

Overview of Key Project Management Models

This article will teach you about phase-oriented project management models and their principles. It will also cover a few adaptive project management models and their principles.

The Waterfall model

The Waterfall model serves as the foundation for almost every project management approach. It is one of the core models of project management. It adopts an approach where the project activities are divided into sequential phases. Each phase must be completed before the next can begin.

Phases of the Waterfall model

These include:

- System and software requirements
- Analysis
- Design
- Coding or build
- Testing
- Operations

The Waterfall model was first implemented in the manufacturing and construction sectors, where altering a plan would be exceedingly costly early in the process. Cost overruns were reduced because of a disciplined approach to project management, gathering product specifications, and obtaining approvals. Due to the inflexibility of the Waterfall model, other modified versions have been developed, including ones with risk management and overlapping stages. Winston W Royce included risk management notes to the model in the 1970s to address the model's inherent risks.

Project Management Body of Knowledge edition 7 (PMBOK7)

The Project Management Institute (PMI) is well known for its certifications. To obtain these credentials, you must first pass a test based on the Project Management Body of Knowledge, or PMBOK. The latest edition, known as PMBOK7, marked a significant transition from phase-based project management to principles-based project management. Phases remain significant to the PMBOK7 approach, though. For this course, we are adopting the phase names from PMBOK6. PMBOK7's emphasis on principles-based

project management makes it possible for guidance to be easily deployed to various project types, such as those adopting the Waterfall approach or those working in sprints. For each principle, information and resources are offered. You may also note that the emphasis is on customizing your project management strategy, also known as a tailored approach.

Projects In Controlled Environments (PRINCE2)

This model is based on the Waterfall approach and is governed by six aspects, seven principles, seven themes, and seven processes. The six aspects are scope, timescale, risk, quality, benefits, and cost. The seven principles that represent the guidelines include continued business justification, learning from experience, defined roles and responsibilities, management by stages, management by exception, focus on products, and tailoring to suit the project environment. The seven themes that represent the tools include business case, organization, quality, plans, risk, change, and progress. The seven processes that represent the roadmap include starting up a project, initiating a project, directing a project, controlling a stage, managing product delivery, managing stage boundaries, and closing a project.

A practitioner certification program is available if you want to dive deeper into PRINCE2.

Critical Path Method

PERT

The Critical Path Method is widely used with the Program Assessment and Review Technique (often called PERT). The longest series of interdependent project activities form a critical path. The length of the project is then estimated based on this path. To schedule project activities, the Critical Path Method employs an algorithm and the critical path.

Critical Chain Project Management

Eliyahu M. Goldratt created Critical Chain Project Management based on the Critical Path Method to help keep resources balanced throughout the project. Compared to the Critical Path Method, this approach to project planning and management places greater emphasis on resources, such as team members, tools, and software.

Adaptive project management models

These project management models lay great emphasis on responsiveness and flexibility. Like the phase-based models we discussed earlier, these models have entire courses and certificates dedicated to them.

These models, which are more adaptable and flexible, include:

- Agile

- Scrum
- Six Sigma Method
- Lean
- Kanban

Agile

In an Agile project management model, a project is carried out in iterations using sprints, which are typically week-long, as opposed to long and rigid project phases, as followed in Waterfall. Weekly processing of design decisions, implementation decisions, prototypes, and client feedback allows the end user to be more involved in the design process and enables the team to react swiftly if necessary.

Agile: Core values

The Agile Manifesto was created in 2001 and is a declaration of a unifying concept for frameworks like Scrum, Extreme Programming, and Feature-Driven Development (FDD).

The original Agile Manifesto identified four core values that govern Agile. These include:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

It is designed to create self-governed, highly collaborative, and adaptable teams.

Agile can be used for most projects. However, for best results, it should be combined with a more robust project management approach.

Scrum

The next project management model is the Scrum methodology, which is ideally suited for Agile projects. It is also built to work in sprints, making it agile and adaptable. One significant difference is that Scrum has clearly defined Scrum roles.

