

Agile Strategies in Software Project Management and Traditional Management Approaches

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Abstract

Over the past few decades, the significance of knowledge work has caused companies to shift from a progressive way of dealing with project management to a more cooperative working style. A flexible project management system is essential for project managers in today's increasingly interconnected world, where they must respond quickly and effectively to new threats and opportunities. "Agile" project management practices are well-versed in the necessity of distributing responsibility and initiative in support of transformation to change. In this article, we will compare and contrast Agile Project Management with more conventional methods of project management, focusing on its past practices and current applicability. Considering the increased complexity and unpredictability of projects in the modern economy, Agile Project Management has emerged as a useful tool for both the modern knowledge worker and the project managers responsible for their execution. Aiming to promote the adoption of the agile approach in the business world, this document provides an overview of the framework.

Keywords: Agile Strategies, Project Management, Software Project Management, Patterns of Organization, Traditional Management Approaches

INTRODUCTION

The idea of the perfect executive is debunked in the February 2007 issue of Harvard Business Review, which instead promotes the "incomplete leader" who is less concerned with "command and control" and more with delegating authority and encouraging individual initiative [4]. Because of the increasing value of knowledge work, businesses have been shifting from a hierarchical structure towards a more collegial one for several decades. The writers of an essay published in September 2005's issue of the Project Management Journal share similar feelings regarding the administration of projects, calling into doubt the "veracity of tight centralized management," "rationalist" discourse, and a "command and control" strategy [21]. The writers argue that local reactions should be made more malleable so that the project system can more easily adapt to new challenges as they arise. The "agile" methodology is well-versed in this need to delegate authority and encourage self-starting behavior to better accommodate unforeseen changes. In this article, we'll take a look at the origins of Agile PM and see if it makes sense to adopt its methodology for our projects. The new economy's information workers and project managers are finding that Agile Project Management is an invaluable instrument. According to Zwicker [15], Lockheed Martin discovered the agile approach while searching for a better way to create software products. Agile project management will be contrasted with more conventional methods.

New Project Management Theories

Complex and uncertain project circumstances are hallmarks of the modern economy, and much attention in recent years has been devoted to explaining or rethinking a hypothesis of project management that can be utilized in this setting. Authors of a study from 2002, Koskela and Howell [21], contend that the theory of project management has become defunct. The Project Management Institute (PMI) PMBOK (Project Management Body of Knowledge) guide was written with the management-as-planning model, the sending model of implementation, and the thermostat model of control as its theoretical foundations [10]. Koskela and Howell [15] express reservations about the theory's viability in the real world, particularly regarding dealing with ambiguity and innovation. We don't propose anything completely new, but we do suggest some out-of-the-ordinary details: 2) a greater emphasis on Flow and Value generation in addition to change; 3) the incorporation of management-as-organizing for planning; the language/action perspective for implementation; and the scientific experimentation model for control. Although Serum is an agile project management strategy, Koskela and Howell [16] show that it has substantial theoretical foundations. These foundations include the

language/action viewpoint, the scientific experimentation model, the scientific method, the emphasis on flow and value creation (but not change), and management as arranging. Once everything is taken into account, they claim a "paradigmatic shift of the field of project management" has taken place. Williams [33] provides data showing that traditional approaches to project management (including PMBOK) can be inappropriate and even detrimental for projects that are innately complicated, uncertain, and under a great deal of time pressure. On the other hand, initiatives with these features may benefit more from more recent approaches to project management, such as the agile or lean techniques. Management models (such as leading, planning, emotion providing, team building, and engineering) are useful in other studies [17], even if they don't correctly depict best practices. Models provide a common lexicon and structure for collaborating on a variety of tasks. The Agile Manifesto [8] and the Declaration of Interdependence [6] serve as the cornerstones of the standard jargon used in agile project management. The manifesto and proclamation, as the foundations upon which "agile" is built, will be the subject of forthcoming research.

