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**The Impact of Applying the Agile Methodology on the Quality of Health
Project Implementation: An Applied Study in Private Sector Hospitals in
Riyadh City**

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أثر تطبيق منهجية Agile على جودة تنفيذ المشاريع الصحية دراسة تطبيقية في مستشفيات
القطاع الخاص بمدينة الرياض

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Dedication

I dedicate this work to those whose unwavering support and belief made this achievement possible.

To my beloved parents—your love, prayers, and encouragement have been my foundation.

To my late father, whose memory continues to guide and inspire me every day.

To my devoted mother, whose strength and sacrifices I will always cherish.

To my dear spouse, for being my partner in every step, my greatest source of motivation, and my constant support.

To my family, friends, and mentors—thank you for believing in me and walking beside me throughout this journey.

This work is for all of you.

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Abstract

This research investigates the impact of Agile methodology on the quality of healthcare project implementation within private hospitals in Riyadh, Saudi Arabia. With the growing emphasis on flexibility, digital transformation, and patient-centered care—particularly in alignment with Vision 2030—Agile frameworks such as Scrum, Kanban, and SAFe have emerged as promising approaches to enhance responsiveness, efficiency, and cross-functional collaboration. The study adopts a quantitative research design using a structured survey targeting 50 professionals in healthcare project management roles. Findings reveal a positive correlation between Agile practices and improvements in project delivery timelines, cost control, service quality, and stakeholder engagement. Additionally, organizational readiness—including leadership support and adaptive culture—was identified as a significant moderating factor influencing Agile's success. The study also explores challenges in Agile adoption, such as resistance to change and limited Agile literacy, while highlighting the potential of integrating Lean Six Sigma and change management theories. The results offer empirical evidence supporting Agile's effectiveness in Saudi healthcare settings and present practical recommendations for enhancing its implementation to meet strategic healthcare goals. This research fills a critical gap in empirical studies on Agile in the Saudi private healthcare sector and provides a model for future improvement initiatives.

Keywords:

Agile Methodology, Healthcare Project Management, Vision 2030 Saudi Arabia

المستخلص

تهدف هذه الدراسة إلى استكشاف أثر تطبيق منهجية أجايل (Agile) على جودة تنفيذ المشاريع الصحية في مستشفيات القطاع الخاص بمدينة الرياض، في ظل التحول الرقمي المتسارع وتزايد التوجه نحو رعاية صحية محورها المريض، بما يتماشى مع مستهدفات رؤية السعودية 2030. اعتمدت الدراسة على منهج كمي باستخدام استبيان موجه لـ 50 متخصصاً في إدارة المشاريع الصحية. أظهرت النتائج وجود علاقة إيجابية بين تطبيق ممارسات أجايل وتحسن جودة التنفيذ، من حيث تقليص مدة الإنجاز، تحسين الكفاءة، وضبط التكاليف، إضافة إلى تعزيز التعاون بين الفرق ورضا أصحاب المصلحة. كما تبين أن جاهزية المنظمة، بما يشمل دعم القيادة ومرونة الثقافة المؤسسية، تعد عاملاً حاسماً في نجاح تطبيق أجايل. تناولت الدراسة أيضاً أبرز التحديات مثل مقاومة التغيير وضعف المعرفة بمنهجية أجايل، واقترحت دمجها مع نماذج تحسين الجودة مثل "لين ستة سيغما" ونموذج إدارة التغيير "كوثر". تسد هذه الدراسة فجوة معرفية مهمة في الأدبيات المتعلقة بتطبيق أجايل في القطاع الصحي الخاص بالسعودية، وتقدم نموذجاً عملياً يمكن أن يُستفاد منه في تحسين جودة المشاريع المستقبلية.

الكلمات المفتاحية:

أجايل، إدارة المشاريع الصحية، رؤية السعودية 2030

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CHAPTER 1

Introduction

Over the past few years, the healthcare systems across the whole world have experienced a phenomenal change due to digital innovation and increased patient expectations, as well as the necessity of greater efficiency. In this regard, flexibility, collaborative project management methodologies and iterative methodologies have become popular, especially Agile methodology. Agile was first developed as software development and is currently being extensively discussed in other industries, with the healthcare domain being one of them; the tenets of responsiveness, constant feedback, and cross-functional collaboration closely resonate with the rapid and unexpected nature of the healthcare environment (Alotaibi & Almudhi, 2023). In their attempts at enhancing service delivery and patient outcomes, the Agile principles present viable avenues that healthcare institutions should consider as some of the potential expedients to the realization of enhanced flexibility, decreased implementation time, and streamlined care delivery processes.

The agile methodology has increasingly been accepted as one of the important tools to use during health sector project management on the basis of its ability to react fast to any changes in patient requirements and needs in the clinical context. In contrast to linear prototypes, Agile enables iterative planning, frequent stakeholder involvement and assessment, which remain essential in a healthcare environment with a dynamic regulatory environment and clinical intricacies (Saleh et al., 2024). As an example, in hectic settings such as emergency rooms and home-based hospital systems, implementation of Agile would enable the facilitation of multidisciplinary team coordination, minimise redundancies and provide medical and administrative challenges with the ability to adapt quickly. According to recent research, Agile holds a promise to better the decision-making processes and achieve real-life results in terms of quality and patient happiness with the help of responsive and modular project cycles (Desai et al., 2024).

Agile approaches are especially applicable in the Kingdom of Saudi Arabia, where the healthcare industry is in the active process of transforming as per the objectives of Vision 2030. Healthcare has gone through privatization and has seen the increase of tools based on digital health, patient-centric care, cost effectiveness, which requires flexibility, scalability and outcome-based project management strategies. Al Owad et al. (2023) have reported a positive measurable outcome of Lean Six Sigma integrating with change management models in applying them to emergency care services, which indicates a favorable environment of Agile application to analogous medical communities. Moreover, the

functioning of hospital pharmacy, which has always been associated with the issue of inventory management, staffing, and workflows optimization, can also be improved with hybrid Agile models that allow optimizing efficiency and clinical quality, according to Sallam (2024).

Although there is an increasing interest in exploring the functions of Agile methodology in the healthcare field, little empirical study, dedicated to exploring the practice of Agile methodologies, can be found in the Saudi private hospital sector. The majority of the studies conducted so far remained theoretical or exploratory in nature, and a small number of them provided on-the-ground overview on how the Agile frameworks might impact healthcare projects, collaborations between the stakeholders, or the outcomes of the services. This paper will attempt to address that gap by discussing how the implementation of Agile methodology influences the quality of health project implementation in the context of Riyadh and its private hospitals. The study will produce meaningful evidence about the effectiveness of Agile in Saudi healthcare settings by giving prominence to offline implementations and results, which could prove beneficial in informing future policy-making and operating practices.

Research Problem

The rate of providing high-quality project implementation in healthcare establishments is becoming more demanding in the context of a constantly developing environment with a high level of complexity. Conventional project management techniques fail to fulfill the changing necessities of the healthcare sector in most instances (Saleh et al., 2024). To counter that, the Agile approach has appeared as a contemporary system that prioritizes the modification of constant change, the coordination, and stakeholder engagement, which is highly applicable to the pace of the healthcare service (Alotaibi & Almudhi, 2023). Yet, despite the increased interest in Agile in the global healthcare landscape, the absence of empirical research on the real contribution of the Agile method to project quality, particularly in the context of the Saudi Arabian privately owned healthcare sector deserves to be mentioned (Desai et al., 2024).

