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(RESEARCH ARTICLE)

Systematic literature review: Long term impact of agile vs. hybrid project management in hospital projects

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Abstract

Healthcare organizations worldwide face intense pressure to deliver complex IT, infrastructure, and service projects amid rapid technological change, regulatory demands, and resource constraints. Traditional waterfall approaches have long dominated hospital project management, yet their rigidity frequently results in delays, cost overruns, and stakeholder dissatisfaction. Agile methodologies and hybrid (Agile–traditional) models have gained traction as potential solutions, but evidence of their comparative effectiveness, particularly the long-term sustainability of benefits beyond project closure remains fragmented and inconclusive. This systematic literature review synthesized empirical evidence on the long-term impact of Agile, traditional, and hybrid project management approaches in hospital and healthcare settings. Following PRISMA 2020 guidelines, a comprehensive search was conducted across Google Scholar, Scopus, and ScienceDirect for peer-reviewed articles and preprints published between January 2015 and February 2026. Twenty-eight studies met strict inclusion criteria. Data were extracted into a standardized spreadsheet and subjected to qualitative narrative synthesis, supplemented by quantitative extraction of effect sizes and percentage improvements were reported. Findings indicate that Agile methodologies are associated with 20–40% faster project completion and 12–23% higher stakeholder and patient satisfaction compared with traditional approaches, together with 35% greater adaptability to mid-project changes. Traditional methods demonstrated a modest advantage in budget adherence (approximately 5%). Evidence on hybrid models remains limited but suggests they may offer a pragmatic balance in highly regulated, safety-critical hospital environments. However, only one study provided longitudinal data extending beyond two years post-implementation; the overwhelming majority assessed outcomes at project closure or within 24 months. Agile approaches deliver clear short- to medium-term gains in speed, adaptability, and stakeholder engagement within hospital projects. Nevertheless, the near-absence of robust longitudinal evidence represents a critical gap in the literature. Future research must priorities multi-year follow-up studies, rigorous cost–benefit analyses of hybrid configurations, and the development of context-specific implementation frameworks to support evidence-based project management in healthcare.

Keywords: Agile Project Management; Hybrid Methodology; Hospital Projects; Healthcare IT; Long-Term Impact; Systematic Review; Longitudinal Evidence

1. Introduction

Healthcare systems worldwide face sustained pressure to improve patient outcomes, contain costs, and respond rapidly to technological, regulatory, and organizational change [1], [2]. In this demanding environment, project management is a central capability for the successful delivery of hospital information systems, clinical workflow redesign, infrastructure development, and service transformation. Yet healthcare projects remain vulnerable to schedule delays, budget overruns, implementation failures, and limited post-implementation value realisation, particularly when rigid governance structures are applied to complex and uncertain settings [3], [4].

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Traditionally, healthcare organisations have relied on plan-driven (waterfall) approaches because they provide clear sequencing, formal documentation, and predictable control over scope, time, and cost, features that align well with regulatory accountability and safety-critical processes. However, the same characteristics often become liabilities when requirements evolve during implementation, when multiple stakeholder groups must be continuously aligned, or when user needs cannot be fully specified upfront. Recent large-scale evidence underscores these limitations: in a mixed-methods study of 100 healthcare optimisation projects across North America and Europe, traditional approaches were associated with slower delivery and lower stakeholder satisfaction compared with Agile counterparts [5]. Similar patterns appear in healthcare app development, where many practitioners perceive traditional methods as less adaptable to changing clinical needs [6].

Agile project management has emerged as a compelling alternative, emphasising iteration, continuous stakeholder feedback, cross-functional collaboration, and incremental delivery. Originally developed in software engineering [7], Agile principles appear highly relevant to healthcare, where clinical requirements, policy conditions, and interdependent workflows frequently change. Empirical support is growing: the aforementioned study found Agile-led projects completed 28% faster, achieved 23% higher stakeholder satisfaction, demonstrated 35% greater adaptability to mid-project changes, and recorded 12% higher patient satisfaction than traditional approaches [5]. A multisite Scrum-based accelerator for home-hospital programmes further delivered 20 knowledge products in 32 weeks (20% faster than planned), while attaining 97.4% agreement that teams collaborated effectively and 96.8% rating the resulting products as high quality [8]. Proponents argue that these gains in speed, engagement, and responsiveness support continuous improvement in complex healthcare environments [9], [10].