Agile Project Management Approaches

Examining actual agile project management techniques is one method of analyzing the methodologies behind this method. Included in one collection of procedures [21] are the following:

- Assume Simple
- Accept Change
- Enable and Concentrate on the Next Attempt
- Adjust on the small scale
- Maximize value
- Manage with a goal in mind, Question your actions
- The project manager is responsible for managing the scope of the project and how it is implemented.
- Quality Deliverables
- Rapid Input to All Parties
- Make Useful Records Depending on Their Content

Create Useful Takeaways Agile, according to Glen Alleman [3]'s definition, is a "thought process" that involves the following procedures:

1. Focus on producing frequent, smaller results.
2. Have the client invest in the outcome
3. Never have failures; implement constant quality assurance testing throughout the entire assurance process.
4. Admit up front that the requirements will change, and adapt the procedures to accommodate the changes

Patterns for organization and Project Management

There is also the option of looking at patterns to learn about agile-based project management techniques. Christopher Alexander, an engineer, is widely credited as the man who first used patterns in urban planning and building design. Specifically, a pattern is "a repeating structural arrangement that solves an issue in context, adding to the completeness of some whole, or system that represents some artistic or societal value." [13] As shown by Coplien and Harrison [13], values determine the framework from which processes develop. They maintain that a company's structure is more indicative of its efficacy than its processes and that it is most efficient when it is product-focused rather than process-focused. To lay a solid basis, effective communication must take into account the human aspect and be valued. According to Coplien and Harrison [13], successful companies will exhibit replicable trends. Throughout four sections, namely (1) project management, (2) organizational style, (3) incremental development, and (4) people and code, 93 total designs are presented. What makes patterns especially applicable to agile project management is (1) their base in agile standards and (2) their description of a strategy that is about the agile theory of not providing strict rules that promise to be used in all circumstances. As an alternative, these patterns are a unique type of regulation that "works together with other patterns to generate emergent structure and behavior" [13]. This is what makes patterns so useful in creating efficient systems. Patterns, according to Khazanchi and Zigurs [14], can be "a means of comprehending and coping with complexity," which can be especially useful in the administration of digital initiatives. Khazanchi and Zigurs [24] propose three theoretical elements—communication, collaboration, and control—to describe patterns in their 2005 PMI article. They think it's possible to establish norms for the aforementioned three components by analyzing processes, best practices, factors, tools, and methods.

METHODS IN THEORY

Books on agile project management have been written with a wide range of theoretical underpinnings, including the Theory of Constraints [5], the Critical Chain [27], the Lean Production [29], the Theory of Complex Adaptive Systems [7, 21], the Theory of Chaos [15], and the Theory of Cooperative Game [11]. Despite their apparent differences, all of the theories are consistent with the agile ideals outlined in documents like the Agile Manifesto [8] and the Statement of Interdependence [6]. Wysocki [4] provides a brief overview of how to manage a project efficiently of several of these systems in his work. His book's focus on software doesn't diminish the universality of its principles or the usefulness of the models it employs for comprehending agile project management.

Methods for managing projects with agility

Wysocki's [34] definition of iterative, adaptive, and extreme methods all fit under the heading of agile project management. Common methods of project management include linear and incremental techniques. A quick overview of these methods will help you tell them apart from agile methods. Wysocki [34] also found a method that uses a quadrant to classify projects according to their traits before assigning each one to a specific method of project management. The project's ends (goal) and its answers (methods) are placed on a confidence-to-ambiguity continuum, and the resulting categories are used to describe the project's traits (means). Once the project's quadrant (see Fig. 1. below) is determined, a situationally appropriate project strategy can be chosen to best fit the project management strategy with the issue type. If you're not sure which quadrant a given endeavor fits in, it's safer to go with the higher figure? However, if the project's traits alter, it may be wise to shift the administration of the project to the tactics of a lower region. In a future article, the writers plan to investigate the features of each quadrant.

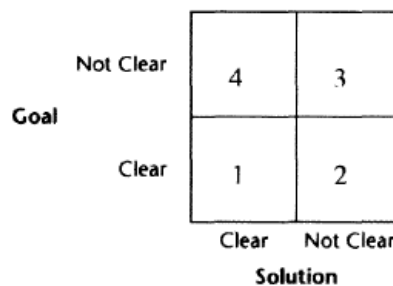


Figure 1: the four possible outcomes of a project based on the degree of uncertainty surrounding its objectives and proposed solutions.

