Effect of Agile Project Management in comparison to Traditional Plan-Driven Approaches: A Literature Review

The University of Plymouth, Faculty of Science & Engineering, 01/12/2020

Abstract

This review has been devised to evaluate relevant and contemporary resources, such as those found in journals, articles and other forms of written literature. This has been done to establish a reference point for the development in the use of hybrid systems in the modern-day industry, with a focus surrounding industries with an emphasis on software development. The study provides an overview of current Traditional and Agile methodologies and will then develop into a discussion surrounding the implementation of Hybrid methodologies, and their impact on project management in industry. Using thematic analysis, this study analyses the effects that Hybrid development has, and measures results from judgments conducted surrounding this topic. Where Hybrid development was found to have a significant, yet targeted impact on product and project performance. Further studies are required to establish the impact that these techniques would have over longer periods.

Keywords: Agile, Project Management, Plan-Driven Development, Behaviour-Driven Development (BDD), SCRUM, Continuous Deployment, Daily Meeting, Definition of Ready, Extreme Programming (XP), WBS, CPM, Project Plan.

Introduction

In terms of progression, Project Management as a field has only faced slight modifications in recent years, with countless individuals and businesses opting to transfer from older, traditional development models, to agile frameworks utilizing collaborative efforts to counter the negative implications of plan-driven approaches. Along with this change, the requirements and expectations set on project managers have also shifted significantly, with risk management deferring due to the competitive nature of product development in business. This article aims to evaluate and highlight the positive and negative connotations of utilizing Agile development frameworks over Traditional alternatives. Establishing what impact each methodology has on a project lifecycle, how easy is it to convey ideas and collaborate and the effects each methodology has on team morale and promoting open communication.

1. Project Management and Its Relations

Project Management in enterprise has become one of the most protected and impressionable internal processes to date. Project Management coordinates efforts between team members ensuring tasks are completed following a schedule. Depending on the development methodology used, the project lifecycle is decided unto components of the methodologies, most commonly being divided into two categories, those that are built upon the foundations of Traditional Project Management and those based off Agile Project Management.

Since the adoption of the Agile methodology in the early 1990s, and furthermore, the wide acceptance of its components, detailed in the manifesto for ASD that was formulated, written and signed in the early 2000s by seventeen industry representatives. Project Management as a platform has changed substantially, with a clear divide appearing between two groups. Those who support classic Traditional methods of resource allocation, time management, testing and the latter, to those who promote the use of newer Agile methods or other industry alternatives when planning their project.

2. Analysing and Comparing Traditional and Agile Approaches to Project Management

Traditional Project Management is utilized to follow a linear organizational structure, it involves using clearly defined user requirements before product implementation begins, due to the client involvement in the project lifecycle being low and the cost of change being significant, based on the nature of the development cycle. Due to the low probability of client interaction during the development phase, it is imperative that anticipation from the client in terms of features and functionality for the product are defined early and in detail, this is true for both low and high impact attributes, such as how interactive elements should operate, all the way down to minuscule details such as the font size and type displayed on a certain webpage/application.

When discussing TPM (Traditional Project Management), the focus tends to remain on the processes proceeding the completion of the project, rather than the product itself. This has a significant impact on the final product and the process the team undertakes to achieve these pre-set goals. Carr (Carr, 2017) discusses the process used to determine the project lifecycle, and therefore why these processes are focal points during product development, over that of the final product.

Agile Project Management follows an unstructured, iterative approach to producing solutions that not only fit the client's requirements when beginning the project, but follow the climate surrounding the project closely, resulting in a solution that is tied tightly to the desires of the client. The Client/Stakeholders are involved throughout the entire development cycle, commencing as soon as the development team begin working towards the goals of the project, and because of this, adaption throughout evolution is expected and the Project Manager will facilitate the opportunities for the team to implement these changes during their work.

Kashyap (Sandeep Kashyap, 2018) details throughout his article that many businesses would prefer an Agile development methodology over that of the Traditional means of Project Management. This will be discussed in further detail in section three of this review, however, Kashyap fails to detail the reasons that the methods of Traditional development would occasionally be preferred. This is something that Lewis (Lewis, J.P, 2007) discusses thoroughly throughout the early chapters of his novel when communicating the role of Project Managers and the impact and benefits that their approach to traditional management can have on both the team and the product.

3. Selected Problems in the Area of Traditional/Agile Project Management

Traditional Management methods have been utilized since their inception in early 1957. In a report created for TRANSCOM 2019 (Buganová & Šimíčková, 2019), risk management for traditional project management is discussed exhaustively, communicating common issues found when applying the traditional methodology. One of the most significant sticking points when discussing the issues related to traditional management is the integration of change, with altered requirements being difficult and sometimes, depending on the circumstance, impossible to implement due to the impact on the documentation and architecture of the project itself.

