Utilization of Agile Management in Construction Industry

Gopika Krishna. S. A
PG student
Department of Civil Engineering
Arunachala College of Engineering for Women, Manavilai, Kanyakumari, India

Abstract:
Agile methodology is a type of project management process, mainly used for software development, where demands and solutions evolve through the collaborative effort of self-functional teams and their customers. During the past few decades, fundamental changes have taken place in project development, planning, and execution. This has taken from with embracing new techniques such as various agile project management, instead of using the traditional waterfall project management. It is mainly suitable for complex project, where there is delay in construction projects & final deliverable in advance. Construction delays are a common phenomenon in civil engineering projects. There are many reasons to delay in construction as pre-design, design and execution phase. It leads to time overrun in the construction work. Completion of construction projects on time seems to be challenging tasks in large-scale construction. It has been observed that about 90% of government infrastructure projects fail to achieve on time completion in India. Time is a major factor in construction and on time completion will bring about many benefits to the client, contractor and the society. This paper will study the 13 case studies about agile management in construction industries in different areas of construction works. Also will find out the scope of agile management in construction industry in future.

Keywords: agile project management, scrum, execution phase.

I. INTRODUCTION

Agile project management has its roots in the software development industry, and it has developed through empirical progress. This methodology’s uses are not limited to that industry. It defines values and principles that can be adopted by other industry as well. Moreover, it includes different tools and methods of conducting a project, which will lead to follow its values and principles. The agile methodologies are widely used by the software development industry where the customer recognized his need and improving it by repeated tests. A traditional concept of management, the responsibilities and authorities are defined in a hierarchy so if a middle level chain is broken than the ground level subjects are failed. In agile concept, the basic belief is to keep all responsibilities & authorities on the same level such that even if there is a failure in single subject, the remaining subject can work efficiently in their sectors. Utilizing agile methods to develop and implement systems has improved the speed in which companies meet market demands. Given the relative newness of the agile project management approach, some research exists, but much more is needed to understand how the backbone components of agile project management can be used in a construction project development process.

II. AGILE PROJECT MANAGEMENT IN CONSTRUCTION

Application of agile project management is mainly seen in software industry which follows an iterative and incremental method which assures efficiency in the project by reducing the delay. Many researchers have been done on the application of APM during the pre-design and design phases of construction projects. It seems application of APM is laborious in the construction phase. The concept of agility is applied by dividing the entire project into smaller manageable parts and completing each part. Some basic concepts of agility include

- Avoiding inflexible processes that can’t be changed
- Using short iterative processes allowing for improvements to be quickly implemented or failures to be identified before the end product
- Emphasizing learning and continuous improvement
- Identifying issues and weaknesses as soon as they occur
- Implementing root cause analysis to determine the cause of problems
- Changing processes to suit specific projects, goals,
- Focusing on continuous training and mentoring

III. SCOPE AND OBJECTIVES

The objective of this paper is to study the different literatures about agile management and identify the utilization of agile management in construction industry

The scope of paper includes

- To study the traditional project management and agile project management principles related to construction industry.
- To study the effect of agile management in construction industry

IV. LITERATURE REVIEW

Literature survey aimed to identify the effective utilization of agile management in construction industry. The report “Is agile project management applicable to construction” was written by robert owen &lauri koskela, university of Salford (2006), briefly summaries the evolution of Agile Project Management (APM) and differentiates it from lean and agile production and ‘leagile’ construction. The significant benefits being realized through employment of APM within the information systems industry are stated. The characteristics of APM are explored, including: philosophy, organizational attitudes and practices, planning, execution and control and
learning. Finally, APM is subjectively assessed as to its potential contribution to the pre-design, design and construction phases. In conclusion, it is assessed that APM offers considerable potential for application in predesign and design but that there are significant hurdles to its adoption in the actual construction phase. Should these be overcome, APM offers benefits well beyond any individual project.