Linear Strategy

A linear strategy follows the conventional model of a series of interdependent, consecutive steps carried out in the absence of feedback loops. Only at the end of the undertaking will the answer be made public. The following are some of the reasons why this approach is appropriate for initiatives in Quadrant 1: Goal, answer, and criteria are well-defined; there are few requests for changes to the scope; the work is routine and repetitive; and known templates are used.

The Linear method has many benefits, such as (1) a comprehensive plan for the project, (2) an accurate knowledge of what resources will be required, (3) the elimination of the need for the most specialized people, and (4) the versatility with which team members can be assigned. A few disadvantages of linear approaches are as follows. It (I) requires comprehensive plans; (II) requires adherence to a specified set of procedures; (III) can result in higher expenses; (IV) can extend the time it takes to complete; (V) is not as focused on client value as it is on achieving against the plan; and (VI) does not handle change very well.

INCREMENTAL METHODOLOGY

The only difference between a Linear and a Gradual approach is that with the latter, a complete answer is not delivered until the final stage of the project. Aside from the requirement that business value be provided before the final step, this strategy is otherwise similar to the Linear approach. Thus, initiatives in Quadrant I can also benefit from this approach. Incremental approaches have several advantages over linear ones, including the following: (I) Business Value is created early in the project life cycle; (2) Change requests can be handled between increments; (3) Incremental solutions can help uncover client value. However, the Incremental strategy has some drawbacks compared to the Linear one, such as (1) the need for extensive documentation,

(2) the difficulty in describing function/feature dependencies, and (3) the necessity for a higher level of client participation.

Repeated Trial and Error Methodology

After a set of iterative stages is finished, the results are fed back into the process to improve future iterations. If the client so chooses, a partial answer can be offered in the final stage of the group's work. The iterative approach is a method of discovery through experience that employs partial answers as stepping stones to the final answer. There are several benefits to using an iterative approach, such as the ability for the customer to provide feedback on the present solution, the flexibility to make changes to the scope of the project between iterations, and the ability to adapt to shifting market circumstances. 1) It requires a more engaged client than Quadrant I projects, and (2) the end answer, at the end of the project, cannot be justified to the customer. Serum [32] is an agile project management framework.

Plan of Adaptation

Similar to Iterative approaches, Adaptive approaches use the results of previous iterations to fine-tune subsequent iterations until an answer is reached. The client decides when and if an incomplete answer is released during an iteration. The Adaptive approach falls into both quadrants 2 and 3, as it is most effective when applied to tasks for which a complete answer is unknown. Removing the guesswork from the answer is accomplished through a cycle of constant improvement known as iteration. For the Adaptive strategy to be successful, its participants must be able to accept and adapt to a high rate of change. That's why JIT (just-in-time) preparation is so common. Adaptive benefits include (I) avoiding time-sinks like busywork, and (II) delivering maximum company value within available budget and schedule. Two of the strategy's major flaws are (1) it requires continuous, substantial client input and (2) it lacks a clear way to define what will be provided upon completion of the project. Adaptive Project Framework [14] and Adaptive Software Development [21] are two examples of agile project management approaches.

High-Stakes Tactics

Extreme strategies are similar to Adaptive ones, but instead of making small tweaks at each iteration to get closer to the desired answer, the desired outcome of the project must be uncovered and agreed upon. The key dissimilarity between the Adaptive and Extreme approaches is the absence of well-defined objectives. While the Extreme strategy doesn't necessitate a specific objective, the Flexible strategy does. This Quadrant 3 approach could be used for R&D or related endeavors. The term "chaos" is often used to describe this kind of project ambiguity because "often the project ends up with ultimate outcomes that are different from the project's initial purpose" [16]. Finding one's way through an extreme, third-quadrant undertaking is visually represented in Fig. 2.