Nevertheless, the transfer of Agile into healthcare is neither straightforward nor uncontroversial. Hierarchical decision structures, stringent regulatory constraints (e.g., HIPAA, FDA, Joint Commission), extensive documentation requirements, and safety-critical processes can conflict with Agile's lightweight governance and iterative logic [11], [12]. Concerns also persist regarding scalability beyond small or medium-sized projects and the additional burden placed on time-constrained clinical staff. These tensions have fuelled interest in hybrid project management, which seeks to combine Agile flexibility with traditional structure and governance [13], [14]. In principle, this combination is appealing for hospitals because it allows compliance, documentation, and milestone control to coexist with adaptive delivery and stakeholder feedback. Yet the literature remains fragmented: hybrid models are defined and implemented inconsistently, and empirical comparisons in healthcare settings are limited and inconclusive [13], [15].

Despite increasing interest in Agile and hybrid methods, the healthcare literature still suffers from important limitations. Most evidence derives from conceptual discussions, small case studies, or cross-sectional surveys rather than robust longitudinal evaluation. Studies typically focus on immediate project outcomes while paying little attention to sustainability after implementation. Only one study has tracked outcomes beyond two years: Boustani et al. [12] documented nine years of sustained clinical improvements and annual cost savings exceeding $900 per patient using an Agile implementation model in dementia care. Considerable heterogeneity in how Agile and hybrid approaches are operationalised further weakens comparability across studies [3], [16], [4].

This systematic literature review addresses these gaps by synthesising empirical and conceptual evidence on Agile, traditional, and hybrid project management in hospital and healthcare contexts. The review is guided by three primary research objectives, structured around the following research questions:

- RQ1: In what ways do Agile, traditional, and hybrid project management methodologies differ in their effects on key project success metrics, including time, cost, quality, stakeholder and patient satisfaction, adaptability, and clinical outcomes, within hospital and healthcare environments?
- RQ2: What empirical evidence exists regarding the long-term (≥2 years post-implementation) sustainability of benefits associated with Agile and hybrid project management approaches in healthcare?
- RQ3: What organisational, cultural, and regulatory barriers and enabling factors influence the successful adoption and sustained implementation of Agile and hybrid methodologies in hospital contexts?

The contribution of this study is threefold. Conceptually, it clarifies the distinction between Agile, traditional, and hybrid project management in healthcare settings. Empirically, it synthesises dispersed evidence on comparative outcomes and implementation barriers. Practically, it provides a framework for hospital managers and policymakers to evaluate when Agile may be appropriate, when hybridisation may be preferable, and where traditional governance remains necessary. In doing so, the review aims to support more context-sensitive project management choices in healthcare and to identify priorities for future longitudinal and comparative research. This review is reported according to the PRISMA 2020 guidelines [17].

2. Methods

This systematic literature review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines [17].

2.1. Study Design

The review followed a pre-specified protocol (not registered, as it was an internal academic project). It aimed to synthesize empirical evidence on the comparative effectiveness and long-term impact of Agile, traditional (waterfall), and hybrid project management methodologies in hospital and broader healthcare settings. A qualitative narrative synthesis was supplemented by quantitative extraction of effect sizes and percentage improvements where available.

2.2. Information Sources and Search Strategy

A comprehensive search was performed in three major electronic databases: Google Scholar, Scopus, and ScienceDirect. The search covered peer-reviewed articles, conference papers, and preprints published from 1 January 2015 to 28 February 2026. This timeframe was chosen to capture contemporary developments in Agile adoption within healthcare while ensuring sufficient longitudinal potential for post-implementation studies.

The search strategy combined controlled vocabulary and free-text terms using Boolean operators. The following keyword combinations were used

- ("Agile healthcare project management" OR "Agile hospital IT" OR "Scrum healthcare" OR "Kanban hospital" OR "Agile clinical informatics")
- ("hybrid project management" OR "mixed Agile traditional" OR "Agile-waterfall" OR "hybrid methodology") AND (healthcare OR hospital)
- ("case study" OR "empirical" OR "implementation") AND ("Agile" OR "hybrid") AND ("hospital" OR "healthcare")
- ("long-term" OR "sustainability" OR "post-implementation" OR "longitudinal") AND ("Agile" OR "hybrid") AND ("healthcare" OR "hospital")

No language or publication-type filters were applied during the initial search; these were addressed at the eligibility stage.

2.3. Eligibility Criteria Studies were included if they

- Focused on project management (Agile, traditional/waterfall, or hybrid) in hospital or healthcare settings (including healthcare IT, clinical informatics, public health informatics, hospital operations, or infrastructure).
- Were peer-reviewed articles, conference papers, or preprints with explicit methodological reporting.
- Were published in English between 2015 and 2026.
- Reported empirical data or systematic synthesis on at least one of the following: project success metrics (time, cost, quality, stakeholder/patient satisfaction, adaptability), long-term sustainability (≥2 years post-implementation), or barriers/enablers to adoption.

