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Optimizing Project Management Methodologies for Non-profit and Community-Based Organizations: A Data-Analytics-Informed Agile Approach.

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ABSTRACT

This conceptual paper explores how data analytics can enhance Agile project management within Non-profit and Community-Based Organizations (NPOs and CBOs). The study employs a qualitative methodology through a systematic literature review, synthesizing existing research on traditional project management approaches such as Waterfall and PRINCE2, as well as Agile frameworks like Scrum and Kanban. By examining studies that integrate data analytics into project management, the paper identifies opportunities for real-time data insights to improve decision-making, resource allocation, and project success rates. Findings reveal that conventional project management models are often rigid and incompatible with the dynamic and resource-constrained environments of non-profit projects. In contrast, Agile methodologies provide flexibility, stakeholder collaboration, and adaptability qualities further strengthened when combined with data-driven decision making. The analysis develops a hybrid conceptual model that merges Agile's iterative approach with the analytical precision of data insights, offering a more responsive and evidence-based management framework for non-profit initiatives. This integrated framework aims to support NPOs in overcoming challenges such as uncertain funding and limited capacity, thereby enhancing efficiency, accountability, and social impact. The study concludes that this model holds strong potential for optimizing non-profit project performance and recommends future empirical validation in real-world non-profit settings to refine the framework and explore the transformative role of emerging technologies in the sector.

INTRODUCTION

Project management (PM) methodologies serve as a key organizing framework for organizations to plan, implement, and successfully conclude projects (Simonaitis *et al.*, 2023). Conventional project management methodologies like Waterfall and PRINCE2, which have been generally preferred for their fragmentation and organization, are limited for managing a variable and changing project environment (Székely *et al.*, 2025). Agile approaches, alternatively, provide a more flexible and iterative model of project development process that is more responsive to change and feedback from the project's stakeholders (Ndou *et al.*, 2024). Agile has spread to other fields, and especially to fields such as software development, where adaptability and speed are important. Non-profit and community-based organizations (NPOs and CBOs) differ from for-profit organizations in that they have specific goals of social good and community impact. Non-profit Organizations, in contrast to most businesses, tend to function with minimal financial and workforce resources and are highly dependent on volunteer support and outside funding. As a result, they are also confronted with inconsistent budgets, limited resources and the networks and diverse set of stakeholders that they are embedded within. These types of organizations may also have multiple simultaneous goals such as social impact, community, sustainability, etc.

(Hosseinifard *et al.*, 2025; Maalouf *et al.*, 2025; Ko & Liu, 2020). These complexities require a project management that is more flexible and responsive, more concerned with the impact and sustainability of a project's outcomes, than just the successful finishing of the project.

In the presence of these challenges, traditional PM methods do not have the flexibility needed in non-profit projects. Therefore, adapting PM methodologies to tackle the needs of NPOs and CBOs is very important for the optimization of the use of limited resources, the improvement of project success rates, and the achievement of meaningful social outcomes. Agile methods, with its focus on flexibility, stakeholder engagement, and iterative development, proffers a significant approach to meet these needs, enhancing both the execution and impact of non-profit projects (AbuKhamis & Abdelhadi, 2022).

Research Gap

Agile practices are prevalent in other sectors but their use in non-profit and community-based organizations is less common and has not been well studied (Amajuoyi *et al.*, 2024; Anifa *et al.*, 2024; Bello *et al.*, 2025; Chukwunweike & Aro, 2024; Daraojimba *et al.*, 2024; Dugbartey & Kehinde, 2025; Jovanović & Berić, 2018; Krpan *et al.*, 2023; Magistretti & Trabucchi, 2025; Oyekunle & Anibaloye, 2024).

Despite the increasing acknowledgment of the unique

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project management struggles of NPOs, including poor resources, insecure funding, and difficulty engaging multiple stakeholders, little literature exists on adapting NPOs to conventional PM practices. Existing studies have been concerned primarily with traditional methodologies, Waterfall or PRINCE2 for example, and non-profit organizations do not usually exist in the types of environments these rigid methodologies plan for.

Also, although project management in other sectors has incorporated data analytics, the idea of data analytics-based Agile project management in NPOs is still new. Non-profit project management literature does not capture the coupling of data-driven decision making with Agile practices that allow for on-the-spot modifications and ongoing refinement. This absence indicates the need for employing a blend of Agile techniques and data analytics to inform a more flexible, adaptable framework of optimizing project management in NPOs such that NPOs can effectively achieve their missions even in highly complex and unpredictable project situations.

