**Role Played by Agile Methodology in Project Management and Software Development**

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**Role Played by Agile Methodology in Project Management and Software Development**

# **1.1 Introduction**

Project Methodology has been considered as a system of prediction, collection, and corrective performance. In this case, the concept encompasses the set of practices and for organizing the required activities to complete the project activities. Agile project management is an iterative approach used to deliver projects throughout its lifecycle. Ideally, agile project methodology lifecycle comprises of several iterations that must be followed to deliver the required software products. One of the main aims of agile methodology is to benefits throughout the whole lifecycle rather that at the end (Shastri et al., 2021). The application of agile project management methodology is based on the premise that it exhibits core values and behavioral trust, flexibility, and collaboration. The application of this methodology is geared towards delivering maximum benefit against business priorities in terms of timeline and project cost. The concept of project management comprises of the operations that include the stages of defining the requirements determination of work level, allocation of the required resources, executing the project activities, monitoring the progress, and regulating the project plans. Agile software development is a wide methodology, that comprises of different approaches in which requirements keep on evolving (Christou et al., 2009). The evolvement of agile methodology is based on a collaborative effort of cross-functional team members as well as end users. The methodology advocates od evolutionary as well as adaptive planning. Furthermore, agile software development is known for continual software development and facilitates flexibility and responsiveness to changes.

Notably, with the adherence of agile methodology that is connected with values defined in the agile manifesto, most of key project activities that are involved in software development are either not implemented or have explicit definitions. Therefore, project management activities as involved in these methodologies are somehow distinct from disciplined software development methodologies such as waterfall-based methodology and Rational Unified Process (RUP). Ideally, this is mainly due to disciplined methodologies have tried to define or the required activities, such as project management activities unequivocally. The rationale behind the application of Agile Methods is to eliminate any existing complexity and resolving the challenges relating to lack of clarity relating to the project requirements and risks within the project. This paper aims to discuss the role played by agile methodology in project management and software development.

# **1.2 Background of the Study.**

In providing the solutions based on the problem domain, the use of appropriate software development methodology is paramount. The principle of Systematic Literature Review (SLR) focuses on the review of the work conducted under the study subject. Hence, conducting SLR will be paramount when investigating the results analyzed for the previous studies accurately. In this study, only the most critical method and common citations will be used in extracting the related studies. Nevertheless, this might amount to the neglect of the studies that have been intermittently published in other sources. Ideally, project management has been traditionally defined as multifaceted process that can amount to the successful implementation of the project in different aspects, which include planning, projecting costing and cost control, and quality assurance during project implementation (Gandomani et al., 2020). Notably, the foundation of OMI is established as manifestation of the project management specifically in the real-world. Nonetheless, various challenges have been identified and reported in this domain. The most common challenges are connected to project planning, cost estimation, and other issues introduced by PMBOK. Additionally, it appears that the techniques introduced by PMBOK are not enough in controlling and achieving project success.

The individual-based values have been properly addressed under the new parameters in directing and managing the projects. Therefore, project managers have been recommended to take advantage of the project team in the development of such projects. Traditional project management describes different plans and disciplined methods that are not applied in software development whenever the development methods are needed for iterative lifecycle. Mostly, this occurs when software development team have adopted Agile methods, particularly in their projects. In this case, Agile project management would be the best choice. With Agile project management, the method is geared towards defining the key elements applicable in traditional project management. Such elements are visually controlled with high performance teams. Test-driven development, collaborative team, leadership, and collaboration development. It is worth noting that with agile project approaches, it becomes easier to resolve issues that organizations come across relating to delivering the product based on the needed timeline, budget, and quality of the project. The question that arises in this case are based on whether agile project management approaches can be adapted or imported to PBMOK. The response to this question is nearly positive. In fact, various Agile related projects can be conveyed to project management best practices especially those relating to PMBOK guidelines.

Based on the division of Agile managers agile resource managers and project managers, the duo work together to ensure successful completion of their projects at hand. This study introduces Agile approach where there are some roles that can handle project management roles. With the deep focusing on rational factors has been evidently addressed as the main reason for the failure of the most projects (Gandomani et al., 2020). Agile project methodology seems to be the best choice for most of the companies; it is not only applied by software companies but also adapted by those companies that are non-software. Nevertheless, there have been little effort spent on how to apply Agile project management, especially in software projects and its specific roles and responsibilities.

