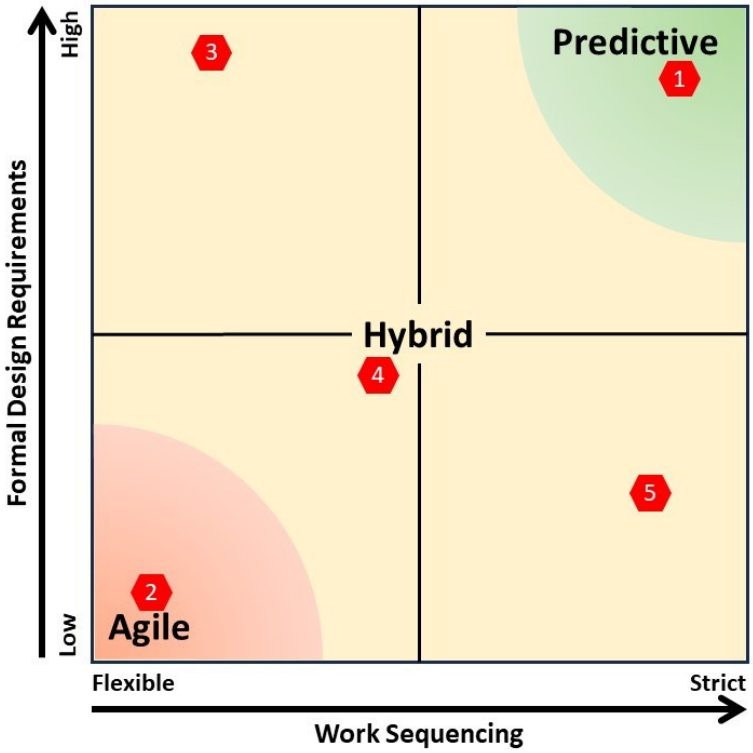
How should the different types of project management be described?

Introduction

The **PMI 2024 Pulse of the Profession**[1] has endorsed a relatively new framework for categorizing projects based on the management approach being used. The core message in **PMI 2024 Pulse of the Profession** is project success is enhanced by selecting a management approach suited to the type of project and the environment the management team are working in. This insight contributes to earlier work looking at methods for classifying projects[2] with a view to understanding the best management approach based on the project's classification. This article looks at the PMI classification process of Predictive - Hybrid - Agile and the consequential consigning of *waterfall* to history.



PMI 2024 – Predictive / Hybrid / Agile, Augmented

The major weakness in the PMI model is the dimension of *predictive* some projects need the design documentation to be complete before physical work starts, others need the work sequence to be defined before work starts, many need both the design and the work sequence to be developed to allow the project to be delivered safely.

This diagram shifts from the straight line proposed by PMI and separates the predictive element in the PMI model into the need for formal design requirements to be complete and the need for the work sequencing and schedule to be defined.

The five projects identified in the diagram are:

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1 Download the ***PMI 2024 Pulse of the Profession*** from https://mosaicprojects.com.au/PDF-Gen/PMI_Pulse_of_the_Profession_2024.pdf

2 For more on project classification see ***Project Size and Classification***: https://mosaicprojects.com.au/WhitePapers/WP1072_Project_Size.pdf

1. **New major bridge**. This type of project needs the design to be fully engineered before work starts, the loads and stresses of the bridge have to be calculated and the soil conditions analyzed to allow the foundations to be designed. A strictly controlled work sequence is also critical to avoid overloading the partially built structure allowing the construction process to progress safely.

   Railway tunnels and most engineering projects have similar constraints.

2. **Small hobby or business websites**. Websites similar to the Mosaic website[3] are developed iteratively and incrementally, there is very little forward planning needed and as external influences change development is adapted. We had no idea we would be writing this article and posting it on the website 2 weeks ago.
3. **Windfarm and other distributed projects**. This type of project is becoming increasingly common. While the engineering design and procurement has to be largely complete early in the project (wind turbines can take up to a year to be manufactured and delivered), the actual sequence of working for large parts of the project can be changed as needed. There are constraints on some sequences and flexibility in others[4].
4. **A major business' marketing portal upgrade for the 'end-of-year-sales'**. There are both time constraints and minimum scope requirements. But development using agile approaches will create the solution quicker and to a higher quality than other options. The challenge is controlling scope to deliver a viable product in the time needed.
5. **Shutdown / maintenance projects**. This type of project typically has tight time constraints, and safe work practices dictate work sequences. But a large percentage of the work that will be done is unknown until after the project starts and access to restricted workspaces obtained. The people doing this type of project know they don't know the challenges that will need to be overcome to deliver the shutdown on time – they just know there will be challenges and they need to work safely.