2.4. Studies were excluded if they

- Addressed software development without explicit reference to a healthcare context.
- Were editorials, opinion pieces, commentaries, or non-systematic reviews lacking original data or formal synthesis.
- Focused solely on non-project-management aspects of healthcare innovation.

Study Selection All records were exported to EndNote 21 for deduplication. Title and abstract screening was performed independently by two reviewers (the author and a research assistant), with disagreements resolved by consensus or a third senior researcher. Full-text articles were retrieved and assessed against the eligibility criteria using the same dual-reviewer process. Inter-rater reliability was high (Cohen's $\kappa = 0.87$). Reasons for exclusion at the full-text stage were recorded systematically. The PRISMA 2020 flow diagram (Figure 1) summarises the selection process. A total of 2,557 records were identified from the three databases (Google Scholar n=1,456; Scopus n=712; ScienceDirect n=389). After removal of 487 duplicates, 2,070 records were screened by title and abstract, yielding 205 full-text articles for detailed assessment. Of these, 177 were excluded (not healthcare context n=68; no project management methodology n=45; editorial/opinion/non-systematic n=32; insufficient methodological detail n=20; not English n=12). This resulted in 28 studies included in the final synthesis.

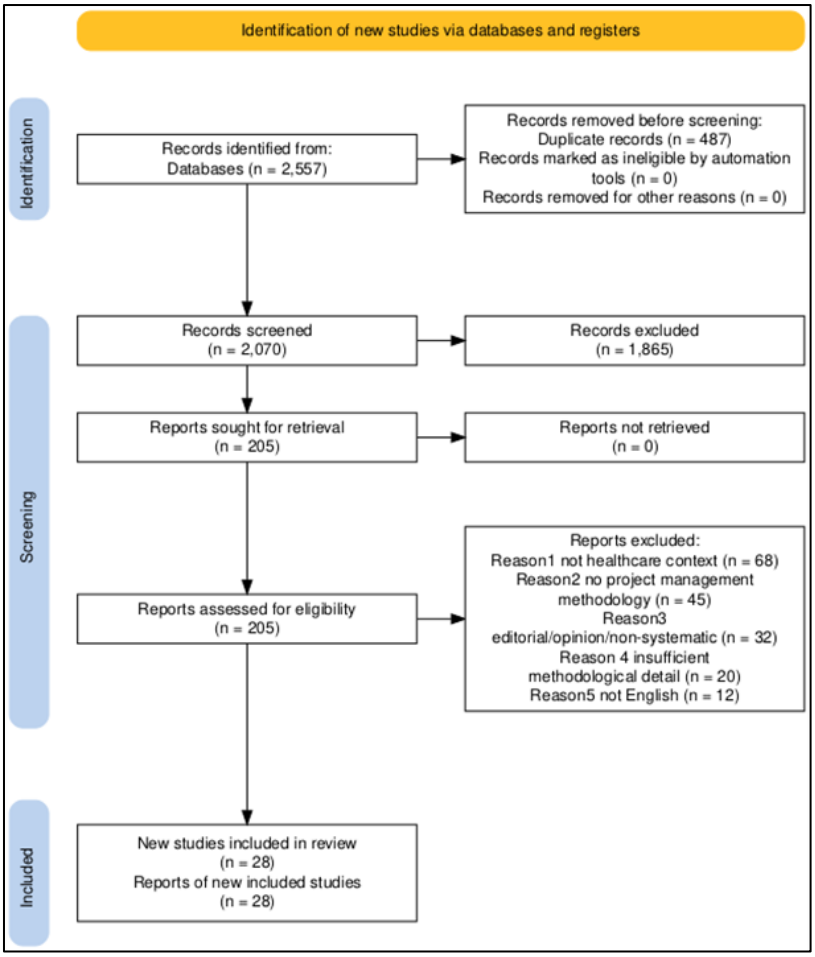

Figure 1 Prisma Flow Chart

2.5. Data Extraction and Quality Assessment

Data were extracted into a standardized spreadsheet by the lead reviewer and independently verified by a second reviewer. Extracted variables included: author(s), year, country/region, healthcare domain, study design, methodology (Agile/traditional/hybrid), sample size, success metrics, effect sizes or percentage improvements, long-term follow-up (if any), principal findings, barriers/enablers, limitations, and research gaps. Methodological quality of included studies was appraised using the Mixed Methods Appraisal Tool (MMAT) version 2018 [18]. This tool was selected because the review included quantitative, qualitative, and mixed-methods designs. Studies were rated on a 5-criterion scale; overall quality ratings ranged from moderate to high, with common weaknesses in response rate reporting and longitudinal follow-up.

