BE605: Take home Exam Submitted by Yash Tiwari
Student ID: 20911298

Question:1

Project management plays a very vital role in the successful completion of the project. There are different ways to proceed with the execution of the project plan amongst which we are focusing on predictive and agile methodologies/ approaches.

To understand the differences between these models, we first need to understand their workflow. The predictive methodology, also known as the waterflow method, focuses on planning and analyzing the project's future in-depth for anticipated risks. It relies on an early phase analysis and a detailed breakup of features and tasks for the entire development process. In this traditional model, we determine the critical path and standard timelines to complete tasks, dependencies between tasks, and the projected completion date. It is a very rigid model since the tasks get activated only when the previous tasks are completed, and it is quite challenging to change the direction of the project if something goes wrong. The Agile methodology is an iterative model where the entire project is split into sprints (a sprint consists of a specified number of tasks), and the product is delivered after each sprint. The difference between these models are as follows:

- Agile is an iterative/ incremental approach whereas predictive method is a sequential design process
- Agile is a flexible method that allows changes in the project requirements even if the initial planning has been completed. In predictive methodology, there is no scope for changing the requirements once the project development starts.
- Agile is customer-centric which satisfies the needs of its end customers and changes itself as per the customer's demands whereas the primary focus of the predictive model is to accomplish the project
- Agile requires a high degree of coordination and synchronization for project execution whereas synchronization is very limited in the predictive approach.
- Budgeting in agile is not fixed as the cost might change as per the new demand, which might be stressful. The price almost remains fixed in the predictive model

Construction Management Plan

A construction plan typically has the following phases: planning, designing, construction, testing, delivery, and project closeout. Generally, the process is sequential and has multiple contractors working individually with negligible interaction amongst each other. For example, the designer only focuses on sketching the architecture/ layout of the building and has no contact with the construction team which manages the labor and materials. Additionally, cost plays a very important role in the construction project. It is estimated in the planning phase so that all the necessary funds are gathered to initiate the work. The cost of the project is supposed to remain fixed through the project and any changes in the plan are generally not welcomed. However, a significant number of projects might have delays, and its cost increases. This might be due to lack of material availability, increased labor wages, and many more. Thus, to complete the project, an efficient project management plan is required. The following are the advantages and disadvantages of using the above project management plan methodologies:

BE605: Take home Exam Submitted by Yash Tiwari
Student ID: 20911298

Agile Approach:

Since construction management is sequential, agile is a very poor approach. The following are its advantages and disadvantages:

Advantages:

- It has high customer satisfaction since the entire project is built based on customer's requirements.
- Different teams work in collaboration and share similar goals and objectives
- Since the team is comprised of skilled members, root causes of the issues, delays, or problems are identified and fixed easily.

Disadvantages:

- Implementation of agile methodology is difficult.
- The costs of the project might increase which is not acceptable in these types of projects.
- Collaboration of different professionals to work as a single team is difficult, and hiring these many would significantly increase the budget of the project

Predictive Approach:

The predictive methodology aligns with the nature of the construction management plan and has the following advantages and disadvantages:

Advantages:

- Implementation of predictive approach is easy when compared to agile
- The costs of the project are almost fixed
- Since there is the least interaction between the teams of different phases, the contractor-based approach is efficient in handling issues. For example, delays can result due to not having the right material, delayed transportation, etc. which impacts the project timeline. In these cases, the construction team completely takes care of these problems
- A smaller number of professionals are hired because of the contractor-based system which makes it less expensive than agile

Disadvantages:

- The project plan is fixed so no changes can be made in the future
- It might fail to provide customer satisfaction
- Since it is a sequential model, any error in the initial part of the process might lead to the failure of the entire project

BE605: Take home Exam Submitted by Yash Tiwari
Student ID: 20911298

Question 2: Agile approach in project Management

Agile is an iterative model in which the entire process is sub-divided into small iterative cycles. One of the key concepts of Agile is 'SCRUM'. Initially, a product backlog is created which contains user stories. Each user story is a point-based task that is created based on the demand from the clients. This product backlog is subdivided into different sprints to form sprint backlogs. The duration of each sprint is around 1 - 4 weeks. A sprint burndown chart is created to illustrate the work remaining in the sprint. It helps both team members and the scrum master to track the progress on daily basis.