Most projects will have a degree of hybridization the two extremes are:

- Projects similar to the bridge project described above are predominantly predictive, the engineering design including defined work sequences is needed to allow work to start, but agile approaches can be beneficially used in key support roles such as managing the opening ceremony and dealing with stakeholder issues.
- Work on the small business website can be largely implemented based on agile, adaptive, and iterative approaches to the work overlaid with common sense. But some degree of predictiveness

[3] See https://mosaicprojects.com.au/index.php

[4] For more on managing distributed projects such as windfarms see ***Scheduling Challenges in Horizontally Distributed Projects***: https://mosaicprojects.com.au/PDF_Papers/P208_Scheduling_Challenges_in_Distributed_Projects.pdf

helps, the site needs a consistent theme, cyber security is important, and the prioritization of things to do next with dependencies mapped generates efficiencies.

This means, the open question for every project is how to balance Agile with predictive to optimize the probability of project success. This is a key finding in the PMI report.

Problems with the PMI 2024 approach

First the good news – PMI at last appears to have consigned *waterfall* to history – more of this in the next section. Unfortunately, its replacement ***predictive*** lacks any clear framework – what does PMI mean by predictive project management? There are some clues in the **2024 Pulse of the Profession** but the lack of clarity is a problem. This may be due to almost everyone involved in the publication working in information technology and predominately internal projects. This lack of clarity also applies to agile, the concept of Agile as defined in the Agile Manifesto and agility seem to be mixed up in the report.

Agile -vs- agility

The first area of confusion is between Agile and adaptability (agility). Agile is a well-defined flexible process, based on the Agile Manifesto and is as much a management approach as a defined methodology. Agile is applicable to software development and a wide range of other *soft projects*[5] such as business change. These days the dominant Agile methodology is Scrum, but there are other methodologies, approaches, and combinations in use and evolving.

While the use of Agile is widespread in IT departments and it is found in some other areas of business, not everything developed using an Agile approach a project. One of the newer concepts being promoted is *flow*. Flow has many similarities with Lean and focuses on the continuous delivery of value by developing a continuous flow of small batch items to the client. The flow concept is based on a systems-thinking approach, with management being responsible for setting up an environment within which flow can occur. This concept is very similar to our thoughts on ***De-Projectizing IT Maintenance***[6]. There is a lot to be said for removing project overheads if you are not working on a project![7]

Business and project management agility is a different concept. In the business/project context agility is defined as *the ability of an organization to rapidly adapt to situational, market and environmental changes in productive and cost-effective ways*. An extension of this concept is the agile enterprise, which refers to an organization that uses key principles of complex adaptive systems and complexity science[8] to achieve success. Effective project management has always required agility to overcome issues and problems and

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[5] For a ***definition of hard and soft projects*** see: https://mosaicprojects.wordpress.com/2023/01/21/hard-v-soft-projects/

[6] Download ***De-Projectizing IT Maintenance*** from: https://mosaicprojects.com.au/Mag_Articles/N010_De-Projectising_IT_Maintenance.pdf

[7] ***Defining exactly what constitutes a project is difficult***. For a discussion on this topic see https://mosaicprojects.com.au/PMKI-ORG-035.php#Overview

[8] For more on ***complexity in project management*** see: https://mosaicprojects.com.au/PMKI-ORG-040.php#Overview

drive the project to a successful conclusion – no plan is ever perfect; agility and adaptability are an essential component of every effective management system.

Predictive

PMI claims the predictive project delivery paradigm is focused on schedule, scope, and budget. The projects tend to use a phase-based approach: Analyze / Design / Build / Test / Deliver, and are plan driven. PMI states there is a need for detailed requirements early in life cycle and delivery occurs at the end of the project schedule.