An another report “Agile construction project management” written by r.l o w e n , l. Koskela, the research institute of the built and human environment, the university of Salford, Project management in the information systems industry has had a poor record of delivering value and has consequently seized upon the recent evolitional of agile project management. What is meant by agile project management, from whence it originated and whether it has further applicability are not widely understood. The construction industry also has a less than perfect project management record and might benefit from the adoption of agile project management. In order to resolve to an agile theory, the underlying rationales for agile have been explored, leading to the identification of further promising research

Prof. Divakar.K And Ashitha, CIT, Coimbatore, is the authors of the paper “Application of agile management to reduce the time overrun in the construction of infrastructure project” was discussed two case studies. Time is a major factor in construction and on time completion will bring about many benefits to the client, contractor and the society. Agile Project Management (APM) is an interactive and incremental method of management which is applicable for highly flexible environment. Agile methodology has been found to improve the reliability of project delivery by decomposing the project into smaller manageable parts and completing these parts with greater delivery value. This paper is about developing a suitable framework for the application of agile methodology in the construction of infrastructure project by adopting data survey and case study analysis. Two case studies about road construction delayed 3 years each other.APM is reduce the delay for 60% to 80% in construction industry.

The report “Implementing agile project management approach in the development of building projects” was written by Auliik Pareliya, Cept University, Ahmadabad (2018) researched, what are the opportunities and benefits to implement an agile project management approach in the construction phase (execution phase) of any building project. This Research is conducted PSP projects Ltd., case studies are chosen from their projects. The results was APM in construction phase project will decrease uncertainty & risk and Decrease delay by scheduling, time management, employees’ motivation and client’s involvement.

The report “Agile perspectives in construction projects-how to improve efficiency in the design phase” written by kth, abe, real-estate and construction management, holmgren, linnea (2014), research looks into how agile methodologies can make the program and system stages, of construction project, more efficient and thereby increase the client satisfaction. In this project dividing each stage in to shorter cycles, it is easier to keep the goal focus through whole project. The Cost of making unwanted changes becomes decreased. The client’s involvement and client satisfaction positively

The report” Agile project management in the construction industry-an inquiry of the opportys that unities in construction projects” was written by mattias yllen Johnson, he says that Agile project management approach evolved from the software industry where it has grown and developed through empirical progress. It is suited for large complex projects where it is difficult to specify the product in advance. This thesis has researched what opportunities there might be in implementing the Agile project management approach in the design phase of construction projects. The major advantages found with implementing the agile approach is an increase in the client’s involvement. It can also decrease uncertainty and improve risk management

An another report” implementation of scrum in construction industry” was written by Thomas Streule,Nino Miserini, Olin Bartlome,... Institute of structural (2016). This paper investigates the implementation of a framework from the IT sector into the construction industry: Scrum. Conducting a case study, the implementation and application of Scrum was analysed through the evaluation of its different artifacts. This research covers the following questions: Can Scrum be implemented in the design phase of the construction industry? What adaptations are needed to use Scrum to improve the design phase of construction projects? How and where could Scrum, or parts of it, be used by the design and planning departments of construction companies? The results from this study show that Scrum has great potential in the design and planning departments of construction firms. Finally, this paper gives recommendations about the use of Scrum in the design phase and proposes an outlook to implement Scrum in other phases of construction projects.

In the report “Framework of agile management’s sprint planning construction projects -AFD method” was written by Blessie John, AP, care school of architecture, Thiruchirappalli (2018),this paper discussed that, Though the Construction project management field is persistently developing, the construction industry with its unique nature is facing time-cost overrun during the execution phase. AFD means, in each meeting approval (A), Finalisation (F), Discussion (D) has to be carried. With an ultimate goal of delivering projects on time, within estimated cost and approved work orders, an Agile’s framework for execution phase is established. Also as in IT industry, the structure of Sprint meeting is developed to ease the performance to obtain effective results in the construction project management field.

The report “Scrum in construction industry to improve project performance in design phase” was written by yingchenliu, Harrisburg University of science and technology(2018), in this paper researches the implementation of scrum (a framework of agile project management) from the IT field into the construction industry by means of case study, personal interviews, & literature review. Agile management creates a work environment with transparency and increase the share of real time information and feedbacks. Since the people become more aware of their responsibilities, task, and goal, the deliverables are better product. The thesis also includes the recommendation section to provide the suggestions for the future researches

The report “Feasibility in applying agile project management methodologies to building design and construction industry” was written by Roy S.Morile, Harrisburg University(2017), in this paper research and illustrate what is involved with the process of adopting and transforming companies from traditional to the agile methodology and will explain the benefits, the hardships, and other components relevant to
illustrate what needs to take place in order to implement agile in the construction industry, as well as layout possible solutions that can ease the adoption process. Using Kanban visualization techniques, the team’s processes will become quicker and more effective in order to carried out the various tasks.