Objective Of The Paper

This paper aims to present an Agile project management approach for use within non-profits and community-based organizations that is informed by data analytics. This discussion of combining Agility and DDD, is to provide NPOs and CBOs, and the specific challenges they face, with better project management practices to allow for more successful, efficient, project adaptable, and sustainable projects.

LITERATURE REVIEW

Project Management Methodologies

Waterfall, PRINCE2, and PMI methodologies have been traditionally associated with the effective control of the project in any industry sector (Simonaitis *et al.*, 2023;

Székely *et al.*, 2025). These methods are usually linear and sequential; thus, these approaches are appropriate for projects where the requirements are well understood and would not change during the project's lifecycle. Waterfall, for instance, was developed by Royce in 1970 and is a linear project life cycle that spans from start to finish (Figure 1), focusing on planning, documentation, and risk management from the project's inception (Kirpitsas & Pachidis, 2022). Also, PRINCE2 by AXELOS (Projects in Controlled Environments), (Figure 2) emphasizes on role clarity, process definition, and staged planning which are well used in government and public sector projects, along with heavily regulated projects (Takagi *et al.*, 2024). But these approaches are also problematic when considering non-profit and community-based organizations. NPOs generally exist in volatile environments with finite and fluctuating resources dependent on external funding and stakeholder interests. This reflects a natural, almost inevitable project environment; traditional methodologies via strict staged process can react poorly to these uncertain conditions, and outside of something like change management, which feels counterintuitive can produce phobic project landscape (Essien, 2025; Muravu, 2020). For instance, the rigidity of the Waterfall method may pose a challenge to a non-profit project team attempting to adjust to emerging needs or a change in the scope of a project based on feedback in the community, or changes in the funding dynamic. In addition, these methodologies require a lot of documentation and prior planning, which does not make sense for non-profits with limited resources as it can lead to an inefficient use of resources or lead to delayed projects. The limitations of traditional methods are that they are not flexible or fast enough for most non-profit work and most projects are iterative and adjust continually. The misalignment highlights an obvious opportunity for more adaptable approaches such as Agile

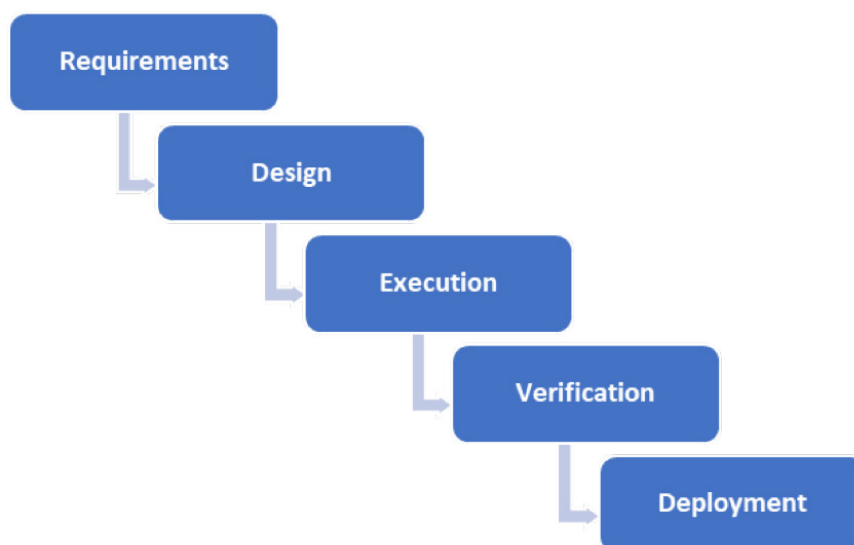


Figure 1: Waterfall model.

Source: Kirpitsas & Pachidis (2022).

