

An Implementation of Agile Project Management in Construction Projects – A Review

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Abstract: The goal of project management is to deliver a project that fulfils the necessities and objectives of client's in the most efficient manner. However, it usually arises, that the client's objectives may still be unclear or though the objectives clear, but the requirements are unsteady. Due to such situations where changes may occur in project scope, specifications or maybe in final objectives, it is hard to implement the traditional project management methodology. Distinguishing this concern, new principles like Agile Project Management were developed, specifically for IT Projects, to deal with such dynamic scenarios. By the adoption of agile project management the construction sector also might benefit. A literature review has established that agile project management can thus offer necessary improvements that the construction industry might also potentially benefit. The agile methodologies are fitted for highly complex and unpredictable projects. It is also appropriate to work in agile ways when a project has changing situations, unclear specifications, complex project goals and results need to be achieved frequently or early in the project process. Using agile methodologies have various advantages over the classical methods employed for project management in construction projects.

Index Terms - Construction Project Management, Agile Project Management, Scrum Method.

I. INTRODUCTION

The construction industry is taken into account as a critical sector in the developing process of any country. The development of the building and civil engineering projects is one of the yardsticks for measuring the economic growth [4]. Due to the actual fact that construction projects carry plenty of risks, and unpredictable in nature [8]. Changes might arise at any time due to client dissatisfaction. Changes arising at any stage of the project might cause delays in all aspects of time, cost and resources of the project. As way of trying to deal with construction project management challenges over the year's traditional techniques of project management is being used for construction projects. However, due to weaknesses related with traditional project management approaches it's the role of construction professionals and project managers to take measurements for change management and satisfy the client needs.

1.1 Traditional Project Management

In the traditional project management method which is known as waterfall method the complete process are performed in a single continuous flow, with sequential steps [PMI]. The output from the first stage will be the input for the second stage and so on. Thus no changes can be considered in between the waterfall process as changes might lead to begin the work from the start and projects move further down the life cycle. This type of method will be best suited when all the scope of the project is well defined and clear.

1.2 Agile Project Management

Agility is the ability of organizations to adapt to constant changes, to adapt, to change rapidly, and to succeed in a rapidly changing, uncertain and turbulent environment [1]. Agile methodology is mainly utilized within the software development industry. Agile frameworks follow the iterative and progressive kind of development that dynamically adjusts to changing needs which enables efficiency in the project by reducing the delays and higher risk management. The concept of agility is applied by dividing the whole project into smaller manageable parts known as sprints and completing each sprint as a separate entity as interpreted in figure. 1 below and is continued until the project is completed. Several researches have been carried on the application of agile project management during the pre-design and design phases of construction projects. It appears application of APM is difficult in the construction phase [3].

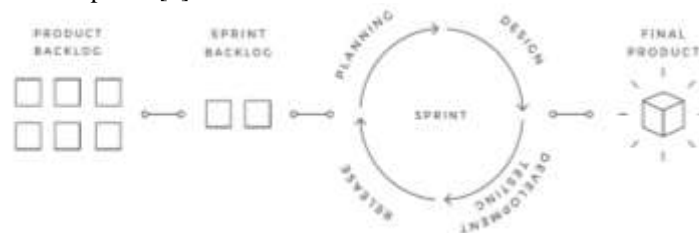


Fig – 1: Agile development cycle [PMI]

Some basic concepts of agility include [2]:

- Avoiding inflexible processes that can't be modified.
- Using short iterative processes allowing for improvements to be quickly enforced or failures to be identified before the final product.
- Emphasizing learning and continuous improvement.
- Identifying problems and weaknesses as soon as they occur.
- Implementing root cause analysis to determine the reason of issues.

- Dynamic processes to suit specific projects and goals.
- Specializing in continuous training and mentoring.

II. LITERATURE REVIEW

K. N. Mohammed and K. Syam Chambrélin (2020) in this paper author illustrated that finishing a construction project timely is challenging as delays can occur for various reasons. These delays might result in costly disputes and adverse relationships with project participants like contractors, consultants, clients, and material distributors. So as to tackle the issues due to changes, they have implemented agile management in construction phases which is employed in software industries to deliver the project on time and with the required quality. This paper describes the possibility and framework of sprint preparation for agile management that can be enforced to any organization with ease and in a stabilized way for the benefits. A case study was conducted in which the scope of the project was to construct a 2BHK flat with amenities needed by the client but during execution phase the customer required a change in the scope. Thus target sprint within which the changes required were identified and changes were implemented following the agile sprint planning. It was concluded that agile management has to be accepted in the construction industry in order to manage the change in construction projects. As in the case study by implementing sprint planning agile practice has managed the change arisen in the project. They also concluded that the design framework is only applicable in the planning and designing phase and few minor changes in the execution phase [2].

J.Sahaya Nisha and Gopika Krishna .S.A (2020) during this research literature study, questionnaire survey and case study analysis methods were followed to study the impact of agile management in construction industry. Two case studies were conducted to identify the factors contributing delays and also the areas where APM can be applied. Also two survey analysis were carried out the first survey adopted for this is construction work of the grade separator in a hospital infrastructure project at Kerala. The client for this project was The Kerala Government. The second survey adopted for this is the grade separator in a road infrastructure project at Tamilnadu. The client for this project was a town panchayat in Tamilnadu. From the Survey of project 1 and project 2, it was analyzed that client contributed a lot of to the delay reason throughout execution in contrary to the contractor from survey. The delay is mainly due to owner's slow decision making and owner interference that shows improper planning by the client. Thus Based on the information survey agile enablers or activators were applied which can cut back the delay or time overrun in the projects. This paper concludes that agile project management reduce the delay for about 70% to 80% as per the study based on survey in the two different infrastructure project. This modern management methodology can bring about reduction in delay achieving greater efficiency in construction projects [3].