Apart from being chronically IT focused, every project that is being delivered under a contract to an external client has to be focused on schedule, scope, and budget. If you do not meet contract milestones you get sued, if you do not deliver what was promised (scope) you get sued, and if you overspend your business loses money. But, a very large number of projects are being delivered under legally enforceable contracts, using Agile development methods to assist in delivering the contracted scope on time and on budget. And many predictive projects are designed to deliver incremental value with working outputs being delivered progressively in line with the contract milestones - a windfarm is a good example, the first turbine is often generating power months before the last one is built.

There is no doubt the vast majority of projects in the construction, engineering, oil & gas, defense, and aerospace industries are plan driven, you need various types of plans including design documentation and project controls information before you can do anything useful. Changing the plan after work has started typically costs $millions.

These plan driven projects generally have three basic phases each of which may incorporate a number of subphases which may be sequential or overlap:

1. A definition phase undertaken by the client organization to define the capabilities of the product they want to be developed.
2. A procurement phase where the client selects a delivery agent, or agents, for the development of the product and determines the contractual arrangements.
3. A delivery phase where the delivery agent(s) builds and delivers the product.

The design of the product (ship, building, rocket, etc.) may be undertaken in full or in part during any one of the three phases, a minimum level of design is required to initiate procurement but how much design is done by the client varies:

- For simple buildings and civil engineering projects it is not unusual for a complete design and specification to be provided by the client.
- In other more complex projects the client only may provide an outline design, or a performance specification relying on the contractor's expertise to finalize the design detail.

Consequently, the procurement phase may be a simple pricing exercise, or a complex phased design process sometimes even involving the production of working prototypes with selection being based on the capabilities of the design produced by the successful tenderer. Then in many projects, a significant amount of detailed design is still required during the delivery phase, including shop-drawings produced by subcontractors and suppliers.

This means the procurement arrangements will vary widely. The client may choose to enter into some form of alliance or partnership with the preferred delivery agent based on shared risk and profits, or the client may choose a hard dollar contract based on a fixed price to deliver a fixed scope, or some other arrangement. There are multiple forms of contract arrangement[9].

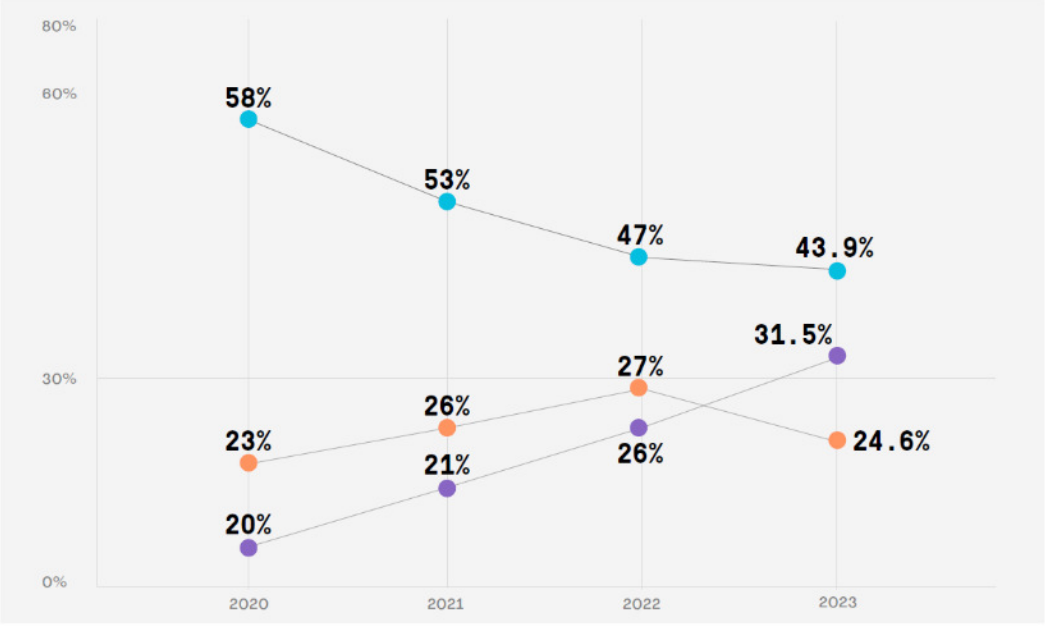
The only certainties are, that the typical project approaches used for the vast majority of plan driven *predictive* projects bear no resemblance to the *waterfall* approach.