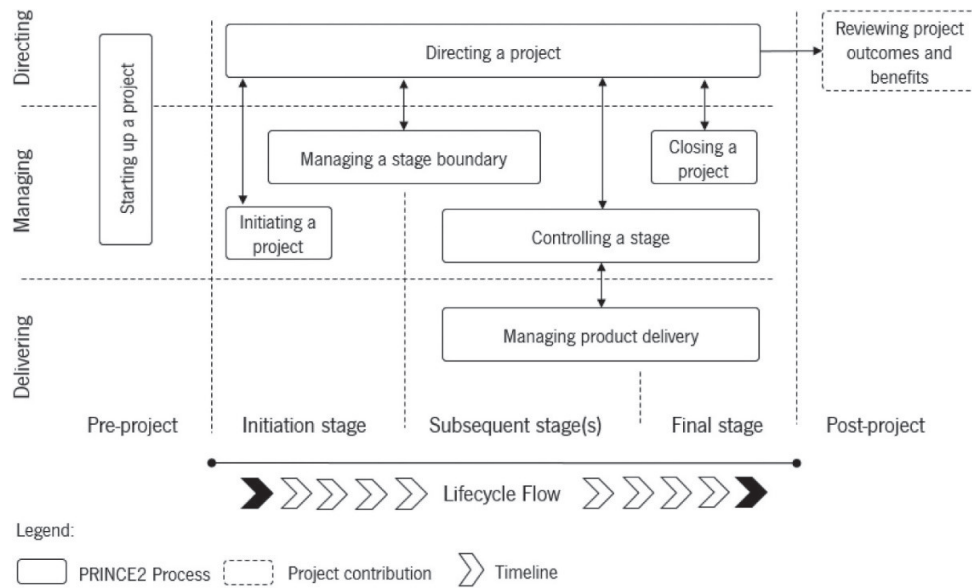


Figure 2: PRINCE2 processes.
 Source: Takagi (2024).

that can cope with these uncertainties, while remaining outcome oriented.

Agile Project Management

Agile project management is an evolution away from traditional project management reliance on a continuous pipeline of work and linear workflow processes. Its focus is on partnerships and flexibility and learning for improvement (Anifa *et al.*, 2024; Tetteh, 2024). Reiter (2025) notes that Scrum, Kanban, and Extreme Programming (XP) are core frameworks of Agile. Scrum for instance structures work in time boxes of two to four weeks called sprints in which the team works together to produce specific deliverables. The process is iterative and involves regular re-evaluation which means that adjustments can be made during the project, a process that can work well in a setting where requirements might evolve.

Agile can provide a few benefits specifically for non-profits. The focus on autonomy, continuous contact with stakeholders, and adaptability that are inherent in Scrum and Kanban are also important for non-profit sectors that often deal with limited resources and shifting demands (AbuKhamis & Abdelhadi, 2022). For instance, a non-profit engaged on community health projects could adopt Scrum practices to iteratively review project progress and modify the project plans from stakeholder feedback like from the neighboring communities or funding partners. This flexibility allows projects to be relevant to a community and responsive to what is available. One of the advantages of Agile for NPOs in particular is its focus on collaboration with stakeholders. Transparency and frequent communication are important because most non-profit initiatives impact multiple parties, including donors, beneficiaries, government, etc. Habibu & Kabiru (2024) for instance found stakeholder satisfaction to increase by 42% when NPO's adopted Agile, in a sample of 12 NPO's. Agile's iterative cycles help with this, as non-profits can quickly adapt to changing stakeholder needs and external

conditions. Finally, the Agile emphasis on short-term goals and small increments is also useful for NPOs, as producing short-term results helps foster trust and satisfaction from stakeholders, which is critical for organizations that depend

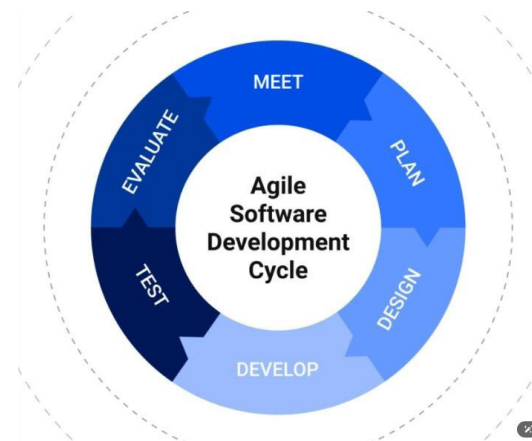


Figure 3: Agile Software Development Cycle
 Source: Tetteh (2024).

heavily on donors and volunteers.

Data-Analytics-Informed Approaches

The use of data analytics in project management is becoming more common across various industries and provides organizations with means to help with better decision making, project forecasting, and increased efficiency. Data analytics project management at its most fundamental level means collecting and analysing data throughout the lifecycle of a project, such as project performance data, stakeholder input, and data on resources utilized. By utilizing this data, organizations can use it to make decisions, adjust projects and resources (Aljehani *et al.*, 2024).

For non-profits, data analytics can be transformative.

For non-profits, particularly those resource constrained, analytics provides advantages in that it highlights areas of concern and where things may go wrong early in the project life cycle (Onuche, 2024). Through examining the data from previous projects, non-profits can have an idea of where things are likely to become problematic and can act rather than react.