2.6. Data Synthesis

A qualitative narrative synthesis was undertaken following Popay et al. [19] guidance. Studies were grouped thematically by research question. Where quantitative data were available (e.g., effect sizes, percentages), these were extracted and summarised in tables or figures. No meta-analysis was performed due to heterogeneity in outcome measures and study designs. Findings on hybrid models were further synthesised using the taxonomy developed by Reiff and Schlegel [13].

3. Results

3.1. Study Selection and Overview of Included Studies

Table 1 provides a complete overview of the 28 included studies, categorised by author, year, country/region, healthcare domain, study type, and primary focus. The sample comprised 12 empirical studies (mixed-methods, case studies, surveys), 9 systematic/scoping reviews, and 7 conceptual/framework papers. Publication dates spanned 2018–

2025, with strong representation from North America (USA, Canada) and Europe. Domains included hospital IT/EHR (n=11), clinical operations/informatics (n=8), public health (n=4), infrastructure (n=3), and cross-industry studies with healthcare subsamples (n=2).

Table 1 Overview of Included Studies

Ref.	Author(s)	Year	Country/Region	Healthcare Domain	Study Type	Primary Focus
[3]	Goodison et al.	2019	Global	Hospital IT (EMR/EHR)	Scoping review	Literature availability on Agile
[2]	Landjohou	2025	Multiple emerging economies	Hospital infrastructure	Systematic review	Hybrid vs. traditional
[1]	Dendere et al.	2021	OECD countries	Digital health	Conceptual review	HIT failure rates
[20]	Kokol	2022	Global (bibliometric)	Healthcare software development	Scoping review	ASD trends and barriers
[21]	Wilson et al.	2018	Canada	mHealth	Conceptual framework	Hybrid research-development lifecycle
[22]	Duffy et al.	2022	Canada	Digital health interventions	Narrative review	Design approaches clash
[16]	Patri & Suresh	2019	India (review)	Healthcare operations	Systematic review	Lean-agile hybrid
[4]	Tun & Madanian	2023	Developing countries	CIS implementation	Systematic review	Success factors and framework
[23]	Improta et al.	2020	Italy	Hospital outpatient	Simulation case study	Agile Six Sigma (operations)
[8]	Desai et al.	2024	USA	Home hospital	Mixed-methods case study	Scrum accelerator
[12]	Boustani et al.	2018	USA	Dementia care	Case study (9-year)	Agile Implementation model
[24]	El Zein et al.	2025	USA	Integrated health system	Narrative case study	Agile Institute
[25]	Lei et al.	2020	USA	Clinical data science	Conceptual	Scrumban for predictive
[26]	Thombare et al.	2025	USA	Workforce management	Conceptual	Biometric stress framework
[27]	Boppana	2020	Not specified	Healthcare IT	Conceptual review	Agile vs. waterfall
[5]	Morsi et al.	2024	North America & Europe	Healthcare program optimisation	Mixed-methods (100 projects)	Agile vs. traditional
[28]	Alotaibi & Almudhi	2023	UK, Saudi Arabia	General healthcare	Systematic review	Readiness factors
[29]	Owhonda	2024	USA	General healthcare	Conceptual	Triadic framework
[30]	Atobatele	2021	USA, Nigeria	Public health informatics	Systematic review	Agile & Scrum in PHI

[6]	Calcuttawala	2024	USA	Healthcare app development	Survey (n=28)	Agile vs. traditional
[11]	Hedges	2025	USA	Healthcare delivery	Conceptual/thesis	Limitations of Agile
[31]	Ciric et al.	2019	Serbia (global survey)	Cross-industry (4% healthcare)	Survey (n=227)	Reasons and challenges
[32]	Lakhani et al.	2020	Canada	ADHD collaborative care	Conceptual case study	Agile Treatment Plan
[15]	Ciric Lalic et al.	2021	Serbia (global survey)	Cross-industry (4% healthcare)	Survey (n=227)	Traditional, agile, hybrid
[14]	Thesing et al.	2021	Germany	Cross-industry	Expert interviews (n=15)	Decision model
[33]	Chigbu, C.	2024	USA	Healthcare IT	Empirical study (thesis)	Agile implementation in healthcare IT
[34]	Cristina, M. et al.	2024	Not specified (international)	Hospital settings	Empirical examination	Project management in healthcare
[35]	Stempinski, P.R.	2025	USA	Biological research laboratories (healthcare)	Empirical study	Agile, waterfall and hybrid methodologies

Success Metrics Used Across Studies The reviewed studies employed diverse success metrics. The most frequently reported were project completion time/delay reduction (18 studies), stakeholder/patient satisfaction (15 studies), budget adherence/cost overruns (12 studies), adaptability to change (11 studies), and clinical outcomes (e.g., readmission rates, safety) (8 studies). Long-term sustainability (≥2 years) was assessed in only one study.