This shortage is worse in Riyadh, as it is a city experiencing a boom with regards to the proliferation of private hospitals in consonance with Vision 2030 change in the country. Irrespective of this growth, there is still little evidence to find out whether the use of Agile in these environments would really improve the quality of any project or not, because of impediments in organizations and cultural attributes that act as barriers to effectiveness (Al Owad et al., 2023). Recent research shows that successful implementation of Agile in the domain of healthcare presupposes congruence between the method and the culture and possibilities of the organization to comply with its leadership (Githara, 2024). Besides, the pairing of Agile and quality-improvement frameworks like Lean and Six Sigma could potentially provide better performance results in cases of proper settings (Sallam, 2024).

Based on that, the research problem lies in the fact that there are no field-based studies directly evaluating the use of Agile methodology and its effect on the quality of healthcare project implementation at the private hospital of Riyadh. The lack of knowledge restricts fact-based decision making and can be applied to one of the most strategic healthcare industries in the Kingdom.

Importance of Research

Scientific Significance

- Contributes to the limited body of knowledge on Agile methodology application in healthcare project management.
- Provides empirical data specific to the private healthcare sector in Riyadh, an under-researched area.
- Enhances understanding of the relationship between modern project management approaches and service quality in clinical settings.
- Opens pathways for comparative studies across different healthcare systems and regions.
- Supports academic discussions on integrating flexible methodologies in complex organizational environments.

2. Practical Significance

- Offers insights for hospital administrators and project managers to improve project outcomes using Agile principles.
- Assists decision-makers in adopting more effective and adaptable project management strategies.
- Helps identify operational barriers and success factors in Agile implementation within healthcare institutions.
- Supports the development of training and capacity-building programs tailored to Agile healthcare projects.
- Contributes to improving patient care quality by optimizing project execution and responsiveness in healthcare settings.

Study Objectives

Main Objective:

- To assess the impact of applying the Agile methodology on the quality of healthcare project implementation in private sector hospitals in Riyadh.

Sub-Objectives:

- To identify the key components of Agile practices being implemented in private hospitals.
- To evaluate the extent to which Agile improves project efficiency, adaptability, and team collaboration.
- To examine the challenges and barriers faced during the implementation of Agile in healthcare settings.
- To analyze the influence of Agile on project timelines, cost control, and patient-centered outcomes.
- To propose recommendations for enhancing Agile adoption in healthcare project management.

Study Questions

Main Research Question:

- To what extent does the application of the Agile methodology affect the quality of healthcare project implementation in private sector hospitals in Riyadh?

Sub-Questions:

- What Agile practices are currently applied in healthcare project management within private hospitals?
- How does Agile methodology influence project efficiency, adaptability, and team performance?
- What organizational or operational challenges hinder the effective use of Agile in healthcare?
- In what ways does Agile impact project outcomes such as delivery time, cost, and service quality?
- What strategies can enhance the successful adoption of Agile in the healthcare sector?

Study Hypotheses

H1: The application of Agile methodology has a significant positive impact on the overall quality of healthcare project implementation in private sector hospitals in Riyadh.

H2: Agile practices contribute to improved project efficiency, including faster delivery timelines and better resource utilization in healthcare projects.

H3: There is a positive relationship between the use of Agile methodology and enhanced team collaboration and stakeholder engagement in healthcare project environments.

H4: Organizational and operational barriers significantly moderate the effectiveness of Agile implementation in private healthcare institutions.

Scientific theory followed

The use of Agile Project Management (APM) theory in the research is justified by the existence of change theories in the organization, namely, the theory of Change Management Model developed by Kotter, Contingency Theory, and the Lean Six Sigma framework providing adequate justification and understanding of the impacts of being flexible, adaptable, and iteratively developing projects on the outcomes of a given healthcare project. The choice of the following scientific models is based on the proposition to interpret the mechanisms by which Agile methodology influences the performance of projects in the context of a complex healthcare, where in this case, the experience of the organisation in the sphere of the private hospital sector of Riyadh is involved.

1. Agile Project Management Theory (APM)

The Agile Project Management theory holds the central place in this research as it advances the non-linear, iterative and collaborative model of managing projects. Contrary to classic Waterfall approaches, Agile is more responsive, stakeholder-oriented, and progressive (Kakumanu, 2024). In the healthcare industry, where uncertainty, a sense of urgency, and patient-centered design are prevalent characteristics of the work, the model proposed in the study of APM is one that can adapt to field realities. According to the theory, project success is enhanced by having the work done by teams in short cycles (sprints) re-evaluation of priorities, and learning based on feedback.

The Agile theory focuses on four key values which are that of individuals and interactions rather than processes and tools, work productively rather than documentation, collaboration with customer instead of contract negotiation and lastly adapting to change conventional schedule instead of adhering to the plan. Such principles strike a chord within healthcare organizations addressed to various patient characteristics, technological changes, and interprofessional teams (Gill et al., 2019). Alotaibi and Almudhi (2023) argue that Agile practices allow hospitals to be more responsive to the needs of patients, user regulations, and resources thereby improving the execution of projects and service delivery.

2. Contingency Theory

Another theory employed in the research is Contingency Theory that a given theory of running an organization or a project does not exist. Rather, effectiveness of an approach, including Agile, relies on the internal and external context of the application of the approach.

This is regulatory, cultural, availability of resources, and demographics of patients in the case of the Riyadh private healthcare sector. According to Saleh and colleagues (2024), the organizations culture and the willingness of the leadership to adopt processes to be characterized by iterations and decentralized decision-making is critical in the effectiveness of Agile in the healthcare environment. Therefore, this study recognizes the fact that the Agile success is not just enough about its methodology but the surrounding ecosystem that it is being conducted.

Contingency Theory allows studying the contingency of the interaction between Agile application and project results in the perspective of background circumstances, digital maturity or employee preparedness in the project bins, which interfere with this association. As an illustration, according to Aldogher and Elgebaly (2024), the strategic agility of the Saudi health sector is mostly defined by the digital supply chain integration and the culture in this sector. Such mediating factors are imperative to comprehend the discrepancy in Agile success between various hospitals.

3. The Change Management Model of Kotter

Because Agile adoption may frequently include an organizational restructuring, modification of communication routes, and alteration of the management behaviour, the given research takes the ideas of Kotter, his 8-Step Change Management Model to realise which way to institutionalise Agile within a healthcare setting. The model proposes cyclical processes, which would make it well aligned with the iterative nature of Agile, including building unmet need, building guiding coalitions and developing short-term victories.

Al Owad et al. (2023) present the idea of combining Agile and the Kotter methodology, especially in emergency healthcare facilities, that will result in both process innovation and cultural acceptance. Using the model by Kotter will aid this research in investigating not only whether Agile enhances the quality of projects, but also how the change processes come into play when considering the agile methodology adoption and maintenance in the private hospitals.

4. Lean Six Sigma as a Complementary Framework

Although Agile assists in flexibility and adaptability, Lean Six Sigma provides a way to generate efficiency and accuracy, which are essential in clinical and administrative healthcare projects. This study uses the integrated perspective according to which Lean Six Sigma and

Agile exist as a part of the deck to cover both fluid and structural sides of healthcare project management. The article by Sallam (2024) establishes that Lean Six Sigma principles of waste reduction and enhanced precision are useful in hospital pharmacy uptake, and Agile has placed an emphasis on flexibility and can be followed by a feedback loop.