Another issue with traditional management is the lack of prototype material produced that can be meaningfully influential in terms of maintaining the support of stakeholders and client engagement in the process. This, alongside the dictated nature of traditional management, has the possibility of leading to construed or ill-happened communication between the Project Manager and Software Engineers working on the solution. When issues arise with a product, it is unlikely that all members of the team will be notified of these complications at the same time, with it being likely that information will trickle from PM to its respective beneficiaries on terms of proposed importance.

Despite the myriad of merits, the pitfalls of Traditional Project Management as discussed above are significant enough that the adoption of an alternative development methodology was deemed necessary. Here enters Agile, created as a substitute for its Traditional counterpart and adopted by most organisations and enterprises between the years of 2004-2014, with a market infection point located around 2009-2010.

Carr evaluates an online survey completed by 601 respective field experts, stating that "though Agile methodologies were present more than a decade ago, majority of organizations have adopted the practice only in the last 5 years." (Carr, 2017). It noted that in this survey, in the switch to Agile development, collaboration was improved in 54% of cases, both speed to market time and development costs were found to be reduced by 42% on average, and 49% of the individuals involved with this survey agreed that customer satisfaction was improved after this migration.

Nevertheless, even with its virtues, Agile struggles with aspects that can negatively impact the project lifecycle when it is used as a replacement for Traditional methods. Many of the problems surrounding Agile are related to poor planning of resources and documentation, due to the fragmented nature of the lifecycle itself. (Planview, 2020) This also has a rolling impact on other attributes of the project, such as measurement and output. Agile boosts product to market speed, however, this can also be detrimental, as prototypes become disjointed and less cohesive than those created using Traditional methods.

4. Possibilities of Implementing Hybrid Approaches to Project Management

Due to the compounding issues listed above, along with others not mentioned in this review, alternative methodologies must be discussed to further enhance the opportunities accessible for project managers to utilize during their developments. This concept is debated in an article (Sommer et al., 2015) purposed to evaluate the impact that a mesh among agile/stage-gate methodologies would have on the execution of a project. This was achieved by implementing practised SCRUM techniques alongside Stage-Gate methodologies that were already utilized throughout five individual organizations.

During this trial, it was commonly noted that "project efficiency was enhanced through continuous resource reallocation, enhanced process visibility, and enhanced communication and knowledge sharing" (Sommer et al., 2015). This is supported in the dataset collected and displayed in the figure below. The authors note in their conclusion of the article that substantial performance gains can be derived from internal evidence collected from the organizations involved in the use case. Nonetheless, it is not immediately clear where these gains originated, as it is discussed that more iterations of testing must be applied before a conclusion can be set.

TABLE 2. Case study performance challenges, measurements, and improvements

Process Type	Company	Performance Challenges	Quantitative Performance Measurements	Qualitative Performance Improvements
Stage-Gate	WindT	Uncontrolled iterations, budgets overruns, delayed projects due to resource constraints	No performance measurements within or across projects	No improvements identified
	Valves	Hit rate (% of finalized products actually sold) at only 48%	Hit rate increased from 48% to 61% in two years, still short of target hit rate of 90%	Perceived project performance remains largely unchanged
Hybrid	Pharma	Budget overruns, project scope creep due to lack of visibility, insufficient resource allocation	Qualitative measurements through informal evaluation showed perceptions of significantly improved project efficiency	Improved resource allocation, improved communication, increased knowledge sharing, more process visibility
	Toys	Mismatch between Stage-Gate and project activities creating redundant activities and lack of process visibility	Performance measurements not available	Improved visibility, better-defined goals, improved team independence and employee ownership
	Electro	Company crisis due to low market performance of new products	Reduced workforce by 25% while maintaining product introduction rate	Increased market success, decreased customer complaints, eliminated change orders in late stages, and increased team morale and motivation
	Windo	Inefficient development process, frequent delays due to inadequate knowledge sharing	Rework reduced by at least 20%	Increased customer collaboration, improved cross-organizational collaboration and coordination
	Power	Mismatch between Stage-Gate activities and process activities generating unnecessary iterations and redundant work	Performance measurements not available	Increased cross-organizational coordination, increased visibility, increased employee motivation

Figure 1, Hybrid Case Study (Sommer et al., 2015, p.40)

The same mentality is shared between other industry officials, an example of this is in an article written by Bushuiev et al. (Bushuiev et al., 2020) to discuss the process of developing a convergent approach to building hybrid techniques for manipulating projects, software and collections. In this article, the topic of hybrid methodologies is discussed, with an essence surrounding the necessity of this development due to the nature of most software-based applications being modular, and having different composing elements, each with their lifecycles. Stated in the article, "the application of the hybrid project management methodology allowed the authors to execute different projects in essence within the stipulated timeframe with the given budget and quality of construction." (Bushuiev et al., 2020), supporting the idea that HPM possesses a highly important responsibility to fulfil in modern-day Project Management scenarios.