Yasaman Arefazar et.al. (2019) this paper centered on distinguishing agile solutions to respond to changes quickly by exploring the literature in fields of agility and agile project management in construction projects. During this regard, 10 agility strategies were considered to deal with the changes and improve the overall performance of the construction project as expressed within the paper. The aim of this study was to prioritize agile enablers based on their potential effectiveness on facing most crucial changes in construction. It was concluded that the foremost critical causes of changes in Iranian construction projects according to the results, the client was considered as the main cause of change in the construction project's lifecycle, and an increase in the price of materials due to economic fluctuations was recognized as the only major external cause of changes. This study additionally concludes that some agile project management methods might be more practical than others in terms of managing possible changes within the construction process [4].

Maulik Pareliya (2019) the main aim of this research was to carry out on-site scenario during implementation of an agile project management. Three different projects as 12 storey commercial towers at Ahmedabad, 9 storey Hotel Building at GIFT city, Gandhinagar, and 18 storey residential tower at Ahmedabad were taken into consideration for case studies.

Following types of quantitative analysis were performed on the data gathered from the sites:

- (I) Progress using SCRUM vs. Actual planned progress (Burn-Down chart),
- (II) How to cut back delayed work over given execution time period?
- (III) Comparison of Case studies in term of following strategies, tasks for reducing delay and progress.

This paper concludes that project uncertainty and risk will be decreased by the implementation of agile project management approach in construction phase. It will facilitate with activities planning throughout the construction phase and focuses on decrease in delay by scheduling, using time management, daily scrum meeting, sprint retrospective meetings and increasing both employees motivation and client's involvement [5].

Gopika Krishna. S. A (2019) the objective of this paper was to study the different literatures about agile management and identify the use of agile management in construction industry. It concludes that agile project management is the advanced type of technique instead of the traditional waterfall method used for construction project management. It was stated that using agile project management in construction can reduce the construction delay and uncertainty in the construction projects with better customer satisfaction. The time overrun can also be reduced in construction work. In India 90% of government infrastructure projects are delayed, thus agile management can also be enforced for highly complicated government projects. This paper concluded that agile methodology can be used complex projects and it can facilitate to scale back the delay within the construction projects [6].

Aakanksha Ingle (2019) this study was carried to establish the applicability of scrum meeting and scrum roles in construction project management. This research is focused on improving the systematic methodologies to study the Scrum method designed for software development sector has to be defined to comply with construction industry. Artifacts, events, and the roles of scrum framework shall be connected to the stakeholders, group meetings, and documents applying in the construction projects. This paper concludes that for the construction project management, the APM is actually an unusual word to nearly all stakeholders just because all construction projects practice the TPM (waterfall management). Therefore the iterative approach as scrum methods

in APM is actually a tough task to integrate in constructions projects. Thus the agile management strategies to be made familiar first then can be enforced [7].

Kanishka Sahni and Melvin Mathew (2018) in this study author developed the relationship between customer value and the frequency of requirements, interactions, and deliverables for a Project. The core methodology of this study is to form this concept of “Customer Value Pyramid”. It supported interviews with clients, senior project managers, project management specialists and the collective expertise of authors within the domains of construction industry. The paper focused on introducing for the construction projects, providing client the visibility of the real-time status of project coupled with the impact of the changes on project time and cost. The study doesn't intend to create a disruption but aspires for an evolution that brings to life the impactful application of agile project management in construction projects. This research concludes that a successful implementation of such an approach will not only provide intangible advantages of client satisfaction, empowered teams but also a tangible profit that can range up to 5% of the project cost resulting a win-win scenario whereas additionally making a culture of welcoming change in construction projects [9].

Divakar.K and Ashitha.E.V.R (2016) author describes that it seems to be challenging tasks in completion of large-scale construction projects on time. In India it has been observed that about 90% of government infrastructure projects fail to complete on time. This in turn decreases the potency of the project in terms of traffic issues, poor safety, affecting the environment etc., agile project management (APM) is an interactive and progressive methodology of management that is applicable for extremely versatile atmosphere. Agile methodology decomposes the project into smaller manageable components and finishing these components with greater delivery value to improve the reliability of project delivery. This paper adopted literature study, data survey and case study analysis to develop a suitable framework for the application of agile methodology in the construction of infrastructure project. This paper states that as per literature studies the developed agile framework is probably going to reduce the time overrun in infrastructure project. APM is alleged to reduce the delay for about 60% to 80% as per various literatures in software industry and this framework will facilitate to attain the same within the construction [10].

III. CONCLUSION

As per the literature review, there are certain dissatisfactions and failures are experiencing in traditional project management (TPM) approach. The literature says that the cost overruns and time overruns are the prime challenges with traditional project management (TPM). The client who is the ultimate owner of the project is overviewed the output at the end of the entire project. Therefore it is difficult to revise or alter the project even the client may need to feature or omit his needs to or from the project.

The agile project management (APM) is an iterative approach that is feasible to review outputs within the predefined time interval to the product owner (Client). Also, the product owner and the team are able to review and make refinement to the client needs and order of desires at predefined intervals. The ultimate project goal shall be the satisfaction of all stakeholders of the project. Therefore it seems more user supportive approach.

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