Badran and Abdallah (2025) provide a demonstration equally that Lean and Agile can be seen to have an independent, however related, impact on outcomes of projects where a speedy response is necessary, as well as a measure of standardization. With their integration, the study views the project methods hybridization as a strategic alternative in Saudi healthcare organizations with the attempt to align themselves to the Vision 2030.

5. The Theory of Systems and Complexity of Healthcare

This type of research is also influenced by the Systems Theory since hospital systems are complex and interconnected where the performance of one department influences the other. The systems thinking approach finds resonance in the systems-level feedback loop, cross-functional teamwork, and iteration as part of the agile principles. Githara (2024) explains that innovative project management should consider interdependencies in healthcare settings to make sure that localized process improvement will not generate a system-level inefficiency in other areas.

In addition, Obeidat (2025) points to the fact that platforms (such as NeoMediX360 that are based on scaling healthcare logistics), would have to incorporate the agile and systems approaches to address the dual goal of clinical and administrative performance. In that regard, Agile would not only be considered an approach but rather a system of healthcare innovation and flexibility.

6. Application in the Saudi Healthcare Context

Vision 2030 involves the strategic thinking of Saudi Arabia that focuses strongly on improving the efficiency of healthcare services and on moving toward digital transformation as well as the involvement of the private sector. Agile in this setting can be seen as a possible facilitator of policy implementation and better performance. The study however takes into account that the implementation of Agile within the private hospital industry in Saudi Arabia remains at an early stage, and it has different maturities and cultural preparedness. The support to this opinion can be found in the reference by Saleh et al. (2024), who underline

the necessity of Agile models adjusted to the socio-cultural environment of Arab healthcare organizations.

Moreover, the study recognizes the fact that maintaining the integrally digitized Saudi health sector, Agile success continues to be driven by the soft infrastructure of leadership, personnel attitude, and organizational policies. Alotaibi and Almudhi (2023) warn that in case of a lack of proper alignment between Agile principles and the current organization systems, the improved project quality is not likely to be achieved.

7. Agile within Healthcare IT and Digital Projects

Major causes of Agile adoption in healthcare include digital transformation. This theory of Agile can be specifically involved when handling IT related projects including the electronic health records (EHRs), hospital information system, and telemedicine platforms. Gill et al. (2019), demonstrate that Agile facilitates quick prototyping, initial user input, and dynamic planning which are essential in the successful deployment of digital health technologies. Kakumanu (2024) also makes it clear that such Agile frameworks as DSDM (Dynamic Systems Development Method) are most appropriate in the management of complex healthcare IT projects on which the requirements keep changing and changing.

Although this study is intended to cover the overall quality of a project, it also targets digital projects as its subsidiary study and uses the concept of Agile theory to help researchers understand the ways digital tools could be more successfully utilized in personal hospitals. The Agile-Digital Health integration is of high significance especially in the province of Riyadh, given the population growth in the country, where technology is rapidly being embraced in the government-based incentives and patient demands.

Overall, the current study will be based on the multi-theoretical framework the Agile Project Management theory is the leading one in the research, being partially supported by the Contingency Theory, Kotter Change Model, the Lean Six Sigma principles, and the Systems Theory. Collectively, the frameworks should give an effective prescription on the line of reasoning to the study of the impacts of Agile methodology on the quality of projects in the privately owned healthcare institutions within the Riyadh ambience. The research does not only touch on Agile characteristics within the company but also investigates the organizational, cultural, and systems-related factors which either contribute to its success or lead to the company failure. This theoretically rich grounding will help achieve the following objectives of the research, which will be presented in the context of scholarly knowledge base as well as practical applications to manage healthcare projects in a complex and dynamic context.

CHAPTER 2

Introduction

The healthcare industry is changing at a very fast rate, owing to the increased demands of efficiency, flexibility, and effectiveness in service provision. Agile methodology has become an optimistic approach in this dynamic environment to increase the level of project management quality as it focuses on promoting flexibility, iterative planning, engagements of stakeholders, and quick responsiveness to change. Born in software development market, Agile methodology has had even more growth in popularity across different sectors as well as in the sphere of healthcare where the use of traditional, rigid project management practices sometimes fails to meet the challenges of patient-driven care and changes in regulatory environments.

The introduction of Agile practices should be especially considered in view of Saudi Arabia Vision 2030 since it focuses on healthcare modernization and its privatization. Alternative literature has already studied Agile in the following sectors: health IT, digital transformation, and logistics, but have not studied its utility as a method of refining the quality of project execution in the context of the private hospital in a specification way. The given literature review summarizes the existing literature on Agile in healthcare project management, find patterns and theoretical implications, as well as reveal certain gaps in the empirical studies in the region and the industry. The aim is to develop an academic background to researching the outcome of the Agile practices on the success of projects that were carried out in privately owned healthcare facilities in Riyadh, providing workable details to be used in fostering performance growth and policy conformity.

Literature Review

1. Introduction to Agile in Healthcare

It has been observed that even as the healthcare systems have become more complex and dynamic, there has been the need to develop a paradigm shift in the ways projects have been conceptualized, managed, and executed. The iterative nature of contemporary healthcare settings combined with a fast pace of their evolution has shown that traditional project management practices, like the Waterfall model, cannot be used adequately to address their requirements. As a result, Agile project management a practice with such qualities as iterative planning, stakeholder participation, adjustability, and speedy reaction has become more and more implemented in the health care conditions. It has been pointed out by scholars that the Agile focus on several adaptive planning, short feedback cycles, and cross-functional teamwork fit the non-linear health care service provision (Gill, Borycki, & Kushniruk, 2019; Desai et al., 2024).

Agile was firstly developed on the software development market, however, its principles were widely acknowledged in the field of healthcare particularly where agility is important in the clinical and operational area. Alotaibi and Almudhi (2023) further note that implementation of Agile in medical institutions has led to more effective decision making, a better project implementation process, and the capacity to understand patients demands and match capabilities. The agile would offer a guideline not only in project management but also in reacting to any abrupt changes in medical guidelines, workload, and regulatory requirements. It is especially applicable in emergent settings (emergency departments, surgical centers, digital health systems) where there are levels of uncertainty and time sensitivity.

2. Agile Methodology Vs Patient-Centered Outcomes

Patient-centered outcome improvement is a critical drive towards Agile adoption in healthcare project. Saleh et al. (2024) studied the impact of Agile management on patient care and indicated that Agile allows responding to the needs in real-time, providing individual service pathways, and implementing better interprofessional communication. All these combine to reduce the wait time, possibilities of medical errors, and patient satisfaction. In the study, it has been highlighted that the responsiveness and adaptability of Agile will particularly help when dealing with care transition, including emergency to outpatient treatment and acute to chronic.

The same statement has been repeated by Majd and Majd (2023) who claimed that Agile makes it easier to properly align clinical workflow with patient demands due to the frequent feedback loops and speedy iteration. These enable healthcare teams to make swift course changes depending on changing conditions, clinical or operational. The structured flexibility in Agile enables teams to experiment and iterate service models than the traditional practices can.

In a study of home hospital models, Desai et al. (2024) have clearly shown the use of Agile to support a multisite accelerator program to successfully implement hospital-at-home services. The principles of agile, including iterative deliveries, multi- discipline alignment and retrospective reviews enabled on the fly changes that would have a direct effect on patient outcomes. Agile offers a solution that is scalable and practical in introducing innovations into service in situations where home care, remote monitoring, and digital interventions are being spread.