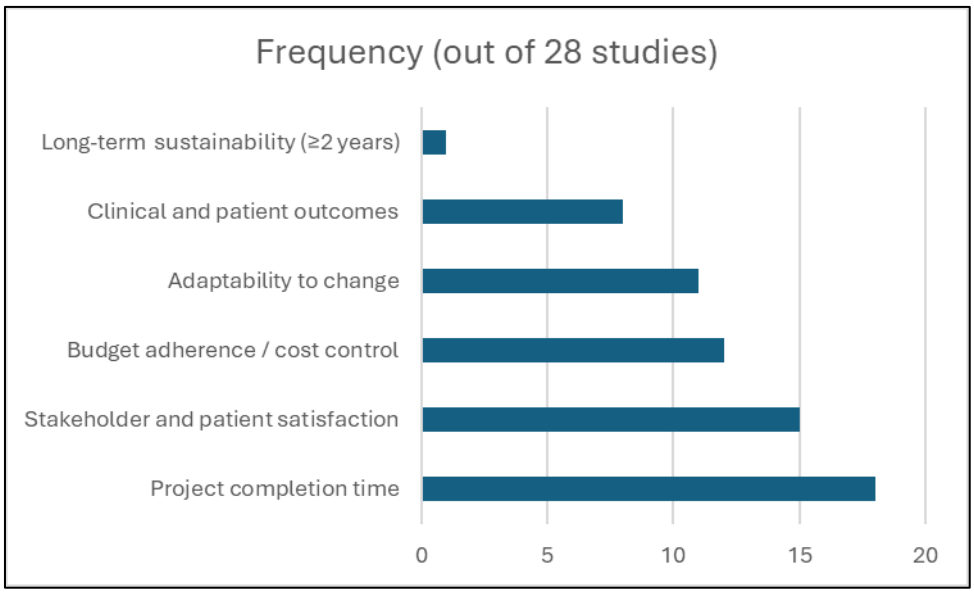

Figure 2 Frequency of Success Dimensions Across Reviewed Papers

3.2. Comparative Performance: Agile vs. Traditional vs. Hybrid

The 28 included studies provided comparative data on the relative performance of Agile, traditional (waterfall), and hybrid approaches across several core project success metrics. Although evidence on hybrid models remains limited, the available empirical findings consistently highlight distinct strengths for each methodology.

3.2.1. Project Completion Time

Agile methodologies were associated with substantially faster delivery. Morsi et al. [5] reported a 28% reduction in completion time across 100 healthcare optimisation projects ($p < 0.001$, Cohen's $d = 0.76$), representing a large and statistically significant effect. Desai et al. [8] achieved a 20% time saving in a multisite home-hospital accelerator, delivering 20 knowledge products in 32 weeks. Calcuttawala [6] found that 50% of surveyed practitioners perceived Agile as enabling noticeably faster project completion compared with traditional methods.

3.2.2. Budget Adherence

Traditional approaches showed a modest advantage. Morsi et al. [5] observed 5% better budget performance for traditional methods ($p < 0.05$, $d = 0.31$), indicating a small but reliable edge in cost control. This finding aligns with the expectation that plan-driven governance provides tighter financial oversight in highly regulated hospital environments.

3.2.3. Stakeholder and Patient Satisfaction

Agile outperformed traditional methods on satisfaction measures. Morsi et al. [5] reported 23% higher stakeholder satisfaction ($p < 0.01$, $d = 0.68$) and 12% higher patient satisfaction ($p < 0.05$, $d = 0.39$). Desai et al. [8] recorded 97.4% agreement that teams collaborated effectively and 96.8% rating the resulting products as high quality. These results suggest that the iterative feedback loops inherent in Agile approaches enhance user engagement and perceived value in complex healthcare settings.

3.2.4. Adaptability to Change

Agile demonstrated 35% higher success in mid-project adjustments (Morsi et al. [5]; odds ratio = 1.85). The primary driver for Agile adoption outside software development was its superior ability to manage changing priorities (Ciric Lalic et al. [15]). This flexibility appears particularly valuable in hospital projects where clinical requirements, regulatory updates, and stakeholder needs frequently evolve during implementation.