# **1.3 Problem Statement**

# **1.4 Objectives**

## **1.4.1 General Objective.**

* To undertake a comprehensive research on the role played by agile methodology in project management.

## **1.4.2 Specific Objectives**

* To understand how agile methodology is implemented in software development and project management.
* To understand how agile methodology relates to Scrumban and Kanban.
* To analyze the performance indicators of the information systems using Agile methodology.
* To analyze the cons and pros of using Agile methods in project management and software development.

# **1.5 Research Questions**

* What is the role of traditional software development in relation to project management perspective?
* How is Agile methodology implemented in software development and project management.
* How does Agile methodology relate to Scrumban and Kanban?
* What are the performance indicators of the information systems using Agile methods?
* What are the pros and cons of suing Agile methods in software and project management?

# **1.6 Significance of the Study**

By undertaking this study, it will be paramount in providing a comprehensive understanding on the application of agile project methodology in project management and software development. This study will also provide hands on experience in the application of Agile methodology in handling projects medium-size and large projects in the organizations as well as enhancing collaboration and teamwork in project implementation.

# **Chapter Two**

# **2.1.1Literature Review**

In this section, the goal is to present literature review of different materials which traces the evolution of traditional software development approaches, the role played by the project manager, introduction of agile methods, within the project management and software development context, and introduction of Agile approaches in the software industry. This review is geared towards assessing the literature revolving around Agile in project management and other approaches connected to it.

## **2.1.1 Traditional Software Development**

The traditional methodology under review in this case is Waterfall, which is specification-driven approach that is pigeonholed by extensive planning, detailed requirements, upfront requirement gathering, among others. Ideally, Waterfall methodology integrates different aspects of traditional project management approach, which include sequential arrangements of different software different steps which put emphasis on far-reaching phase-based approach. The main criticism which has been identified with this methodology is associated with poor flexibility to changes within the project environment. The fact that sequential Waterfall methodology does not fit well into vacillating software development setting, this amount to spiral alternate model as proposed by (Shastri, 2020). Ideally, this model focused on solving the issues relating to risks involving the customer within the development process.

## **2.1.2 The Traditional Project Manager.**

The earliest conceptualization in the project management was coined by Gaddis in 1950’s as a way of managing of professionals. However, there has been an advancement in the recent past with the introduction of PMBOK, which provides the definition of the project management concepts. PMBOK defines project manager as a person who is assigned by the performing organization in leading the team that is responsible in delivering the project objectives. Understandably, a project manager is envisaged as a link between stakeholders and project team. In the recent past, there has been an increase in the demand for the project managers from different industry. This is reflected in the proliferating membership of professional organizations, which include PMI and a surge in their membership that holds project manager certifications.

## **2.2.3 Agile Software Development**

The application of agile methodology has significantly been adopted in software development as well as in project management. Agile software methodology focuses on the development, where the demands and solutions evolve based on the collaborative effort of the project management team and its customers. The method is considered to be one of the modern approaches applicable in software development, which advocates on adaptive planning, evolutionary development, continued development as well as encouraging flexibility to change. . Agile software development methodology is the umbrella term used to describe set of incremental and iterative software development approaches such as Scrum, eXtreme Programming, dynamic development, and future driven development. Ideally, Agile software and project methodology has a clear response to people and rapid response to changes. In the past decades, the application of agile methods in project management has been extremely rapid within the software industry globally. Based on the recurring based nature of agile survey, Scrum was identified as one of the most commonly used approach. In one of the recent iterations of the survey, 58% of the participants affirmed that their projects applied Scrum methodology, which they considered as a standalone methodology. Additionally, based on this survey, 7% of the respondents talked about using Kanban and XP (Siddique & Hussein, 2016). While Scrum put more focus of the project management aspects of agile which include project estimation and planning, eXtreme programming focuses on development practices which include test-driven development.