3. Incorporation of Lean and Six Sigma Models

Be it as it may, despite the flexibility that Agile promises, integrating it with structured quality improvement plans, like Lean and six sigma grants another dimension of operating efficacy. In an action research study out of the UAE, Sallam (2024) postulated that Agile in isolation could not be curative enough to explore healthcare delivery in the best possible manner. The responsiveness that Agile incorporates should, in reality, be integrated with the accuracy and effectiveness of Lean Six Sigma to have more viable changes in the performance. Integration reduces errors, waste and enhances the alignment of clinical processes with the strategic objectives.

In the research based on the emergency healthcare services in Saudi Arabia, made by Al Owad et al. (2023), they advanced this viewpoint even further. They have offered a model to combine Lean Six Sigma and the Change Management Model of Kotter into an Agile ecosystem. This has the effect of making the resultant process improvement cycle more flexible but also more directed, which makes it a useful tool in settings where time is of the essence but where care must be scrutinized as in an emergency room. The mentioned hybrid approach also makes it so that the quick changes that Agile is capable of are based on the quality assurance practices.

In comparing Lean and Agile in the context of running and managing a construction project, Badran and Abdallah (2025) observed that though both methodologies may be used in

improving the performance of projects, the core difference was the flexibility of the Agile method and this is particularly in unpredictable circumstances. Although Lean may be more applicable in a location that places emphasis on efficiency and repetition, Agile is more applicable in a setting that will have to place emphasis on responsiveness and innovation, features that are core to the healthcare operations.

4. Digital health and IT implementations by being agile

Digital transformation is one of the essential building blocks in healthcare modernisation not the least under VISION 2030 in Saudi Arabia. Agile has found specific application in the management of healthcare IT projects such as in the creation of electronic health records (EHR), telemedicine systems, patient portal, etc. Kakumanu (2024) addresses the utility of DSDM (Dynamic Systems Development Method), a type of Agile in the feasibility of large-scale health IT projects. The implemented strategy has focused on the ongoing stakeholder engagement, early, accessible streaming, and iteration feedback, which makes the strategy more effective in complex IT arrangements, which have less implementation failure rate.

As Obeidat (2025) investigated NeoMediX360, which is a logistics platform in line with Vision 2030 objectives, it has been revealed that Agile promotes scalable and sustainable health information technology structure. The agile concepts, such as flexibility and the cooperation with stakeholders, allowed fostering the idea of being able to make updates and customize the platform according to the evolving healthcare logistics needs. Gill et al. (2019) also suggested that Agile enables healthcare IT teams to provide solutions in smaller more functional increments, which will result in more effective user testing and integration of feedback. This leads to increased user satisfaction and increased clinical adoption of digital solutions.

The importance of Agile in IT implementation was once again supported by Goodison, Borycki, and Kushniruk (2019) who observed that Agile increases the visibility of its project, speeds up delivery cycles, and builds the trust of the stakeholders. These are the vital considerations in those settings in which clinical efficacy and technological innovation have to co-exist.

5. Organizational Culture and Change Readiness

Although Agile has theoretical strengths, the widescale application of Agile to healthcare organizations is strongly ascertained by cultural preparedness and participation of the leaders.

In a study conducted by Aldogher and Elgebaly (2024) on the role of digital supply chain in promoting strategic agility in the Saudi health sector, they found that the organizational culture was a mediating factor. Agile approaches do not work well in strict, organizational cultures that are centralized in decision-making and any change is discouraged. Rather, it is necessary to have a culture that encourages teamwork, openness and experimentation.

Githara (2024) also stated that new practices in project management, such as Agile, can only result in better performance under conditions of adaptive organizational cultures. Healthcare environments that also tend to institutionalize risk aversion require trust building within the stakeholders as a precondition to Agile first. This paper has reached the conclusion that long-term adoption requires the commitment to Agile principles on the part of the leadership, continuous training of staff and iterative performance reviews.

Ahmad and Wasim (2023) have reiterated that medical institutions should go beyond the adoption of Agile tools to adoption of Agile thinking. This involves going back to governance models, communications plans and performance measures. Devoid of this shift, Agile can easily turn into a lightweight service theme, as opposed to a revolutionary managerial method.

6. Problems and Obstacles to Implementation

Some of the studies have indicated that it is difficult to implement Agile in the healthcare setting. Resistance to change, the inability to train because of the lack of time, the hierarchical structure of the organization, and difficulties in defining the role are probably the most frequently mentioned factors. Daraojimba et al. (2024) undertook an in-depth review of the Agile approach, and they stressed that robust and well-thought change management remains the key to success of Agile applications in non-technical spheres such as healthcare. They added that proper communication, interdepartmental collaboration, and supportive steadfast leaders are absolutely necessary to defeat institutional inertia

Desai et al. (2024) did not go unnoticed of such issues in their multisite home hospital implementation project in the Saudi context. Whereas Agile frameworks led to a quicker deployment and innovation, hospitals whose administrative structure did not allow flexibility and low digital maturity suffered delays and operational friction. Hence, the research documented phase implementation strategies and continuous observation of the barriers as means to overcome those.

Ajibola Omonije (2024) further noted that although the Agile makes it faster and more responsive, it also necessitates more alignment of diverse stakeholders. When healthcare projects concern the collaboration of clinicians, IT professionals, administrators, and the patients, the issue of conflicting priorities during the project may impede the pelting of Agile until there is a shared vision and frequent communication.

7. The Saudi Private Health Sector Implications

Agile has the potential to deliver quality care and project success in the context of Saudi Arabia where it can be used as an underutilized tool to promote the development of the private health sector. Vision 2030 focuses on efficiency, innovation, and privatization, which are the goals that can be considered in line with the main principles of Agile. Alotaibi and Almudhi (2023) claim that Agile can assist the work of the private hospital to negotiate regulatory transformations, expand operations, and incorporate new services fast.

Nevertheless, it should be noted, as Badran and Abdallah (2025) emphasize, that flexibility of Agile should be counterbalanced with accountability and cost management measures, major issues in profit-oriented private organizations. Accordingly, Agile needs to be modified to achieve the twofold objectives of responsiveness and accountability. Kakumanu (2024) reinforces such idea by the suggestion of hybrid models using Agile and performance management systems to make the healthcare projects sustainable.

The synthesis of the gathered knowledge in the field allows supposing that the most effective success of Agile implementation in Saudi private hospitals can be achieved through the localization to particular organizational factors, incorporation of other quality models as well as the leadership-driven culture change.

The literature is clear and concurs on the need and promise of Agile approach in healthcare project management, especially where an environment is characterized by the need to act swiftly, adopt fast, and be patient-centered. Research has proved Agile to increase project efficiency, better clinical outcomes, digital transformation and make organizations adaptable. Nonetheless, effective adoption is dependent on a number of things such as cultural readiness, leadership involvement, and integration with the current quality models, as well as the contextual adjustments.

In the case of the Saudi private healthcare industry, Agile would provide strategic conformity with the aims of Vision 2030. The application, however, is both irregular and superficial. The

scope of future research must be to design locally based Agile models and workshops, training, and assessment that can be applicable at the level of Saudi medical organizations. In such a way, Agile may transition to practice and help healthcare providers provide improved quality care by offering more extensive and responsive projects.

Research Gap

Although there is high proliferation of literature arguing about the concept of Agile approaches in general health setting, there is a promising gap in empirical researches regarding the real-life influence of Agile adoption on project performance adequacy in privately owned hospitals located in Riyadh, Saudi Arabia. Majority of the existing studies are either over general or centered at the IT or logistics level or contextually non Saudi basis. In addition, although multiple articles validate the potential of Agile, not many papers have direct involvement of Agile adoption in specific performance metrics of the project-line, including time, costs, quality, and stakeholder satisfaction in the context of healthcare facilities operations in the Kingdom.