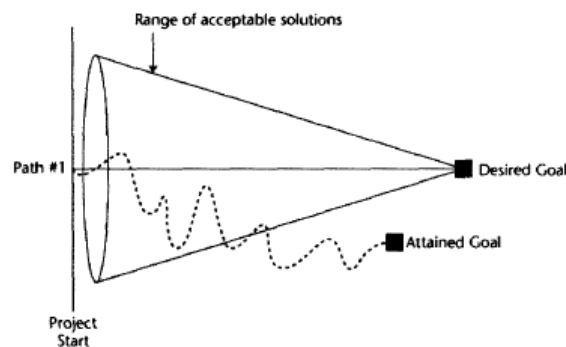


Fig. 2: Goal-Seeking in High-Stakes Projects

Extreme's benefits include (1) examining multiple partial answers early on and (2) allowing for keeping alternatives open until the very end. There is no assurance that the initiative will yield any business value, and there is a chance that (I) the strategy is searching in the wrong areas for solutions. INSPIRE [34] and Flexible (DeCarlo's [IS] eXtreme Project Management) are two examples of agile project management methodologies.

Concise Overview of Methods

To emphasize the distinctions between iterative cycles and the interrelationship between project management stages, Wysocki [34] offers a much condensed, top-level perspective of these systems in terms of project management. The scope, plan, construct, test, and deploy aspects of Wysocki's [34] five strategies are contrasted in Figure 3. The figure oversimplifies the actual variations, but they boil down to which stages are repeated over and over in each cycle. The extent of the project itself may be revised based on lessons learned during rounds of the process in extreme cases. Project management stages can be compared to software

development or building phases to further explore the variations in approach. The planning, monitoring, and control processes are where you can see how the tactics vary at each iteration (Fig. 3). Through an examination of the Linear and Progressive approaches traditionally.

With the help of different kinds of strategies, the distinctions between agile and conventional methods of project management become clearer. Planning in agile methods, in particular, is done more frequently and incrementally.

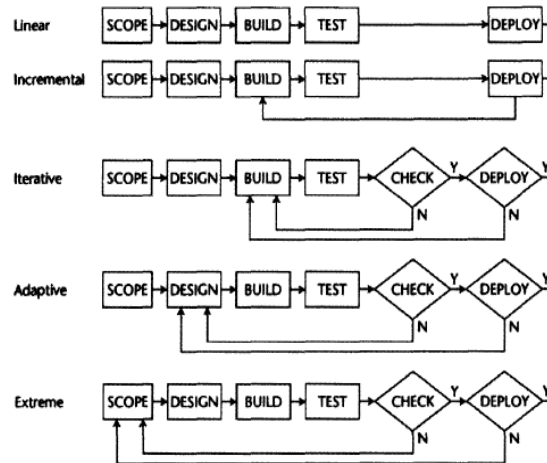


Fig. 3: Strategy for Managing Complicated and Variable Projects

COMMON THOUGHTS ON AGILE METHODS OF PROJECT MANAGEMENT

The Agile Manifesto [8] and the Declaration of Interdependence [6] provide the foundation for Agile Project Management's guiding concepts and ideals. A focus on people and the drive to maintain flexibility and adaptability in the face of complexity and unpredictability are particularly salient. Agile project management emphasizes a generative strategy where only the necessary elements (processes, tools, protocols, documentation, etc.) are used. Furthermore, the agile mindset recognizes that various problems call for unique methods. When deciding on a strategy or technique for project management, It is important to keep in mind the four principles outlined by Cockburn [9] (1) a larger group requires a more robust methodology; (2) a more critical system requires more transparency in its building structure; (3) project cost is inversely related to project methodology size or density as an increase in one decreases other; and (4) physical meeting is the most effective way of communication. The approach taken may also be affected by such factors as priority, deadline, quality, and the degree of transparency wanted. Last but not least, the chosen project strategy should work well with the project's mindset, the team's, and the clients'. However, the team and/or project lead should be flexible enough to adjust the strategy as the project's parameters shift. Processes, protocols, and documentation should all be maintained with a focus on ensuring they are adequate for the job at hand.

