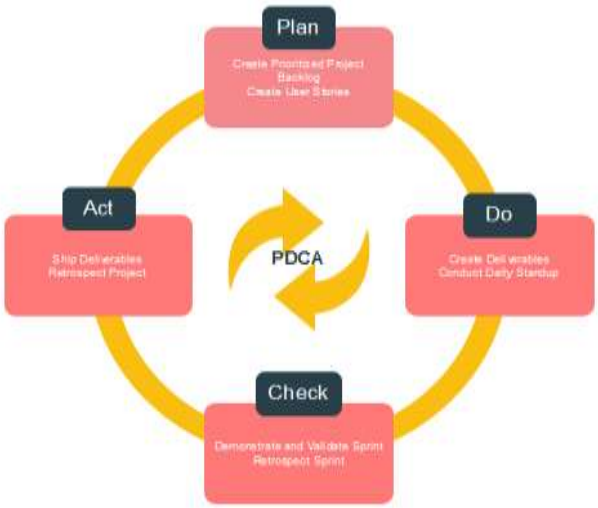


Fig. 3: PDCA Cycle in Scrum

7. Conclusion

The benefits of agile management of projects and specifically the Scrum methodology is the simplicity. agile management of projects is one of the most active means of improving the development cycle within the projects. By focusing in managing the projects on removing unnecessary process, and practice, the method makes it possible for all parties to remove administrative burdens and do productive work actually .
Every project has the process and style used to plan, implement, control, and close the project.
Quality Management benefit from scrum method the validation procedures and a less time of cycle, ensure quality planning and control of quality inputs.
quality management planning, quality assurance performing, and quality control receive high inputs from scrum.

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