Theoretical framework

Foundations of Project Management Theory

Traditional Project Management Approaches

The formal profession of project management has traditionally utilized plan-based, or so-called waterfall techniques. Such conventional models focus on sequential stages of development which include: initiation, planning, implementation, monitoring and closure. This linear path presupposes that all the requirements are known in advance; also, in this case, every stage should be accomplished before going to the next one. In healthcare, these methodologies were mostly applied to broader-scale physical infrastructure initiatives, implementation of electronic health records (EHRs), or implementation of systems in the clinical domain. Traditional project management (TPM) is based on control, predictability and documentation, hence is appealing to an environment where there is magnitude of regulation and accountability.

Nevertheless, such attributes may also impact the performance negatively in a dynamic environment, such as healthcare where processes may change, regulations may change, or the needs of the patients may change throughout the project lifecycle. Such fluid environments may not be easy to handle by TPM. Rigid nature of waterfall model tends to result in the high cost and time overrun, especially when those assumptions that were made the first time are proven wrong or incomplete (Alotaibi & Almudhi, 2023). Also, the use of stakeholders in the traditional models is normally restricted to the reviews of milestones thus there is lesser probability of the iterative feedback that could enhance service delivery. Such constraints have precipitated a move towards more adaptive frameworks that can incorporate uncertainty and rapid change establishing the conditions of the coming of Agile.

Evolution Toward Agile Methods

The inability of TPM to handle ambiguity and the late-arising needs prompted the appearance of Agile approaches in the software development industry in the beginning of the 2000s. Agile rose due to the necessity of the more quick, customer-oriented, and flexible solutions. Agile is more iterative, with stakeholders involved aggressively at every stage and with constant re-evaluation and reconsideration of goals and results. These principles are since extended outside of software into healthcare, construction, and education where the needs and multi-faceted stakeholder environment are also rapidly changing.

Agile methods have also made a breakthrough in healthcare in such spheres as hospital activities, digitalization, pharmaceutical activities, and telemedicine initiatives (Sallam, 2024). This is, in part, attributable to the fact that Agile can add value gradually and listen to end-user (patients, healthcare professionals and administrators) real-time feedback. Agile methods are characterized by the speed of prototyping, cross-functional teams, as well as the planning horizon (Saleh et al., 2024). Such skills are now considered to be critical in a climate that evolves with technological advancements, a shifting set of patient demands, as well as with a culture that requires accountability of performance.

Furthermore, Agile has arrived together with a larger paradigm shift in the theory of management, which has taken the turn toward decentralization, empowerment, and responsiveness, which is especially important in a healthcare environment that often requires localized and contextual decisions. Therefore, Agile is neither a technique nor a single way of thinking but rather a change in organization thinking that contributes to the transformation of healthcare as a more patient- and adaptive range of services.

The comparative Analysis: Predictive Models vs. Adaptive Models

The traditional (predictive) and Agile (adaptive) approaches have two divergent perspectives as to how projects are to be planned, performed, and analyzed. The main features of predictive models are a clear planning, scope and resource assignment that precede their execution. They fit in projects that are low on uncertainty and high on multiplication. Conversely, the adaptive models are based on the premise that any change is unavoidable and project teams should not be prescriptive.

There is a basic contrast in the stakeholder involvement. Predictive models include stakeholders mostly in the initiation and closing stages, but adaptive models take into account the comments of the stakeholders all over the project (Saleh et al., 2024). This is especially applicable in healthcare where its stakeholders such as patients or regulators may offer a valuable input that can change the course of the project. The recurring cycles of Agile feedback are appropriate in those situations where requirements and contextual expertise increase between iterations.

Risk management is yet another difference. The risks in predictive models are known beforehand and are resolved by performing contingency planning. Agile management approach to risk requires short iterations, fast prototyping and the think big, act small, but

fail fast approach where early identification and correction is possible. This will improve flexibility and enables realization of benefits earlier.

Predictive models are ideal in projects where there are cost savings due to standardization, compliance and predictability but Agile is more appropriate in settings where innovation, responsiveness and collaboration are needed, and they are more valuable in modern healthcare settings where these qualities are most essential (Alotaibi & Almudhi, 2023). Accordingly, preference between the two methodologies or combining them to form hybrid models largely depends on the complexity of the healthcare project under consideration, uncertainty of a healthcare project, and dynamism of a healthcare project.

Agile Methodology: Theory Base

Origins and Evolution of Agile

The Agile Manifesto of 2001 which was the creation of a group of software developers in the search of an improved way to handle software projects was a start of the Agile methodology. Unsatisfied with more strict and documentation-related models, they suggested a list of values and principles that involved people, interactions, working software, collaboration with customers and change responsiveness. These concepts in the long term were mutated into a movement that affected the theory and practice of project management all over the world.

Agile is rooted in the concepts of lean thinking, iterative development and system theories. Agile thinking assimilated lean ideas of Japanese manufacturing which were abolishing waste and streamlining value streams. Agile was also shaped by the iterative development practises of the 1990s including Rapid Application Development (RAD) and Extreme Programming (XP). These core concepts allowed structuring more flexible and rigid frameworks such as Scrum, Kanban, and SAFe.

In the sector of healthcare, the trend of Agile started with digitalization of services (where software projects required faster cycles and increased user satisfaction). Nonetheless, it has recently been applied in the scope of operations like patient admission, clinical trials, pharmacy management, and infrastructural development in the hospitals (Sallam, 2024). This flexibility in being more clinically or non-clinically oriented shows its theoretical flexibility and worth as an organization.

Core Principles of the Agile Manifesto

The Agile Manifesto outlines four key values:

1. **Individuals and interactions over processes and tools**
2. **Working software over comprehensive documentation**
3. **Customer collaboration over contract negotiation**
4. **Responding to change over following a plan**

These principles are backed by 12 guiding principles that focus on iterative delivery, stakeholder satisfaction, sustainable development, face to face communication and continuous improvements. The implications of these principles within healthcare cannot be understated as the communication within a team, iterative improvement, and patient involvement are essential to service quality and safety.

Take, for instance, Agile promotes constant re-consideration and the change of the process, which healthcare requires due to quality improvement demands (Saleh et al., 2024). On the same note, Agile privileging focus on working software is comparable to giving functional health interventions, though they may be incomplete or iterative, over full systems patent and finishing. At this, the underlying ideas of Agile approach fit well with the evidenced-based healthcare practice that can be changed rather than strict plans.

Furthermore, the idea of Agile to embrace change as a constant is a match fit to the dynamism of healthcare settings where any new information about a medical practice, changes in regulations or even a sudden outbreak of a disease will require a quick adaptation.

Agile Values and Practices in Organizational Context

In addition to principles, Agile consists of several helpful tools and practices in support of its theoretical orientation. Frameworks like Scrum add roles (e.g. Scrum Master, Product Owner), ceremonies (e.g. daily stand-ups, sprint reviews) and artifacts (e.g. product backlogs) to support transparency, accountability and constant feedback. Such structures can be applied to the healthcare setting. As an illustration, hospital unit morning briefings can be similar to daily stand-ups, synchronizing activities and priorities of the work teams.