Beyond the Realm of Software

Some work has been done to broaden the scope of agile project management beyond the software development industry, where the bulk of the content concerning "Agile" ideas and "Agile Project Management" remains. One industry that has received a lot of interest recently is construction. Several findings from this research are as follows: Iterative and incremental development can enable innovative solutions, which is particularly useful when dealing with complicated and unclear requirements, which is why APM appears to have significant potential benefits in the pre-design and design stages of building. Although it would be preferable for these practices to carry over into building and support, the temporary and disjointed character of the real construction organization is likely to prevent this from happening ". [28]

TRADITIONAL AND AGILE PROJECT MANAGEMENT

Harmony with PMBOK

Griffiths [19] presented a technique for combining agile and conventional approaches at the 2004 PMI Global Conference. His recommendation was to keep the Start and Closing processes from the PMBOK as-is and to expand the Planning process using the ideas from Progressive Elaboration. On the other hand, there were noticeable differences between the Execution and Managing phases, and a flexible strategy is recommended. Based on his research, Sliger [20] concludes that the PMBOK and agile methods are highly compatible. Sliger compares the PMBOK to Highsmith's [21] Agile Project Management paradigm.

Agile vs. Conventional Project Management

Most projects are specified in detail, with all features, duties, and objectives well-documented and known. Alternatively, agile projects find their full set of criteria through iteratively completing the project. This makes agile initiatives riskier than more conventional ones, but they can also respond more quickly and effectively to shifting priorities.

Supervisors of Structurally Dissimilar Projects

Conventional project managers are responsible for controlling the project's finances, timeline, and parameters. Comparisons of actual performance against predetermined benchmarks and variances can be made. The goal of the conventional project manager is to keep costs down and deadlines met. The agile project manager, on the other hand, emphasizes the project's worth to the company and its deliverables, while giving less weight to issues such as cost and timeline. Agile project managers, in contrast to their more process-oriented counterparts, are educated to focus on product delivery.

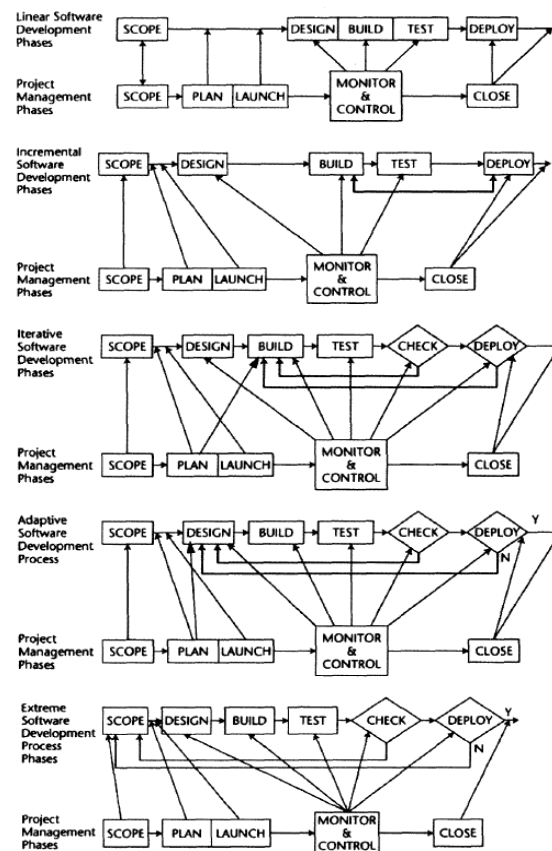


Fig. 4: Difficulty and uncertainty in project management strategies, adapted from [34].

Comparing Conventional and Agile Groups

Having well-defined requirements and other paperwork makes it easier for traditional projects to support dispersed work teams of experts and junior members. To quickly adapt to change and create incremental results, agile project teams must have their members and support staff in the same physical place. Agile techniques can be used by teams in different places for the same project. Agile teams require more dedication from their members than conventional teams because each member has more responsibility.