In addition, data analytics can be helpful to agile project management because of providing real-time feedback on performance of a project. When operating under Agile conditions where decisions are taken after short periods of time, access to actual data makes instant real evidence-based adaptations possible instead of assumptions-based (Batista *et al.*, 2025; Fawzy *et al.*, 2025). This is particularly useful in non-profit endeavours when circumstances frequently require spontaneous adaptation. Non-profit organizations can use community-based projects for example as a way to record donations and volunteer hours to dynamically adapt their strategies to successfully achieve goals.

In sum, project management that is data-analytics driven leads to more transparency, better decisions, more successful projects. Through the integration of Agile methodologies with data, non-profit organizations can avoid resource wastage, ensure that stakeholders are aligned, and achieve successful projects.

Challenges Faced by NPOS and CBOS in Project Management

The non-profit and community-based organization (NPOs and CBOs) project management is also different because of the nature of this project, which often far more different than that of a for-profit organization (Essien, 2025; Onuche, 2024). Limited resources is one of the biggest challenges. Non-profit organizations (NPOs), as opposed to for-profit organizations, in most cases have restricted financial resources that impact all phases and components of a project, including planning and execution (Hosseinifard *et al.*, 2025). Also, they typically depend on many volunteers and part-timers, and this too can create issues with volunteer management. Unpaid community volunteers often do not have the same professional training or level of commitment as paid staff which results in inconsistent delivery of projects as well as no continuity of project teams (López-Cabrera *et al.*, 2020). A project, and a team, comprised of professionals and volunteers, and managing professionals and volunteers can be rather difficult to coordinate and complicates team dynamics.

In addition, unstable funding has also been a perennial challenge for NPOs. The majority of non-profits rely on grants, donations, and fundraising for their ability to operate as well, all of which are variable and subject to external economic circumstances (Essien, 2025). This can result in delays to projects, scalability and continuity of projects and project timelines/scope. In this context of non-stable funding, NPOs need to be particularly sensitive to managing resources efficiently and producing

value when it is needed.

Social objectives and community benefit are at the core of NPOs and CBOs. As opposed to profit-oriented projects, success of projects done with non-profits is typically evaluated based on social consequences such as improved community wellbeing or environmental sustainability (Benjamin *et al.*, 2022; Nordin *et al.*, 2022). This often creates a tension between social value that is hard to measure and that which is quantifiable, and often necessitates that project themselves be adaptive to shifting needs of communities. Responding to these issues requires a more agile and adaptive approach to managing projects that accounts for changes in focus, funding, and resources.

MATERIALS AND METHODS

This conceptual paper uses qualitative methods to discuss-out and conceptualize a data-analytics-based Agile project optimization for non-profit and community-based organizations (NPOs and CBOs). The literature review serves as the main data collection method, conducting a systematic review of the existing research on traditional project management, Agile project management, and data-analytics in project management. The chosen papers encompass the entire spectrum of methodologies, from traditional Waterfall and PRINCE2 to more agile frameworks, such as Scrum and Kanban. Studies pertaining to data analytics and project management are further presented to examine the potential role of real-time data insights in project decision making, resource management and project success rates.

To be sure there is no lack of understanding, the paper combines findings from several of these that discuss specifically the needs and limitations of non-profit projects. The analysis reinterprets existing methodologies to expose their applicability and constraints within the non-profit sector. Plus, based on the theoretical positioning of Agile and data analytics, the method also advances a hybrid model that merges the iterative and flexible emphasis of Agile with data driven decision making to offer a more dynamic and responsive approach to project management for NPOs.

RESULTS AND DISCUSSION

Reinterpreting Existing Findings: Revisiting Traditional Theories

Critique of Existing Project Management Theories
Waterfall, PRINCE2, and PMI, traditional project management PM paradigms have been dominant in the industry for decades. Such approaches promote a formal, sequential approach to project design, documentation and project planning in advance in detail, and documentation of processes followed throughout a project's lifecycle (Simonaitis *et al.*, 2023; Székely *et al.*, 2025). Though they are systematic and inclusive, their strict framework has the drawback of not being as applicable to non-profit organizations and Community- Based Organizations (NPOs, CBOs).

The application of traditional theories of PM, such as Waterfall, is highly problematic in the context of non-profit projects. In the Waterfall methodology there is a linear progression where the initiation, planning, execution, monitoring and closure phase must be completed before moving on to the next phase (Kirpitsas & Pachidis, 2022). It is inflexible and therefore works well for projects where the goals are well defined and the environment is stable. But the linear, prescriptive model does not necessarily work in an environment where issues such as the availability of funding, shifting community needs, and limited resources are the norm rather than the exception. Similarly, non-profit projects are rarely static and are regularly modified in terms of scope and goals, being responsive to the desires of various stakeholders, availability and type of funding, and changing community needs. These, but, are not the conditions that exist in a non-profit environment, where Waterfall presumes predictability and stability.