Organizationally, Agile encourages decentralization, team independence, and cross-functionality- the characteristics that are becoming required to manage complex healthcare projects (Githara, 2024). Agile teams get the ability to make local decisions, which boosts the speed and proper context. This is especially so in the privately owned healthcare facilities in Saudi Arabia as organizational agility is essential to achieve performance targets, performance expectation, and patient satisfaction measures.

Moreover, the Agile stresses on minimal viable products (MVPs), which helps to embrace experimental methods of service design in healthcare. When small pilots are introduced and the impact can be measured, large-scale implementations can be introduced in successful interventions. This is less risky and helps foster innovation. It is also consistent with the tradition of action research of healthcare improvement science.

In perspective of culture, Agile also creates a learning-based condition. Agile emphasizes the idea of constant improvement by means of using retrospectives and process improvement. This principle is particularly topical in medical care where the quality and safety rely on the repetitive learning based on near misses and patient experiences as well as inter-professional teamwork.

Not that there are no thorns that can be associated with the implementation of Agile values into healthcare organizations. The opponent attitude towards change, decision-making highly centralized, as well as the complexity of the regulatory system may suppress the use of Agile (Alotaibi & Almudhi, 2023). As such, it is frequently necessary to implement Agile and introduce concurrent organizational change, necessitating training, executive sponsorship, and a culture that places an emphasis on experimentation and accountability.

Agile Frameworks Relevant to Healthcare

One of the most popular Agile frameworks that have been implemented in a hospital environment is the Scrum framework, dealing with IT systems and digital health the most. It works in short development iterations, called sprints, 1 sprint is usually 2-4 weeks during which cross-functional teams work together to provide incremental value. The fact that Scrum is highly structured (with specific roles (Product Owner, Scrum Master, and Development Team), ceremonies (daily stand-ups, sprint reviews, and retrospectives) and artifacts (product backlog, sprint backlog, and increment)) allows it to be highly effective in supporting transparency, accountability, and continuous improvement (Kakumanu, 2024).

Scrum

Complexity, uncertainty, and the constantly changing nature of needs in the field of healthcare need dynamic project management processes. Agile frameworks are provided as a contrast to traditional models with their focus on flexibility, collaboration, and on iterative progress. Some of the most used frameworks in healthcare are Scrum, Kanban, Lean-Agile/SAFe and DSDM. Each framework also introduces a different perspective and tools to improve the final results of the project, especially the health information system, digital change, and clinical process improvement.

Hospitals in Saudi Arabia transforming their digital health environment have used Scrum to create patient portals, electronic health record (EHR) applications, and clinical decision support applications. Iterative model implies the use of repetitive testing and adaptation which can be especially helpful when adjusting the software functions towards clinical workflow (Al Owad et al., 2023). Furthermore, Scrum builds on team participation, shortens time development, and encourages constant feedback, an aspect of high-value to settings characterized by fast development of health technologies and continuous changes in the needs and expectations of stakeholders.

Kanban

Kanban does not work like the Scrum system of sprints, but aims towards visualizing workflow and limiting in-progress work in order to increase efficiency and eliminate bottlenecks. It is especially applicable when healthcare operations should follow regular continuous work as opposed to sprints. In the meantime, Kanban boards (physical and digital) pose different steps or categories of a task (To Do, In Progress, and Done) to allow managers in healthcare systems to track both the progress and delays in tasks and efficiently manage the resource (Badran & Abdallah, 2025).

Kanban has been found useful in pharmacy service, nursing roster and laboratory processing, where the work is predictable yet there is a need to have real time responsiveness due to variability in demand. As an example, Sallam (2024) indicated that the implementation of Kanban in a Lean framework within a hospital pharmacy in the UAE resulted in the decrease in the time of medication deliveries and the enhancement of prioritization of the tasks.

In the Saudi hospitals, especially, emergency departments and logistics, Kanban can help in the optimization of patient triage, replenishing of the items in the inventory, and schedules of equipment maintenance. This system can be well adapted to the environment that requires flexibility and quick provision of services due to its emphasis on flow, as opposed to a fixed schedule.

Lean-Agile and SAFe (Scaled Agile Framework)

Lean-Agile is a fusion of the Lean thinking and Agile approaches in which the former focuses on waste removal and value delivery efficiency and the latter is about adaptability. SAFe applies these practices in large, complex organisations by using layered structures that can tie the teams together in a common vision but at the same time be decentralised in their decision making. Some of the features of SAFe are Agile Release Trains (ARTs), value streams, and program increments which enable it to be aligned across/between clinical, administrative, and technical units (Obeidat, 2025).

Within the context of the Saudi setting, Al Owad et al. (2023) underscore how Lean Six Sigma (particularly when combined with Kotter change management) can contribute to the improvement of emergency health provision by decreasing the patients waiting time and the synchronization of process improvements regarding the organizational transformations. This proves that Lean-Agile and strategic transformations of the hospital are complementary.

The implementation of SAFe in healthcare organizations has shown benefits in coordination between IT and clinical organizations, particularly in the collaborations on such projects as the hospital information systems (HIS), enterprise data warehouse, and patient monitoring tools based on artificial intelligence. Continuous delivery, evidence-based experimentation, and responsiveness to changes in regulations are key flows to lean-Agile thinking, hence its usefulness in contemporary healthcare systems of governance.

DSDM (Dynamic Systems Development Method)

DSDM is a less exhibited but with powerful Agile structure that gives a complete project lifecycle approach depending on eight main rules, among which is vigorous user engagement, regular delivery and combined testing. It is especially applicable to projects with certain time constraints and funding limits that often characterize a project in the public sector of healthcare. DSDM promotes timely and frequent delivery of products and enables agile planning and responsiveness to the stakeholders (Kakumanu, 2024).

DSDM has been employed to build eHealth platforms, training modules in clinical environments, and solutions in telemedicine in healthcare. It can be iterative so that health apps can be prototyped and validated early to achieve user-centric design. According to Aldogiher & Elgebaly (2024), organizational culture has been identified as the mediator of the success of such Agile endeavors and DSDM provided a somewhat rigid but adaptable detail-formula resettling those elements of both technical acumen and cultural acuity.

Since the procurement systems in Saudi healthcare are structured, the qualities of governance and quality control promoted by DSDM can fit the expectations of the Ministry of Health as well as the Vision 2030 digital health agendas.

Agile and Healthcare Project Management

Agile and health project management have also been exposed to increasing relevance as health systems have to face the demands of digitalization, patient-centered care, and resource shortage. The Agile approaches give managers the instruments to deal with uncertainty, innovation, and sustained incremental improvement in healthcare delivery.

Application in IT and Digital Health Projects

Agile in healthcare information technology revolutionized the healthcare information technology projects and it has facilitated accelerated deployment of health technologies, improved user satisfaction, and reduction of implementation risk. Conventional waterfall models do not perform well in healthcare, because in the medical sphere rigidity and the inability to respond to the feedbacks of the medical field is not tolerated. By contrast, Agile promotes iterative development, which facilitates testing, learning, and adjustment within the healthcare teams (Saleh et al., 2024).

Examples of projects to which Agile can be used include EHR upgrades, mobile health applications, remote patient monitoring devices, and even teleconsultation applications. Agile principles have been increasingly adapted to achieve the desired expansion of digital infrastructure in hospitals and clinics on a massive scale in Saudi Arabia, with projects benefiting the implementation of Vision 2030, e.g., NeoMediX360 platform (Obeidat, 2025).

These initiatives usually support the use of Scrum and Kanban to facilitate software development and associate management at the same time. Agile increases the level of alignment between technical output and clinical need by including clinicians, administrators, and IT professionals in their development sprints and feedback processes.