Although Hybrid methodologies have proven beneficial in several test cases, Project Managers need to be aware of issues that may occur when developing new strategies to respond to complications that cannot be remedied with Traditional or Agile components individually. Johann Strasser considers issues that could occur when meshing both Traditional and Agile techniques in the same project. Strasser states that "frequent changes between traditional and agile approaches from one project to the next pose a risk to the process stability." (Strasser, J, 2020). He also deliberates with the idea of using Traditional elements for sections where the vision is considered ubiquitous and further relying on Agile for ambiguous segments.

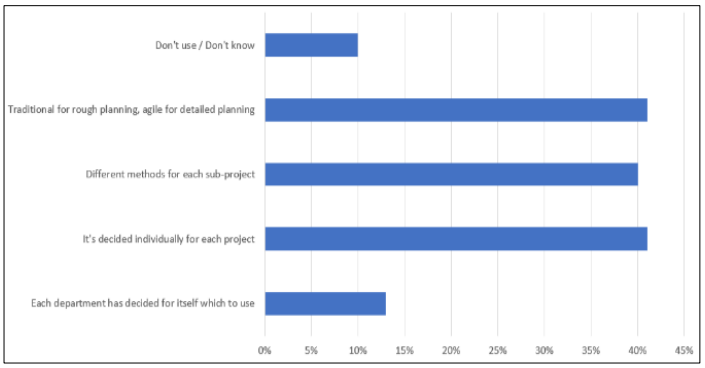

Figure 2, Webinar Survey (Strasser, J, 2020)

Figure 2 displays the results of a survey carried out during a Webinar, held in April 2018, with 256 individual participants regarding the utilization of Hybrid Project Management in industry. The survey revealed that although Hybrid methodologies are becoming more popular, over 10% of the participants had either never heard of or used Hybrid techniques in the workplace. In culmination, almost every business utilizing some form of project management solution would benefit from a discussion surrounding the implementation of Hybrid techniques to relieve pressure triggered due to the constraints of Traditional and Agile planning. However, it is important to approach this with the intent on promoting harmonization, integration, convergence and actualization into the workflow, as synchronization provides a platform allowing for far easier methods to blend Traditional and Agile techniques when considering these factors.

5. Conclusion

The evidence contained in this Literature Review makes it apparent that companies in an array of different industries, but particularly those who focus on the aspects of software development, can observe substantial performance and fluidity benefits when implementing Hybrid approaches into their roadmaps. Aspects such as harmonization, integration, convergence and actualization focus on making these processes operable, affordable and implementable.

The topic itself is endowed, with literature surrounding it being plentiful, however, due to the idea of Hybrid systems being contemporary, it became apparent that it was much easier to discover academic blog posts than it was to find written articles and literature on sites such as Plymouth's Primo service. To counter this, while carrying out my research, I utilized the references found in literature I was able to discover, using this pathing technique to find relevant and inferred sources of information.

With the current state of the literature revolving around the short term, experimental use of these techniques, it would be reasonable to assume that the next step towards widespread adoption would be the creation and evaluation of statistical datasets that observe these implementations throughout three or four distinct projects. They could measure not only the increase in performance, but also the impact on team morale and wellbeing, as well as other determining factors, such as comparable workflow and cost.

6. References

Sandeep, Kashyap (2018). Traditional vs Agile Project Management Method: Which One is Right for Your Project? [online] ProofHub. Available at: https://www.proofhub.com/articles/traditional-vs-agile-projectmanagement#:~:text=Agile%20follows%20an%20iterative%20process,and%20developments%20in%20the%20specification. [Accessed 20 Nov. 2020].

Lewis, J.P. 2007. Fundamentals of Project Management. New York: American Management Association

Carr, K. (2017). Agile Project Management Vs. Traditional Project Management. [online] Knowledgehut.com. Available at: https://www.knowledgehut.com/blog/agile/agile-project-management-vs-traditional-project-management [Accessed 22 Nov. 2020].

Buganova, K|Simickova, J (2019), 'Risk Management in Traditional and Agile Project Management', *Transportation Research Procedia*, Vol. 40, PP. 986-993.

Planview. (2020). What are the Disadvantages of Agile? | Planview. [online] Available at: https://www.planview.com/resources/articles/disadvantages-agile/ [Accessed 15 Dec. 2020].

Sommer, A.F| Hedegaard, C| Dukovska-Popovska, I| Steger-Jensen, Kenn (2015), 'Improved Product Development Performance through Agile/Stage-Gate Hybrids: The Next Generation Stage-Gate Process?', *Research-Technology Management*, Vol. 58, PP. 34-45.

D. BUSHUIEV, B. KOZYR (2020), 'HYBRID INFRASTRUCTURE PROJECT MANAGEMENT METHODOLOGIES', Innovative technologies and scientific solutions for industries., Vol. 1, PP. 35-43.

Strasser, J (2020). Hybrid Project Management – Combining Agile and Traditional Methods (Update 2020). [online] TPG Project Management Blog - Your Project Experts. Available at: https://www.theprojectgroup.com/blog/en/hybrid-project-management/ [Accessed 5 Jan. 2021].