Moving through the same direction PRINCE2 (Takagi *et al.*, 2024), that suggests very formal documentation and control of each aspect of the project, can also be a very exhausting process for the staff and budget sizes that non-profits have. The effort and time that go into maintaining complete documentation is itself more than the returns for those projects which are not large scale or are not highly structured.

Traditional PM theories' dependence on heavy planning and forecasting does not account for the fluidity of non-profit projects either. These projects, like the examples from Yogyakarta, do not have a financial interest in the project, and their success is not determined by budgets and timelines but rather, achieving what the community needs.

Redefining Project Success in Non-profit Contexts

In the private sector, successful projects are traditionally evaluated in terms of being delivered within the agreed upon time, cost and quality, otherwise known as the triple constraint of project management (Njoroge, 2020; Rugenyi & Bwisa, 2016). But in the case of non-profit and community-based organizations, NPOs and CBOs specifically, traditional indicators of success are not always effective in measuring the projects' wider and more complex objectives. Non-profits, by their nature, are concerned with social good, community welfare, and impact rather than profitmaking (Benjamin *et al.*, 2022). In making this shift there also needs to be a different way of measuring success where social impact becomes the central measure of success.

For Instance, a non-profit organization working in the field of community health, could see success, not only in the execution of a health awareness campaign but also in the resulting sustainable behavioural change amongst the target population, involvement and empowerment of community members, or even in health outcomes that might take years to measure. Qualitative metrics of this nature are less easily quantifiable than the time/

cost/scope metrics that are more commonly employed in commercial projects.

Data analytics has the potential to help evaluate these forms of intangibles as forms of success. Non-profits can consistently collect data on important benchmarks such as those of participant satisfaction, behavioural change, and impact on the community and thus constantly assess and adapt their processes. For instance, analytics can help identify what aspects of a project or specific activities lead to the realization of community health outcomes so that efforts and resources can be allocated in areas that yield the greatest results.

On top of that, stakeholder feedback is also an important indicator of success for non-profits in general (Habibu & Kabiru, 2024). These non-profits also increasingly have the ability to use data analytics to capture a better and more continuous sense of how projects are serving the community, and thus changing the definition of success in terms of social value rather than simply project completion.

Agile as A Contingency-Based Solution

Agile project management provides a specifically adaptive, flexible approach to project management that addresses the uncertain and often precarious conditions under which non-profits, especially community-based organizations exist (AbuKhamis & Abdelhadi, 2022). The static, linear movement associated with traditional project management is often incompatible with the pace of change, and goals that are constantly shifting for many non-profit projects. Agile approaches on the other hand provide an alternative based on contingencies allowing non-profit organizations to be responsive and to quickly change course when things changed.

Agile's foundation is the iterative process of breaking projects down into smaller, more manageable chunks, or sprints. At the close of each sprint there is a review of the progress made a feedback session and corrections are made. This type of flexibility is important for non-profit organizations, as they need to be able to adapt quickly as funding priorities, community needs, and new opportunities fluctuate. If during a literacy project the NGO finds that the methodology of teaching is not appealing to its target community, using Agile, they can make these adaptations and deploy new strategies as soon as they come to realize them, rather than have to wait until project end.

In addition, Agile promotes collaboration with all stakeholders (AbuKhamis & Abdelhadi, 2022), which is again especially important for non-profit projects that include various stakeholders such as donors, beneficiaries, and community leaders. The Agile methodology places an emphasis on constant involvement with stakeholders, using feedback cycles to make sure that the project is in tune with the needs and expectations of all offered stakeholders. This is very important for non-profits because trust and engagement by stakeholders is a requirement for ongoing funding and support.

In addition, Agile offers a clear process for dealing with risk. Agile's focus on constant iteration and review makes it possible within non-profit initiatives, where risk might be inconsistent funding or an unstable political landscape, to identify and engage with risk as it arises rather than allowing it to fester into a larger problem (Amajuoyi *et al.*, 2024). In adopting the Agile model, non-profits can be projects remain relevant not only to external realities but also be effective for long term social change.

The Role of Data Analytics in Re-shaping PM Practices

The transformation that data analytics is having on project management is ubiquitous across sectors but uniquely impactful in non-profits. Conventional project management paradigms are based on historical data and static plans and are blind to the dynamic realities of projects. Conversely, data analytics enables non-profit organizations to make data-driven decisions in the moment, which supports more efficient and impactful project management practices (Onuche, 2024).