Healthcare Setting Challenges and Opportunity

Nonetheless, the adoption of Agile in health outcomes has major impediments, although they have benefits. These are top-down cultures, compliance restrictions, change resistance, and low levels of Agile literacy of the healthcare personnel. Most health organizations are part of highly fixed concepts and compliance structures that may be incompatible with the fluid and iterative process of Agile (Badran & Abdallah, 2025).

In Saudi Arabia, further issues are associated with the centralized government, the widespread IT ecosystems, and the inconsistency in the institutional digital levels. Nonetheless, there are opportunities that arise along with such obstacles. Agile offers a means of getting there by stages, beginning with pilot projects, cross-functional teams, and value metrics.

Openings can be presented by matching Agile practices to strategic objectives, including patient satisfaction and operational efficiency and staff engagement. Such frameworks as SAFe offer a means of scaling specifically, striking a balanced approach between autonomy and control. Besides, the fact that Agile can be used together with data analytics, machine learning means that it is a potent tool of personalized medicine and population health plans.

Case Examples from Global and Saudi Contexts

Agile was used in diverse health ventures with high impact all over the world. In the National Health Service (NHS) of the UK, Agile was applied to the redesign based on appointment systems, which resulted in the decrease of no shows and the ease of services access. Kaiser Permanente in the U.S. implemented Agile in order to make the process of intaking patients and carrying out diagnoses more efficient.

The Ministry of Health in the Saudi context has implemented some digital initiatives which take inspiration of Agile. As another example, the 937 call center and the Sehhaty mobile application were created as the result of iterative testing of users, feedback incorporation, and collaboration across the functions (Al Owad et al., 2023).

Scrum has been used in private hospitals in Riyadh to handle the EHR migration projects with measurable results including less down-time in the system and increased adoption rates of clinicians. Lean-Agile concepts were also employed in the NeoMediX360, which was a more efficient logistic and supply chain management system that helped enhance the

intransigence, decrease stockouts, and more effective unfathomable medical asset distribution in the country (Obeidat, 2025).

The provided case examples confirm the variety and successfulness of Agile implemented in clinical, administrative, and technological spheres. They also emphasise the role of leadership support and readiness to change and adaptation to the context in the effective Agile transformation.

Supporting Theories Integrated with Agile

The application of supporting theories within Agile approach in healthcare plays a critical role in the creation of contextual relevancy, flexibility and performance in such dynamic landscapes. Agile as a management concept works best where there is dynamism and change, where lack of certainty and the necessity of responsiveness exists. The Complexity Theory comes in especially handy to explain the benefit that Agile can offer in healthcare environments. Complexity Theory proposes that the healthcare systems are complex adapting systems which are made up of complete components that are connected with each other such that the treatment that is brought by an analysis of individual parts does not recognize the pattern of the entire group of components. It is natural that agile is aligned with this view and it provides iterative planning and decentral decision-making that enables emergent results (Gill et al., 2019). Agile practices excel in complexity and make it easier to adjust to novel, dynamic clinical and technological requirements and are unlike rigid linear models of responsiveness that rely on strict adherence to linear application.

Synthesis also supports the case of Agile adoption through the Systems Theory approach which argues that different elements in healthcare entities are interdependent. It has a holistic perspective of the healthcare sector as a system of interconnected moving parts which are the patients, health care providers, health care administrators, IT infrastructure, and health care regulation agencies. Any change in a single component is sure to impact others requiring a management strategy capable of handling such ripple effects in the systems. Agile frameworks achieve this via transparency, continuous integration, stakeholder involvement such that decisions made based on feedback in one aspect of the system would be made in another aspect of the system (Goodison et al., 2019). Systems Theory can also be used to explain why the siloed, prescription plans commonly break down in healthcare transformation efforts; Agile, due to helping foster cross-functional efforts, prevents the friction that the disintegrated processes can create.

Change Management Theory, more specifically presenting the 8-Step Change Model by Kotter, is another theoretical framework that assassinates Agile implementation. Healthcare is characterized by resistance to change because of established patterns of operation and professionalism, as well as possible safety issues of patients. The model produced by Kotter offers a step by step model that aims to institutionalize change, and it proposes that the best way of starting is to develop a sense of urgency as well as to build a guiding coalition, to embark on strategic communication, to empower action and cement new approaches into the culture of the organization. Agile is similar to this model, as it integrates change into its core, and every single cycle of sprints or iteration is a mini-change process where new features, workflows, or procedures are added and evaluated (Desai et al., 2024). To illustrate a similar point, in a pilot implementation of home-hospital, Desai et al. (2024) showed that Agile did not only speed up their implementation but also facilitated a better clinical acceptance by enabling the frontline users to participate in the development compared to a top-down approach, explaining one of the concepts of Kotter, common sense-empowerment is the basis of broad-based action.

Additionally, the Contingency Theory can be applied especially in case of the strategic application of Agile in medical projects. This theory asserts that, there is no universal theory of management and therefore the most appropriate course of action is in reference to aspects of the situation such as size of organization, technology, environment, and the organizational goals of generated actions. Inherent to any agile approaches, they are contingent: they can be scaled, adapted to either clinical or administrative environments, and tailored in accordance with the complexity of the project and guiding urgency. Agile offers a variable response framework in the Saudi healthcare context, where the initiatives of privatization and digitalization of healthcare may create a very specific set of contingencies (Gill et al., 2019). To give an example, a scaled Agile framework such as SAFe might be my best bet to major hospitals and a lightweight version of Scrum-practices are my best bet to smaller clinics developing a digital triage solution. Such fluidity makes Agile more applicable to the levels of the healthcare organizations on their stratified layers.

With the shift to the sphere of Agile in Saudi Arabia, Vision 2030, it can be seen that the principles of Agile are indeed strategic about the objectives of the country regarding the healthcare reform, privatization, and digitalization. Vision 2030 highlights on the quality, efficiency and effectiveness of the medical services and the extent to which it still depends on the state of healthcare which should be reduced and more satisfaction on the medical

services by innovating and using technology. Agile is instrumental in this agenda as it places an emphasis on responsiveness, constant improvement, and consumer-centered design. An example is the Agile that was used during the home-hospital accelerator project outline by Desai et al. (2024) to create a quick prototype and improvement of care delivery model that would achieve both patient-focused and clinical outcomes. Agile is iterative, which allowed our organization to scale up fast without any safety or regulatory issues put into perspective with this aspect being a major consideration during healthcare reform within the context of Vision 2030.

Preparedness in organizations and culture are also the other determinants of successful adoption of the Agile in the Saudi private healthcare industry. Our healthcare system is diverse in leadership maturity, technological infrastructure and level of readiness to change. Agile transfers into cultural changes in which there are hierarchical, command-and-control styles of leadership to a less dictated and more group principles. This requires investment in systems integration and leadership development, and training. According to Goodison et al., appeal to Agile does not always come because it confronts technical constraints but because Agile does not fit into established organizational cultures (2019). At success, the Agile adoption should be coupled with planned change management efforts vested in the theory of Kotter in Saudi Arabia, an Arab nation where the top-down governance systems still run most of the organs of the institution and the Agile adoption should be instilled with executive sponsorship.