Scrum roles

Some of the roles include:

- A Scrum master

- A Scrum product owner
- A Scrum team

A Scrum Master is primarily a project manager. This role involves managing the project in accordance with Scrum processes and guidelines. The key responsibility of this role is to remove roadblocks for the project team.

A Scrum product owner represents the voice of the customer for the team. The owner establishes priorities for the product backlog and ensures that the project achieves a high return on investment (ROI).

A Scrum team consists of members who have the technical expertise to contribute to a project. They work toward delivering the project on time and with quality.

Six Sigma method

Another project management model is the Six Sigma method. It is a set of tools and techniques used for process improvement. Bill Smith, a Motorola engineer, invented this model in 1986. Six Sigma is a statistical term that refers to the original goal of having an extremely low rate of product defects. Six Sigma is frequently credited with transforming quality management into a profession rather than something handled by the production team.

Overall, the Six Sigma method is data driven. Data accuracy is required. It is a system of systematically identifying errors and providing methods to eliminate them. Some project managers have recently combined Six Sigma and Lean, creating a method known as Lean Six Sigma. With Six Sigma's emphasis on variation and Lean's emphasis on process implementation and waste reduction, these two methods complement each other well.

Lean

The application of Lean concepts to project management is referred to as the Lean project management model. Lean means delivering value while minimizing waste. Note that waste here means improper utilization of resources and time. A bottleneck in a process, for example, is considered waste. In such cases, project managers need to take prompt corrective measures to prevent bottlenecks. Lean, frequently associated with Just-In-Time (JIT) manufacturing, aims to align production with demand by emphasizing productivity, efficiency, and waste reduction.

Lean principles

Lean principles include creating flow, value and value stream, and perfection.

Creating flow is an important Lean principle. Moving a product through different phases swiftly, continuously, and effectively allows space for the next product. Instead of working in huge batches, each task is completed in a continuous flow. While Agile has weekly sprints, Lean is a continuous process from the beginning to the end. Value and value stream are other key Lean principles. The consumer defines the value, and the value stream actively works to reduce waste throughout the process. The last Lean principle is perfection. It refers to delivering the best product with the least amount of waste.

Kanban

Kanban was developed and used by Toyota as part of the Lean manufacturing model.

The key feature of the Kanban model is real-time communication about capacity and complete transparency related to work. Note that Kanban is a Japanese word that means “visual board.” Work assignments are visually represented on a board. This allows the team members to know the status of every work at any stage. This model is based on the pull system, which means that production is based on the customer’s demand. It is not based on the push system, where a product is produced and pushed into the market. The goal is minimizing waste without impacting production and creating customer value without increasing costs.

Application of Kanban

The six rules for the application of Kanban were outlined by Taiichi Ohno in Toyota Production System: Beyond Large-Scale Production in 1988. They are as follows:

1. Each process issues requests (Kanban) to its suppliers when it consumes its supplies.
2. Each process produces according to the quantity and sequence of incoming requests.
3. No items are made or transported without a request.
4. The request associated with an item is always attached to it.
5. Processes must not send out defective items to ensure that the finished products will be defect-free.
6. Limiting the number of pending requests makes the process more sensitive and reveals inefficiencies.

These rules very closely follow the Lean methodology guidelines, including eliminating waste to streamline processes.

Conclusion

In conclusion, there are different project management models available, each with its own set of principles and best practices. The choice of the model depends on the specific needs of the project and the environment in which it is being executed. It is important to select the appropriate model for the project and to adapt it as needed to ensure project success.

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Kanban is currently used widely with Agile as well in SW and project management to visualize work, limit WIP (work in progress) and improve flow. It helps agile teams deliver continuously (unlike Scrum's fixed sprints).

Lean → Gave birth to Kanban.

Agile → Uses Kanban as a tool/method.

Kanban → A practical way to apply lean principles in agile teams.