Particularly in the context of non-profits, which often have limited resources and operate under uncertain conditions, Decisions based on good, sound data can squarely improve the effectiveness of projects. NPOs, for example, could analyse donor engagement, volunteer participation, or project performance data to determine which approaches are most beneficial in optimizing the allocation of resources. This capacity to make real time decisions is especially useful working with small budgets, with funding that is not stable. With data analytics to track the performance of projects, non-profits could shift and pivot in the moment, investing in what provided the best ROI or social impact.

Also, the better engagement of stakeholders, a key element for the success of non-profit initiatives, can also be done through data analytics (Fu *et al.*, 2024). NPOs can adapt their project strategies to be more relevant to the community and stakeholders by ongoing assessment of stakeholder feedback. This continuous feedback cycle helps to ensure that the project meets stakeholder expectations, which in turn leads to higher levels of engagement and satisfaction.

Data analytics is a means of communication and collaboration between stakeholders in an environment of transparency and trust. Finally, project management of non-profits is beginning to use predictive analytics as a strong asset (Jikiemi, 2024). Non-profits may be able to anticipate potential problems, resource requirements, and risks by looking at past data from the projects they conducted to avoid problems. By taking such a proactive approach to project management, the non-profits who do this are less likely to “fail” at their projects, achieve greater success, and can feel comfortable that they are creating long-term value for the communities they work in.

Synthesis And Unifying Theoretical Framework

Combining Agile processes with data analytics has great

potential for meeting the unique needs of NPOs and CBOs. Drawing from the body of literature that exists on conventional project management, Agile project management, and data-analytics decision making, a combined model could be developed to help NPOs more effectively manage projects in a fluid, under-resourced context.

A synthesized approach to improve project management in NPOs starts from the flexibility and adaptability of Agile systems. The emphasis on iteration, teamwork and stakeholders found in Agile is particularly well aligned with non-profit projects that frequently require modification due to external influences including community needs, funding, and stakeholder expectations. Waterfall and PRINCE2 type project management are beneficial in stable conditions, but these are not flexible enough to handle the above.

Agile therefore becomes the basis for the model. It is organized in sprints, and regular reviews with stakeholders that allow non-profits to remain responsive and iteratively adjust their approaches. As an example, an NPO focused on community development could implement Scrum or Kanban, as a means of continually evaluating progress, assessing feedback, and shifting project goals/methods according to real-time data and insights. The cycle of iteration is crucial for NPO success because it helps continuously align projects with community priorities.

In addition to this, data analytics increases model flexibility through evidence-based information for decisions. Data analytics might be utilized in understanding metrics such as resource utilization, funding deployment, stakeholder engagement, and project impacts. Using donor analysis or volunteer trends, NPOs can adjust their engagement strategies and be more purposeful in addressing and serving community needs and utilizing resources. Non-profits can also use data to predict challenges, including the potential risk of lack of funding, and adjust proactively. The combination of Agility and analytics addressed in this framework allows non-profits to be nimble in a dynamic world while also providing methods to ensure that projects are cost-effective and impactful.

Developing a Unified Theory

While an Agile methodology informed by data analytics can be applied to project management, NPOs and CBOs often have different needs in their project management processes that will require an adaptation of an Agile approach to meet best their operational, strategic, and functional requirements – thus necessitating the development of a unifying theory of project management for NPOs and CBOs. Non-profits, by definition, have different sets of goals, constraints, and resources than for-profits. Non-profit projects are driven by values of social worth, community, and stakeholder involvement that are very different from those that dominate business and hence more traditional project management thinking theory. Thus, a new theory needs to be able to accommodate for these particularities, but should retain

the same flexibility and reactivity of Agile. This proposed unified theory marries Agile, Data, and Non-profit into three central tenets. Agile offers a flexible way of dealing with the fluidity of non-profit projects. Because of its iterative cycles, organizations are able to respond and adapt to changes in scope, community needs, and other external conditions. Such transitions are common within the non-profit universe as the nature of funding, volunteer time, and social problems is itself fluid. The Agile approach is flexible enough that projects can pivot without losing the mission of the project. Data analytics supports this adaptability by delivering useful information on project performance and stakeholder engagement. Decision making in this model is based on ongoing metrics such as number of volunteer hours, feedback from stakeholders on the projects, achievement of the milestones of the projects etc. For example, a NPO focused on Disaster relief can monitor, in real-time, where resources have been distributed, funds have been utilized, or volunteers have been engaged to streamline logistics and enhance operational efficiency. It also helps non-profits base their decisions on data rather than assumptions so that when they iterate on the project it is based on actual data.