Complexity makes is complicated!

Complex mega projects are almost by definition *plan driven*, but also by definition they are not predictable. The essence of a complex system is unpredictability and emergence. This class of project is simply ignored in the PMI model[10].

Trends

Given the problems outlined above, the trends shown in the chart below extracted from the PMI 2024 report need to be taken with a grain of salt. No one builds a ship using Agile, but some design shops may well be using agile for the design process, and non-predictive approaches such as Lean Construction are being applied in some construction projects. But you can only build a ship or construct a building after the design has been completed to an appropriate stage.



Percentage of respondents who report using each approach always or often (on a 5-point scale) in their practice. Respondents can report using more than one approach with this higher level of frequency.

Source: PMI Annual Global Survey on Project Management 2020, 2021, 2022, and 2023

[9] For more on ***procurement contracts*** see: https://mosaicprojects.com.au/PMKI-PBK-050.php#Process3

[10] For more on ***complex project management*** see: https://mosaicprojects.com.au/PMKI-ORG-040.php#Process1

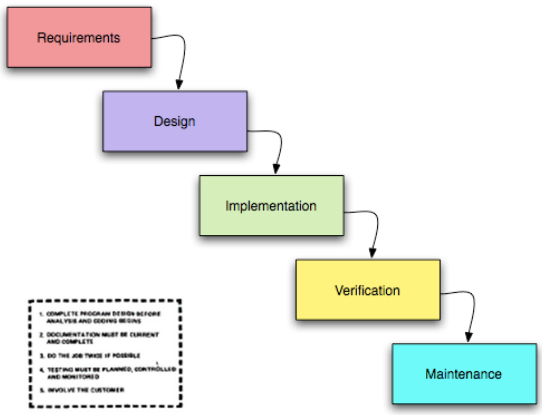
The number of IT projects using wholly predictive approaches (including waterfall) should be close to zero by now. But the intrinsic nature of most *hard* projects demands the predictive, plan driven approach, and by value these are still the largest percentage of projects globally.

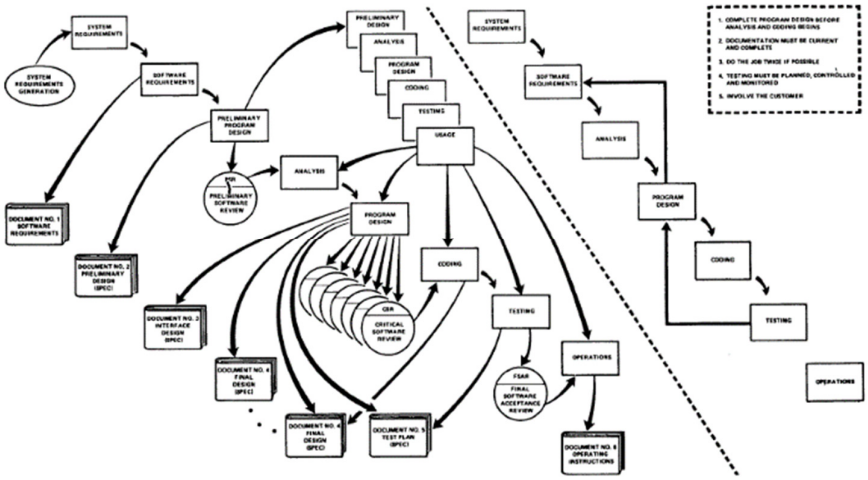
Waterfall is Dead!

Not quite – waterfall remains as one of the many predictive methodologies that may have some value on some IT projects. But other industries using various predictive plan driven and/or phased development processes are no longer confused with IT preocts applying a 1980s software development methodology.

Our papers on the ***History of Agile, Lean, and Allied Concepts***[11] highlight the fallacy of describing plan driven projects as *waterfall* and why the *frozen waterfall* concept failed as a software development methodology. Projects were being delivered for 100s of years using a predictive plan driven and/or phased approach. From the 1950s software was being developed using incremental and iterative development methods. The diversion into waterfall occurred in the late 1970s and 80s, but various agile development processes were being created at the same time. The Agile Manefesto was not published until 2001 as way to consolidate these non-waterfall ways of working and created the 'name'.