The report “Defining and evaluating agile construction management for reducing time delays in construction” written by fei Han, Beijing university of technology(2013), china says that both competitive market forces and growing societal needs have triggered the demand for rapid delivery of construction projects, or at a minimum, for projects completed on schedule. However, schedule delays are common and recurring in construction, inevitably resulting in rework, cost overruns and legal claims. In this paper, a case study is conducted investigating how much delays could be reduced if the agile enablers were validated. Validating agile construction management in four layers. Delay control, rigidly set plans, framework of AGM & future study.

Another report “Agile project management in the design stage” written by Alex Ekstrom(2016), Emma Patterson, royal institute of technology. This paper is performed with a qualitative research approach. Literature review, interview and survey, finally concluded the answers on research questions. The use of agile project management is seen to have greatest outcomes, if it is used in the design team by the designer. It reduces risk for big and costly retakes. The thesis concludes that project management methods within construction projects are not as rigid as it is described in the literature.

The paper “Managing risk and uncertainty in an agile construction environment: application of agile building specialist model” written by Malik M.A. Khalfan, Peter McDermott And Michael Dickinson Salford Centre For Research And Innovation (Scri), University Of Salford (2019), The study focuses on managing risk and uncertainty in construction project due to the owner dissatisfaction in project outcome and dynamism within agile construction environment. The paper identifies some areas in supply chain processes which are pointed to greater risks and uncertainty. The paper concludes that the involvement of the agile specialists mitigates against risks and uncertainty, enhances the project quality and permits a modular approach to design that permits the use of experts’ knowledge in design and construction. The agile specialists approach is more applicable to building projects where prefabricated elements and standardised materials are used as well as to large and complicated building (and infrastructure) projects.

V. CONCLUSION

Agile project management is the advanced type of method used for construction project management instead of the traditional waterfall method. It can be reduce the construction delay and uncertainty in the construction projects and also give better customer satisfaction. It also reduces the time overrun in construction work. Agile project management is mainly used in complex projects. In India 90% of government infrastructure projects are delayed. So the APM can be choosing for the highly complex government projects. It can be use any phase in the construction works like design, execution...Etc. In this paper i studied the journal papers about the agile management and I understood the effective use of agile management in construction industry in different phases.

This paper is concluded that agile methodology can use complex project and it can help to reduce the delay in the construction projects

VI. REFERENCES

[3].Alex Ekstom,Emma Patterson (2016)"Agile Project Management In The Design Stage”, Royal Institute Of Technology, Pp.1-51
[7]. Cory Peter Mcdermott (2009)”The Future Of The Construction Industry And The Implications Management And Education “Iowa State University, Pp.1-107
[15]. Jeff Totten (2017)”Critical Success Factors For Agile Project Management In Non-Software Related Product Development Team”Western Michigan University, Pp.1-140


[21]. M. Naim1, J. Naylor2, And J. Barlow()” Developing Lean And Agile Supply Chains In The Uk Housebuilding Industry”Iglc-7,University Of California,usa.Pp.159-170


[27]. Michael Jerrod Myers(2014)"Implementation Of Agile Project Management In Class Room”, University Of South Carolina,Pp.1-43

[28]. Milind Padalkar "Using Agile In Construction Project: It’s More Than Methodology”, Im,Kozhikode,Kerala,Pp.1-10


[34].Project Management Institute”Agile Project Management Approach”

[35].Qian Chen, Georg Reichard And Yvan Beliveau(2007)” Interface Management – A Facilitator Of Lean Construction And Agile Project Management”.Pp.57-65


[37].Rafaelcarlosanddanielc. Amaral ()"Frame Work For Continuous Agile Technology Roadmap Updating “SãoCarlos school of engineering (Esc),University of sao paulo(Usp), Sãocarlos/Sp,Brazil.Pp. 321-336


[41]. Selim Tugra Demir, David James Bryde, Introducing Agilean To Construction Project Management.


[47]. Tomas Gustavsson “Benefits Of Agile Project Management In A Non-Software Development Context”, Karlstads University

[48]. Yingchenliu(2018)” Scrum In Construction Industry To Improve Project Performance In Design Phase”Harrisburg University Of Science And Technology,Pp.1-41