The unified theory asserts that the social impact of the project must be the focal point of non-profit projects. Though by definition project management theory tends to emphasize constraints of time, cost and scope the importance of the non-profit project's social goal muddles this dichotomy between time, cost and scope constraints. Combining Agile's development sprints with data-driven analytics allows non-profits to have continual alignment of projects with mission and community needs. Ultimately these lead to greater stakeholder satisfaction, community outcomes, and resource efficiency.

In addition, a joint theory argues cross-functional teamwork as critical. Team autonomy, continuous feedback, and iterative improvement are all tenets of Agile which help non-profit teams become cohesive, focused and in line with their mission. Such teams are more prepared to deal with the non-linear nature of non-profit work, projects and initiatives.

It is therefore also a new perspective that goes beyond enhancing project management for non-profits and represents an orientation of non-profit project management away from delivering a project on time and within budget and towards an orientation towards outcomes and impact. This use of Agile and data analytics allows non-profits to be adaptive, effective and sustainable in a consistent environment of flux.

Contingency Theory of Project Management

According to the Contingency Theory of Project Management, there is no single best method to project management, but rather "management should be adapted based on project size, complexity, level of stakeholder engagement, environmental conditions, etc." (Shala *et al.*, 2021). This theory could then be used to understand the

relative effectiveness of different project management techniques given the specifics of a given non-profit or community-based organization and project within that organization.

Within the agile approach oriented by data analytics that I propose, the contingency theory would contend that the most suitable methodology for non-profit projects is determined by project size, community engagement, and stability of funding (Magistretti & Trabucchi, 2025). For instance, small community-based initiatives that depend largely on volunteer work and are not stable in terms of funding, may be more suited to take advantage of the flexibility of Agile's iterative cycles. On the other hand, larger non-profit initiatives, who have stable funding, and established organizations may find more formal methodologies such as PRINCE2, which has clearly established roles and structures, more appropriate. Plus, the role of stakeholders in the selection of methodology is an important aspect of the theory itself (Habibu & Kabiru, 2024). In community-based projects where stakeholders are key to the project itself, the Agile philosophy of continuous feedback, collaboration and iterative work, guarantees that stakeholders be the beneficiaries, donors or community members, continue to engage throughout the project. Non-profits continuously adapt the project based on their input to ensure that it remains relevant in addressing community needs and priorities as these shift.

This project contingency approach to a unified theory implies that, for each non-profit, decisions on which project management methodology to adopt should be based on an evaluation of factors including the nature of the project, resources at hand, community participation, and project size. Agile development provides the necessary flexibility and responsiveness required by most non-profit projects, while the application of data analytics to strengthen decision making ensures that the project continues to be an adaptive process that is informed by

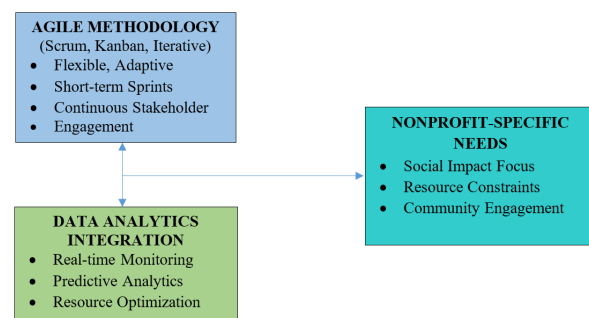


Figure 4: Illustration: Integrating Agile with Data Analytics for Non-profit Project Management

objectives and external factors.

Practical Implications And Future Directions

Bringing a data-analytics and Agile approach to NPOs and CBOs has huge potential to improve project

management in these organizations. Agile and analytics together represent the theoretical construct that can create the formidable decision-making model for NPOs and CBOs operating in these fast-changing, resource-poor environments. The move towards operationalizing this framework is based on utilizing Agile principles along with well- formulated tools to collect and analyse data.

• Agile Integration in Project Teams: Translating this framework into practice starts with implementing Agile methodologies at the NPO within its current project teams. Perhaps get some of the important staff and/or volunteers trained in something like Scrum or Kanban where sprints and regular reviews with stakeholders are a focus. Practically this translates into working in iterative cycles where at the end of a sprint project results are analysed and feedback is integrated instantly. It helps to ensure that the project is relevant to the community it seeks to benefit, even if outside conditions have changed. Agile use of cross functional teams; where people in varying roles work together, improves the organization’s collaboration, communication, and

accountability.