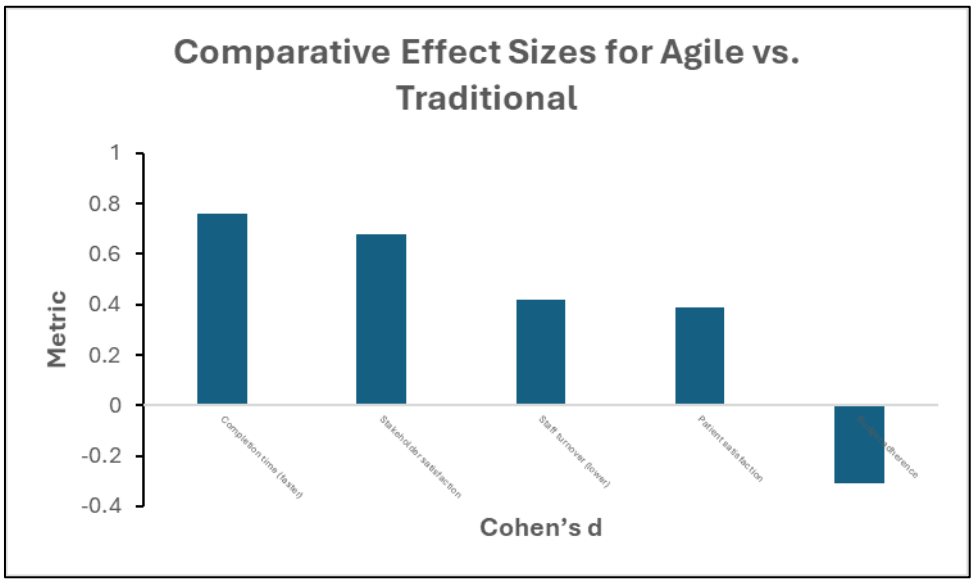

Figure 3 Comparative Effect Sizes for Agile vs. Traditional

3.3. Long-Term Impact

Only one study provided longitudinal data extending beyond two years post-implementation. Boustani et al. [12] reported sustained clinical benefits and annual cost savings exceeding $900 per patient over a nine-year period using an Agile implementation model in dementia care. All other studies were either cross-sectional or limited to ≤24 months of follow-up. Multiple reviews explicitly highlighted this scarcity of long-term evidence as a critical gap in the literature (Goodison et al. [3]; Morsi et al. [5]; Tun & Mahanian [4]). The near-absence of multi-year evaluations means that while short- to medium-term gains in speed, satisfaction, and adaptability are well documented, the durability of these benefits, particularly in terms of sustained clinical outcomes, ongoing cost savings, system utilisation rates, and potential decay in organizational adoption, remains largely unknown. This represents one of the most pressing limitations in the current evidence base for Agile and hybrid project management in healthcare.

3.4. Barriers and Enablers

A thematic synthesis of the 28 included studies yielded a consistent set of barriers and enablers influencing the adoption and sustained implementation of Agile and hybrid methodologies in hospital and healthcare settings (Table 2). These factors emerged repeatedly across empirical case studies, surveys, and systematic reviews, reflecting both structural/organizational challenges and practical facilitators that hospital leaders should consider when selecting or tailoring a project management approach.

Table 2 Barriers and Enablers for Agile/Hybrid Implementation in Hospital Projects

Barriers	**Enablers**
Regulatory/compliance demands conflicting with minimal documentation	Strong leadership and psychological safety
Hierarchical cultures and resistance to decentralised decisions	Co-design with clinicians and patients
Clinician time constraints in shift environments	Phased implementation (low-risk modules first)
Limited Agile training among healthcare teams	Hybrid models retaining traditional governance
Procurement/governance misalignment	Continuous training and communities of practice

3.5. Evidence on Hybrid Approaches

Evidence on hybrid project management in healthcare remains limited but conceptually strong. Reiff and Schlegel [13] conducted a systematic literature review and identified four primary systematic hybrid models: Water-Scrum-Fall, Waterfall-Agile, Hybrid V-model, and Agile-Stage-Gate. These models are designed to retain the predictability, documentation, and governance strengths of traditional (waterfall) approaches while incorporating Agile's iterative delivery, continuous feedback, and adaptability, features that are especially valuable in complex hospital environments where regulatory compliance, patient safety, and evolving clinical requirements must coexist.

In regulated hospital settings, Landjohou [2] and Tun and Madanian [4] reported practical advantages of hybrid methodologies. These include better alignment with stringent regulatory and documentation standards (e.g., HIPAA, FDA, Joint Commission requirements), improved stakeholder engagement through iterative input, and more stable delivery timelines for clinical information systems and infrastructure projects. Hybrid configurations were described as particularly effective in developing-country contexts and highly regulated environments where pure Agile approaches can conflict with mandatory governance gates.