Waterfall – is often depicted as a five-stage software development methodology focused on designing a product (based on requirements) before starting development. The waterfall methodology may still be in use in some software development projects[12], but has never been applied to other types of project. Furthermore, this often-reproduced model is not a true definition of the waterfall approach.





The real diagram from ***Managing the Development of Large Software Systems***, (Royce 1970, Fig10[13]):

[11] Download ***A Brief History of Agile*** and supporting historical documents that describe the myth of waterfall from: https://mosaicprojects.com.au/PMKI-ZSY-010.php#Agile

[12] The attractiveness of Waterfall to DoD management in the 1980s is discussed in ***The Quest for Control***: https://mosaicprojects.wordpress.com/2024/05/02/the-quest-for-control/

[13] Download ***Managing the Development of Large Software Systems*** from: https://mosaicprojects.com.au/PMKI-ZSY-010.php#Agile

Conclusion

One of the key conclusions to be drawn from this article is agility and adaptability are key management capabilities required on every project. Agile is a soft project development framework implement through a range of methodologies including Scrum - they are totally different concepts. Similarly, the degree of management discipline and pre-planning required to deliver a project successfully depends on the project, not the development methodology being applied to create the output.

Based on this conclusion, the **PMI 2024 Pulse of the Profession** is a mixture of good, bad, and questionable concepts.

Undoubtedly the most valuable contribution has been consigning *waterfall* to the pages of history. The second major contribution is demonstrating that the choice of project management methodology is a key contributor to project success.

The choice of *Predictive* as a descriptor to replace waterfall is less certain. The alternative of *Plan Driven* is not much better and *Traditional*, probably worse. The project management industry needs to develop a consensus on how we describe projects that are neither Agile or adaptive. This approach to project delivery has been developed over the last 200+ years and with only minor changes in technology[14] has not changed a lot in the last 100 years, it needs an agreed name.

PMI is very confused by the concept of *hybrid*. There are several models in the report which may (or may not) add something to some software development processes but none have any practical use outside of an internal software shop. In this article we have ignored the PMI marketing and taken the approach that most projects need to combine a level of agility and adaptability with deterministic planning to be successful.

Attempting to categorize a project based on the management process used to deliver the project seems to be a false premise. The PMI finding that selecting the right management approach is a key underpinning of successful delivery holds true, but this choice of management approach should be based on the characteristics of the project and the management environment the delivery team is working within:

[14] For example, the introduction of CPM to replace bar charts for planning in the 1960s and the introduction of EVM in the 1970s. For mor on this history see: https://mosaicprojects.com.au/PMKI-ZSY-020.php

- Most *soft* projects will benefit from applying an Agile methodology to their development, but how much in the way of project controls[15] and up-front design is needed to support the selected Agile methodology depends on circumstances.
- PMI's failure to differentiate Agile from agility is a major omission. All projects benefit from the management team being agile and adaptive regardless of the approach being adopted. In complex mega-projects these are critical management skills.
- Most *hard* projects require a plan driven approach, but there are two distinct planning processes, the design process and the project controls function. Different projects and different management approaches require different levels of intensity and balance between these distinct functions.

Overall, the **PMI 2024 Pulse of the Profession**[16] is useful reading for managers running internal *soft* projects, particularly in IT departments. For the rest of the project management industry, there is very little of interest.

Project categorization is sill of value, but the more established methods discussed in ***Project Size and Categorization*** are likely to be more useful:
https://mosaicprojects.com.au/WhitePapers/WP1072_Project_Size.pdf

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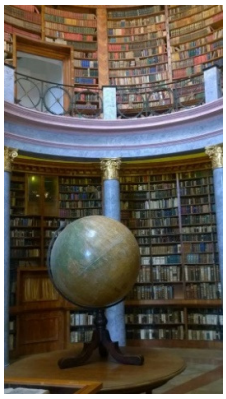

[15] For more on ***applying project controls to Agile projects*** see:
https://mosaicprojects.com.au/PMKI-ITC-040.php#A-Governing

[16] Download the ***PMI 2024 Pulse of the Profession*** from
https://mosaicprojects.com.au/PDF-Gen/PMI_Pulse_of_the_Profession_2024.pdf