To Cite One Obvious Example

There is a wealth of examples of effective uses of the agile approach throughout published works. Attempting to better offer systems to the client, Lockheed Martin [35] discovered the agile strategy as part of its investigation. Lockheed Martin's upper management opted for agile methods to boost performance in four areas: adapting to new needs, boosting output, maintaining quality, and speeding up the iteration cycle. The majority of those surveyed in the business area where agilism was implemented reported a rise in output, product quality, client happiness, and a decrease in development costs of more than 10% [35]. Any increase,

no matter how tiny, has a profound effect on Lockheed Martin's bottom line because of the company's and the industry's massive size.

Post-Agilism

There has been rising discontent with the word "agile" and its associated practices in recent years. Rather than "agile," newer words like "pliant" and "non-linear" are being introduced. Some people are unhappy because they believe that the word "agile" is being misused for promotional purposes, and others are unhappy because they believe that many "agile practices and procedures" are being followed blindly rather than evolving to meet the changing needs of the project. Coplien [13] worries that, instead of being flexible and finding the best practices for the tasks at hand, people will blindly follow the newest fad because that's what everyone else is doing. Aside from emphasizing people and effectiveness over merely being "agile," as he does, he also calls for a reversion to the Agile Manifesto's origins. There are several criticisms and worries about agile and agile project management, including the fear that the term "agile" has lost its initial meaning. To paraphrase Boehm, "external reviewers cannot readily discover design errors due to the absence of documentation." [12] Concerns were raised during the first eWorkshop on Agile Methods [18] that the success of projects should be ascribed to the skills of the team members rather than to the practices and principles of agile development. Using process regions strategically and intelligently, as suggested by Alleman [1,] is all that's required for rapid task management. Elsewhere "A delivery technique," "a manner of performing processes," and "not a discipline," as described by Alleman [2]. Alleman [2] has "had second thoughts about how much hoopla there is around Agile Project Management" after witnessing the failure of projects that applied agile project management methods without first understanding the basic standards and rules of project management. According to Alleman [2], "pick your favorite project management methods" can be anything from PMI to CH2M Hill to Prince2 to DoD PMBOK to NASA Systems Engineering to Solomon's Performance Based Earned Value

CONCLUSION

Agile practices, such as project management, emerged from the requirement to respond to and adjust to the inherent ambiguity and complexity of projects. Project management alternatives are especially important in times of high uncertainty when both objectives and answers are hazy. Project managers who have access to a variety of methodologies will be better able to tailor their strategy to the unique needs of each project. Many project managers may find it beneficial to make the effort necessary to adopt agile project management methods and learn how to be fluid and adaptable. As such, this adaptability may prove invaluable in a variety of project contexts.

The Value of Tailoring Project Management to Each Individual Initiative

To achieve success, projects require a management strategy that is tailored to their specific needs. It's possible that committing to an agile methodology all at once won't be enough for the life of a project or the business. Instead, you need flexibility, adaptability, and cultural awareness to successfully handle any endeavor, no matter the circumstances.

Hybrid Methodology

While Cunha and Gomes [14] are more concerned with product development than project management, their remarks that "the conventional engineering foundations of management processes should be supplemented with a more organic and adaptive perspective" are nonetheless pertinent. In conclusion, order might not be as great as it first appears, and the difficulty might lie in finding the right balance between structure and chaos. The best method of project management may be a mix of conventional techniques and agile methods.

Essential Components of Agile Methods

In this paper, we've discussed several methods and techniques that are grounded in agile values and principles. However, blindly adhering to any one of these approaches risks diluting the original spirit of agility. Agile, as described by Cockburn [10], is "mostly a mindset," not a "methodology" or "fixed collection of behaviors." In other words, agility is a strategy, not a goal in and of itself [20]. When searching for methods to increase output, product quality, customer satisfaction, and decrease production costs, the core of agility may be at the center of the answer, as was the case for Lockheed Martin [35].

Potential Research Directions

While there has been some exploration of agile project management in the software development industry, there is room for much more. Project management techniques that can be used with any type of agile project should be developed as part of this study. A unified theory of agile project management could also be developed to better acquaint teams with agile's core concepts as they apply to project management. Lastly, more effort is being put into incorporating agile concepts into the PMI's PMBOK. The possibility and probability of incorporating agile principles into the PMBOK are, however, uncertain.

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