In the recent past, there has been a blossoming research associated with large scale agile. This is considered as part of reflection of the rising need in the software industries on the clear guidelines relating to implementation of agile methodology especially in large projects with multiple teams. Loiro et al. (2019) in their systematic review of literature have stated that large scale agile comprises of software development organizations with 50 or more individuals or at least six teams.

## **2.1.4 The Project Manager in Agile Software Development**

In Agile Software Development approaches such as Scrum, Kanban, XP, among others the role of project manager in the project management is crucial. For the case of Scrum, it has introduced two additional roles which are product owner and Scrum master (Papadopoulos, 2015). Notably, product owner is the customer representative whereas the Scrum master is predominantly the internal facilitator. eXtreme programming has introduced new roles which include tester, consultant, tracker etc. Industry surveys and recent research affirm on the continued application and role of the project management in agile projects. Additionally, putting recognition on the co-existence of the project managers with the organized agile project teams. As a project manager, the key focus is on collaboration, stakeholder management, and coaching of project teams. A considerable research undertaken has been geared towards checking various aspects of agile teams. Siddique and Hussein (2016) in their recent research have addressed the issue of conflict in the project teams from project management perspective ascribing it to lack of enough experience and customer involvement within the project teams. Ideally, the consequences of such conflicts can lead to dropping in in the productivity as well as motivation.

## **2.1.4 Relationship of Scrumban and Agile Methodology.**

Agile software development is a wide methodology, that comprises of different approaches in which requirements keep n evolving. The evolvement of agile methodology is based on a collaborative effort of cross-functional team members as well as end users. The methodology advocates od evolutionary as well as adaptive planning. Furthermore, agile software development is known for continual software development and facilitates flexibility and responsiveness to changes. Since agile project management methodology is wide, this paper solely discusses scrumban approach, which is an essential approach, in meeting the needs of the teams that aims at minimizing the batching of work (Alqudah & Razali, 2018). Based on agile project management approach, scrumban approach has been identified to have various benefits, while other studies have criticized this approach. This research assesses both the benefits and limitations of scrumban, as retrieved from various journals.

Various studies have discussed various aspects of agile project methodology, which forms part of today’s literature. According to Oivo & Liukkunen (2016), scrumban is an advancement of SCRUM and its major focus is to reduce time wastage thus adding value for the product designed for the customers. According to the research done by Elvadas (2015), the project management team, looks for ways that can lead to the improvement of the processes made by the company, especially in the line of software development. As such, in the past few decades, so project management as well as software development, has been shifting from waterfall methodology to agile software development.

With the stepwise refinement of agile approaches to produce better solutions, establishment of Scrumban has been identified to be an approach that can yield many benefits. Further studies indicate that Scrumban is a hybrid of Srum and Kanban, which can produce an approach with high applicability as well as versatility. Oivo and Liukkunen (2016) affirms that the approach facilitates regular feedback in every iterative process. The popularity of Scrumban approach in the today world has been as a result its ability to increase the efficiency, especially in project management. The rationale behind increase in efficiency is because the method meant to minimize the wastage of resources. According to Elvadas (2015), the advantages of this approach are derived from the combination of Scrum and Kanban. Moreover, Scrumban reduces the overhead stress for the project management and for the whole of the development team, thus increasing the efficiency as well as the overall customer satisfaction.

# **2.2 Pos and Cons of Agile Methodology in Project Management and Software Development**

## **2.2.1 Cons of Agile Methodology in Project Management and Software Development.**

* Agile methodology offers flexibility and adaptability. Automation of business processes may require changes to be made; hence this method is ideal for such as automation.
* The methodology facilitates creativity and innovation. In automating business processes, it is worth noting that in the competitive world that we are living in today, a high level of excellence is needed to develop the right products.
* Improved quality is another merit. In agile methodology, quality is an integral part of the software development process, as compared to a sequential process.
* The method also offers a higher level of customer satisfaction and solutions due to their involvement and providing feedback in the development process.

## **2.2.1 Cons of Agile Methodology in Project Management and /software Development**

* Integration with project management- The methodology may not be completely appropriate for the projects requiring a more plan-driven approach in achieving a specific level of predictability (Cobb, 2019).
* Organization transformation- Agile methodology require specific level of organizational transformation for the whole approach to become successful.

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