Each team in agile is a cross-functional and self-organizing group comprising of 4 – 11 members to stay flexible and productive. These team members work in collaboration to complete the tasks. Unlike other project teams, agile team members must be more adaptive and self-sufficient because they have to cope with the changing customer demands during the project. The team is structured as follows:

Product Owner: They are actively involved in the project to oversee the whole operation and provide timely feedback after every sprint. They relay customer demand to the project team and ensure that the team remains focused on those demands.
Project Manager: The project manager keeps the team members accountable, gives customer feedback from the product owner, and guides the team through the sprint.
Scrum Master: is a central figure within a project. His principal responsibility is to eliminate all the obstacles that might prevent the team from working efficiently.
Developer team: They work on the user stories in the sprint backlogs and complete all the tasks related to the development of the project.

The agile process is followed through a few recurring meetings or events, like the Daily Scrum (Standup), the Sprint Planning, the Review, and Retrospective meetings (the Sprint Retrospective). The Daily Scrum is a timeboxed meeting, during which the development team discusses the hindrances in the project and sets their daily goals accordingly to meet the timeline. After the sprint backlog is created, a sprint planning meeting is conducted to plan the work that is to be completed in that sprint. Everyone involved in the Sprint (a Product Owner, a Scrum Master, and a Development Team) participates in this event. The duration of the meeting is generally less than 8 hours. After the completion of the sprint, a sprint review meeting is conducted during which the team shows the work that is completed, any incomplete work is shifted to the next sprint accordingly. The whole team goes to retrospective meetings to reflect on their work during the Sprint. Participants discuss what went well or wrong, find ways to improve, and plan how to implement these positive changes. The Sprint Retrospective is held after the Review and before the next Sprint Planning.

Thus, the teams in agile are managed as follows:

- The tasks are ranked in the order of priority in the product backlog
- Scrum uses sprints of fixed duration where each sprint has predefined goals
- The spring planning meeting is conducted to discuss the working
- Daily scrum meeting is conducted to review the progress and ensure that the work is on track
- The sprint review meeting is conducted to discuss the results
- The above process is iterated for each sprint

BE605: Take home Exam Submitted by Yash Tiwari
Student ID: 20911298

Predictive Approach in Project Management

The predictive/waterfall model is a sequential model that takes the fundamental process activities of specification, development, validation, and evolution and represents them as separate process phases. These phases directly reflect the team's management and development activities:
System and Software Requirements: This is the initial phase of the project where the project requirements are outlined and defined in a document. This document is written from the user's perspective and defines the objective of the application.

Analysis: In this phase, the team will work to determine the conditions to meet the project and studies the conflicting requirements.
Design: In this phase, the team establishes a solution concept based on the previously determined requirements, tasks, and strategies.
Implementation: In this phase, the product is developed. The result of this phase is an alpha-level product ready for testing.
Testing: The product is tested in this phase. This phase is iterated till the errors in the product are rectified.
Operations and maintenance: The product is deployed into the market and maintained.

Based on the above phases, the team is designed by assigning roles as per the project phases described above. The different roles are:

Project Manager: The main responsibility of the project manager is to ensure that the project is executing as per the plan. Their duties are delegating and team management
Business Analyst: They ensure that all the business requirements are considered and transformed into artifacts of the functional specification of the system.
Developers: They are responsible for the implementation of the project.
Testers: Their task is to identify bugs and defects within the product – prompting its possible return to developers.
Quality Managers: They are responsible for the final quality of the product and ensures that the project is implemented according to the defined processes.

Thus, in the predictive model, all the phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for the previous phase by their respective team members.