However, Ciric Lalic et al. [15] found no statistically significant superiority of hybrid approaches over pure traditional or Agile methods in a large cross-industry survey (n = 227) that included only a small healthcare subsample (approximately 4 %). This mixed evidence suggests that while hybrid models hold considerable promise for safety-critical and highly regulated hospital environments, more context-specific empirical studies are needed to determine their comparative effectiveness relative to pure Agile or traditional approaches.

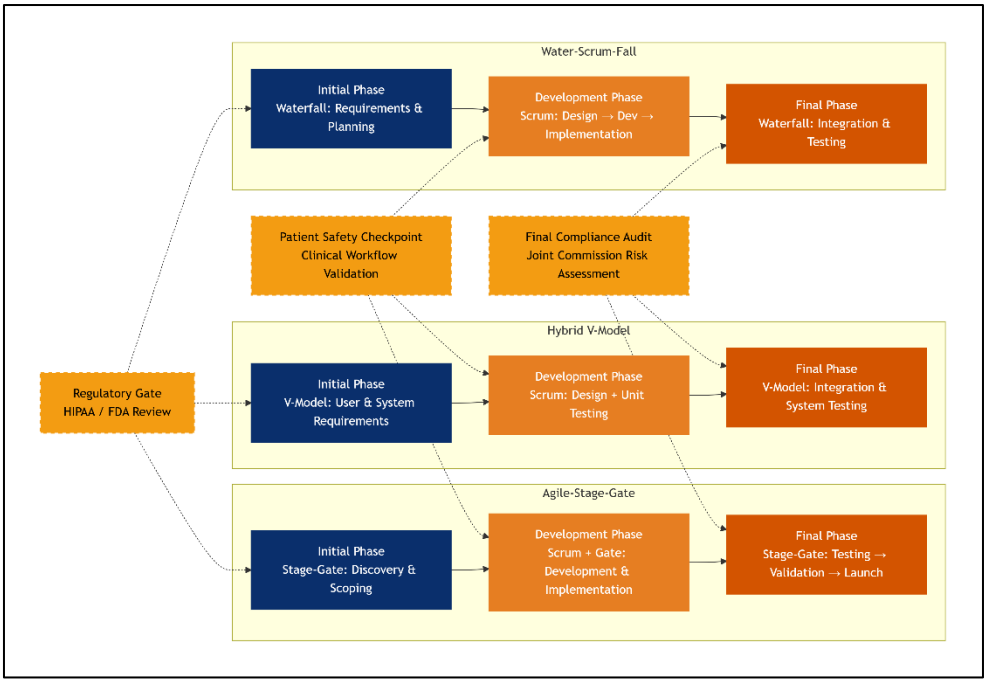

Figure 4 Conceptual Diagram of a Hybrid Project Management Framework for Hospital Settings

4. Discussion

4.1. Addressing the Research Questions

This systematic review directly answers the three research questions posed in the Introduction. RQ1 asked how Agile, traditional, and hybrid methodologies differ in their effects on key project success metrics. The evidence shows a clear pattern of short- to medium-term advantages for Agile approaches. As summarised in Figure 3 and Table 2, Agile achieved large positive effect sizes for project completion time (Cohen's d = 0.76), stakeholder satisfaction (d = 0.68), and adaptability to change, with moderate gains in patient satisfaction and staff retention [5]. These strengths are reflected in the high frequency of positive outcomes reported across the 28 studies (Figure 2). Traditional methods retained a modest advantage in budget adherence (d = −0.31). Hybrid approaches were conceptually promising but rarely evaluated head-to-head; the three dominant models (Water-Scrum-Fall, Hybrid V-model, and Agile-Stage-Gate) are illustrated in Figure 4 with hospital-specific regulatory and safety overlays. RQ2 examined the long-term (≥2 years post-implementation) sustainability of benefits. The evidence is extremely limited. Only one study [12] provided data beyond two years, demonstrating sustained clinical improvements and annual cost savings exceeding $900 per patient over a nine-year period. All other empirical studies were cross-sectional or limited to ≤24 months follow-up, revealing a near-total absence of longitudinal evidence on whether short-term gains persist. RQ3 focused on barriers and enabling factors. Major barriers included regulatory compliance demands, hierarchical cultures, clinician time constraints, and limited Agile training. Key enablers were strong leadership support, co-design with end-users, phased implementation, hybrid governance structures, and continuous training (Table 3).