• Data Analytics Integration: In order to engage in data-analytics-informed project management, non-profits must continuously collect and analyse data throughout the project cycle. Tools such as Google Analytics, Tableau, or specific non-profit project management tools such as Asana or Trello can help track the progress of projects, who is being engaged with, how resources are being used, and what kinds of outcomes are being achieved. Information obtained from surveys, interviews with stakeholders or feedback forms can then be processed and analysed to generate real time information on the performance of the project. Volunteer hours or use of funds, for example, can be monitored to help modify project pathways, improve resource use and allocate a better sense of emerging risks.

Potential Tools, Technologies, And Practices

To support the operationalization of the developed data-analytics-informed Agile methodology in NPOs and CBOs, the following tools and technologies can be

Table 1: Tools for operationalization of data-analytics-informed Agile methodology in NPOs and CBOs

Category	Tool/Technology (Sources)	Description
Agile Tools	Jira (Avramovska <i>et al.</i> , 2024)	Robust project management tool well suited for Agile. Enables the team to schedule, understand and be aware of the status and blocks of work in sprints.
	Monday.com (Noori, 2025)	Agile-supportive project management tool. Facilitates planning and tracking of tasks/sprints in real time.
	Trello (Naik <i>et al.</i> , 2019)	Intuitive and simple way of managing tasks using boards and cards that makes it easy to see what stages tasks are in and to iteratively make changes to workflows.
Data Analytics Tools	Tableau (Marapatla, 2025)	Dashboard tool to visualize project performance data and enable leaders to see where issues are developing or where things may need to shift.
	Power BI (Gonçalves <i>et al.</i> , 2023)	Business analytics service for helping to visualize performance data of projects in order to see if you are meeting goals or where issues are.
	Google Analytics (Harris, 2024)	Web analytics service which serves to evaluate campaigns as part of the effectiveness of outreach or fundraising efforts by providing information about who is engaging with the community and who is donating.
	Excel (Shapiro & Oystriick, 2018)	Commonly used for metrics tracking, budgeting, and scheduling due to its adaptability and accessibility for many non-profits.
Stakeholder Engagement Platforms	SurveyMonkey (Ong <i>et al.</i> , 2023)	Survey platform to gather real-time inputs from members of the community, stakeholders & volunteers to stay attuned to their needs and expectations.

employed as shown on Table 1.

Suggestions for Empirical Research to Test The Propositions Developed

Future research should include case studies of non-profits that have adopted Agile as well as data science, examining project success, stakeholder satisfaction and impact. Also, longitudinal studies could document the long-term outcomes of these practices on sustainability,

in contrast to conventional practices, in terms of resource management, and levels of community benefit. Additionally, perspectives on these challenges and benefits from the perspective of non-profit managers and relevant stakeholders could be gained through surveys and interviews. In addition, the contribution of artificial intelligence, machine learning, blockchain and mobile technologies in helping projects to be more

effective, efficiently allocate resources, and increase transparency in Non-profit management should be studied.

CONCLUSION

Now more than ever, there is a serious need for new forms of project management specifically within NPO and CBOs. Because these organizations function in resource poor, intermittently funded and, changing community context, usually project management approaches were not sufficient to provide a framework for success. Because non-profit projects are dynamic and have social impact at their core, the engagement of stakeholders and community requires a responsive data-driven approach. Combining Agile's way of doing things and data analytics presents an answer that enables NPOs to be adaptive while still running an efficient and manageable project. Organizations using this model are able to adapt to a rapidly changing environment, basing their decisions on live data. Non-profits can fine-tune their resource-thought processes and deploy their assets, and engage the community more efficiently and effectively utilizing this data driven model for understanding and acting upon the world to create a sustainable social impact. As the non-profit industry has more competition, less funding, and less predictable environments, the Agile approach, that is based on data-analytics, is a way to move forward that can improve projects outcomes and also innovate project management.

In terms of where NPOs and CBOs could head, I see the future of project management as the combination of flexible processes such as Agile and the capabilities of data analytics. The adapted framework presented in this paper overcomes all the issues faced by non-profit project managers, and allows for flexibility and no waste. As technologies like AI, machine learning, and mobile applications continue to advance, the potential for the optimization of project management will only increase. The development of project management theory for non-profits is still a work in progress. As more non-profits begin using these new methods, increasing historical and empirical research opportunities will exist in order to update and verify the discussed concepts and ensure project management continues to evolve with the complex nature of the non-profit sector. Accepting such tools will allow NPOs and CBOs to be more effective, sustainable, and resilient in tackling the most relevant problems of populations around the world.

Ultimately, in a world that is becoming more complex and changing more quickly, the combination of Agile and data analytics will drive the future of project management for non-profits, enabling them to work effectively amidst uncertainty and achieve meaningful and sustainable impact.

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