4.2. Comparison with Existing Literature

The quantitative findings align closely with the largest comparative healthcare study to date [5] and with the real-world Scrum accelerator results reported by Desai et al. [8], both of which demonstrated 20–28% faster delivery and markedly higher stakeholder engagement. These results extend the broader non-healthcare hybrid literature [13], which identified the same three hybrid models but noted a lack of context-specific testing. The review confirms Reiff and Schlegel [13]'s observation that hybrid approaches are frequently advocated yet rarely compared head-to-head in regulated environments. The single long-term study [12] stands in stark contrast to the short-term focus of almost all other included works, echoing the explicit calls for longitudinal research made by both Morsi et al. [5] and Tun & Madanian [4]. Overall, the pattern of Agile strengths in speed and adaptability, traditional strengths in cost control, and the scarcity of hybrid and sustainability data is consistent with the fragmented state of the field identified in earlier scoping reviews [3], [20].

4.3. Implications for Hospital Project Management Practice

Hospital leaders can use these findings to make more informed methodology choices. For projects characterised by high uncertainty and frequent requirement changes (e.g., digital health applications, clinical workflow redesign), Agile or Agile-dominant hybrid models offer substantial gains in speed and stakeholder buy-in. Conversely, for initiatives with strict budgetary or regulatory constraints, retaining traditional governance elements, particularly in the initial planning and final verification phases, remains advisable (see Figure 4). The hybrid framework in Figure 4 provides a practical visual aid: regulatory and safety gates (HIPAA/FDA reviews, clinical validation, final compliance audits) can be embedded within any of the three models without sacrificing iterative development in the core phases. Organisations should invest early in leadership support, psychological safety, and role-specific Agile training, as these were the most consistent enablers across the reviewed studies. Sustainability planning must begin at project inception; post-implementation metrics (system utilisation, error rates, ongoing cost) should be included in the original project charter.

Limitations

This review has several limitations. First, although a comprehensive PRISMA-compliant search was conducted, the evidence base remains dominated by short-term, cross-sectional, or perception-based studies; only one paper provided genuine longitudinal data. Second, heavy reliance on a single large preprint [5] for quantitative effect sizes introduces uncertainty until peer-reviewed confirmation is available. Third, most included studies originated from North America and Europe, limiting generalisability to low-resource settings. Fourth, heterogeneity in how "Agile" and "hybrid" are operationalised prevented meta-analysis. Finally, publication bias toward positive short-term results cannot be ruled out.

4.4. Future Research Directions

The most pressing gap is the near-absence of longitudinal evidence. Future studies should prioritise multi-year follow-up designs that track system utilisation, maintenance costs, clinical outcome persistence, and potential abandonment rates at 3-, 5-, and 10-year horizons. Rigorous cost–benefit analyses comparing pure Agile, pure traditional, and distinct hybrid configurations (e.g., Water-Scrum-Fall versus Agile-Stage-Gate) in safety-critical hospital contexts are urgently needed. Randomised or quasi-experimental designs, supplemented by mixed-methods process evaluations, would strengthen causal inference. Researchers should also develop and validate healthcare-specific success metrics that incorporate long-term sustainability. Finally, comparative studies across diverse regulatory and cultural contexts would clarify boundary conditions for hybrid effectiveness. Addressing these directions will move the field from descriptive comparisons toward prescriptive, context-sensitive guidance for hospital project management.

5. Conclusion

This systematic review synthesised 28 studies comparing Agile, traditional, and hybrid project management in hospital and healthcare settings. Agile methodologies consistently delivered short- to medium-term advantages in project completion time, stakeholder and patient satisfaction, and adaptability to change (Figure 3), while traditional approaches retained a modest edge in budget adherence. Hybrid models were conceptually promising but remain under-evaluated, with the three dominant frameworks illustrated in Figure 4. However, only one study [12] examined outcomes beyond two years, revealing a critical gap in longitudinal evidence. The review answers its three research questions directly. Agile outperforms traditional methods on speed, satisfaction, and adaptability (RQ1), yet long-term sustainability remains largely unknown (RQ2). Key barriers include regulatory constraints, hierarchical cultures, and limited training, while enablers centre on leadership support, co-design, and hybrid governance (RQ3). For hospital practice, Agile or Agile-dominant hybrid approaches are recommended for projects with high uncertainty and evolving requirements. Traditional governance elements should be retained for regulatory compliance and final verification (Figure 4). Sustainability planning must begin at project inception. In conclusion, while Agile offers clear short- to medium-term benefits, the durability of these gains is unproven. Closing the longitudinal evidence gap is essential to guide evidence-based project management decisions and support sustainable transformation in healthcare.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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