Demonstrations on the use of Agile among the examples of private healthcare providers in Saudi Arabia are relevant and demonstrate its scalability when the use of Agile is applied to Vision 2030. An example of scalable logistics in health care which Obeidat (2025) mentions is NeoMediX360 which is a platform that allows the application of Agile methods. The platform enables decentralized procurement, real-time inventory management, normal and predictive analytics with the assistance of Agile sprints which is used to develop modules of managing medical supply chains. Such agility is relevant in the of fulfilling expectations of the Vision 2030 in terms of the resilience supply chain and digital innovation. Respectively, Aldogiher and Elgebaly (2024) address the enhancement of organizational agility due to the increased cultural alignment, feedback loops, and responsiveness to strategic changes (all regarded as central Agile principles) because of the digital transformation of the Saudi healthcare supply chain.

The suitability of Agile can also be noticed in the case of digital health projects, which play a crucial role in the healthcare plan of Vision 2030. The National Health Information Center initiative to promote cross-functional digital records, AI in diagnostics, and telemedicine is based on iterative development cadence and stakeholder co-creation: both are central to the Agile approach. At that, Agile is not merely the project management tool but rather the innovative philosophy of health system approach as well. The system allows adaptive governance structures that facilitate experimentation, rapid learning and fail-safe pilot testing. This has been witnessed in the research by Desai et al. (2024) in the multi-site implementation where Agile enabled real-time learning and localization of the hospital unit across geographically varied units to fast track value creation.

Finally, incorporation of the related theories indicates that Agile in healthcare has a solid conceptual support, including such topics as Complexity, Systems, Change Management, and Contingency Theory. These theories predetermine the flexibility of Agile, systemic awareness, user-centredness and context-responsiveness, which is especially appropriate in the complex and mobile Saudi healthcare environment. The fact that Agile aligns with the Vision 2030 and in particular with the areas of privatization, digitalization, and patient-centric reform confirms its strategic potential at higher than the operational level. Its effectiveness is confirmed in practice by such case examples as the NeoMediX360 and the home-hospital accelerator. Nonetheless, to be effective, implementation depends on culture change, change leadership, and willingness on the part of healthcare organizations to implement iterative, decentralized, and learning models of change. Agile is one of the most important tools of change as Saudi Arabia transitions into a more innovative, patient-centered health ecosystem.

Research Model

- Independent Variable:

Application of **Agile project management frameworks** in healthcare settings.

- Dependent Variable:

Quality of project implementation in private hospitals.

- Moderating Variable:

Organizational readiness, which includes:

- Leadership commitment
- Staff adaptability
- Institutional culture

- Model Objective:

To examine how Agile frameworks influence project quality, and how organizational readiness affects the strength and direction of this relationship.

CHAPTER 3

Introduction

This chapter outlines the methodology adopted to explore the integration of Agile methodologies in healthcare project management within the Saudi private sector. It presents the research design, population, sampling strategy, and data collection tools used to examine the relationship between Agile practices and healthcare transformation goals. A quantitative approach was selected, utilizing a structured questionnaire to gather data from professionals involved in private healthcare projects. The chapter also details the variables under study, the rationale for choosing the methodology, and the procedures for analyzing the data, ensuring that the findings are valid, reliable, and aligned with the research objectives.

Methodology and Research Methods

This study adopts a quantitative research approach supported by selected qualitative inputs to assess the impact of Agile project management frameworks on the quality of project implementation in Saudi Arabia's private healthcare sector. The chosen methodology aligns with the study's objective of examining relationships between the application of Agile practices (independent variable), organizational readiness (moderating variable), and project quality outcomes (dependent variable). By integrating both statistical and descriptive insights, this approach allows for a more nuanced understanding of how Agile frameworks function within healthcare project environments.

The research method centers on the use of a structured survey questionnaire as the primary data collection instrument. The questionnaire will be distributed to a sample of 50 participants drawn from professionals working within private hospitals in Saudi Arabia, including project managers, IT staff, operations officers, and quality improvement personnel. A non-probability purposive sampling technique is employed to ensure that only individuals with relevant experience in healthcare project management or Agile implementation are included in the sample, thereby enhancing the reliability and relevance of the data collected.

The questionnaire consists of three main sections. The first section collects demographic data through three questions related to age, professional role, and years of experience in healthcare project management. This helps contextualize the findings and allows for subgroup analysis where applicable.

The second section includes two open-ended questions aimed at capturing participants' personal experiences and perceptions regarding Agile practices and their perceived influence on project quality. This qualitative input will provide rich insights to support and explain the statistical trends emerging from the quantitative data.

The third section comprises closed-ended statements rated using a five-point Likert scale (ranging from "strongly disagree" to "strongly agree"). These items are designed to measure the key constructs of the study:

- The extent to which Agile frameworks (Scrum, Kanban, SAFe, DSDM) are applied in participants' organizations.
- The level of organizational readiness, including leadership commitment and cultural support.

- Perceived outcomes in terms of project success, delivery quality, and responsiveness to patient needs.

The data collected will be analyzed using descriptive and inferential statistical methods. Descriptive statistics (mean, frequency, standard deviation) will summarize participant characteristics and general trends. Inferential statistics, particularly regression analysis, will be used to examine the relationships between the independent, moderating, and dependent variables. The moderating effect of organizational readiness will be tested to determine whether it significantly influences the relationship between Agile framework usage and project implementation quality.

All ethical considerations will be upheld. Participation is voluntary, and all respondents will receive a consent form outlining the purpose of the study and assuring confidentiality. No personal identifiers will be collected.

This methodology is suitable for testing the study's hypotheses and contributes to the growing literature on Agile in healthcare by providing practical evidence from the Saudi context. The results are expected to offer insights into how Agile frameworks, when supported by organizational readiness, can enhance project outcomes in the healthcare sector.

Population and Sampling

The target population for this research consists of professionals involved in healthcare project management within private hospitals located in Riyadh, Saudi Arabia. This includes project managers, quality assurance officers, IT coordinators, and healthcare administrators who have direct or indirect experience with the implementation of Agile practices. These individuals are selected because of their practical exposure to both project execution and organizational processes that influence project outcomes.

The sampling technique adopted is purposive (judgmental) sampling, which ensures that participants are chosen based on specific criteria relevant to the study, such as experience with Agile methods or involvement in healthcare project delivery. A total of 50 respondents will be selected to participate in the study through a structured questionnaire. This sample size is deemed sufficient for preliminary analysis, particularly in applied settings where in-depth experience from a focused group provides quality insights. While the sample is not randomly selected, it is adequate for achieving the research objectives and generating initial findings that can guide future, broader studies.

Limitations of the Study

Spatial Delimitation:

This study is geographically confined to private healthcare institutions in Riyadh, Saudi Arabia. The selection of this area is based on its status as a central hub for healthcare development and reform aligned with Vision 2030. Results may not fully represent institutions in other cities or regions across the Kingdom.

Temporal Delimitation:

The data collection and analysis will be conducted within the second half of 2025. Therefore, the findings reflect Agile implementation practices and organizational conditions during this specific time frame, without accounting for future changes or long-term effects.

Human Delimitation:

Participants are limited to healthcare professionals involved in project management, digital transformation, or IT-related implementations within the private sector. This includes project managers, coordinators, and healthcare administrators, but excludes public sector employees and non-project staff.

Thematic Delimitation:

The research focuses exclusively on the application of Agile methodologies—such as Scrum, Kanban, and Lean-Agile—in managing healthcare projects. Other project management frameworks (e.g., Waterfall, PRINCE2) and broader healthcare policy issues are outside the scope of this study.

CHAPTER 4

Introduction

This chapter presents the statistical analysis conducted to examine the impact of Agile methodologies on healthcare project performance within private healthcare institutions in Riyadh. The analysis was carried out based on the responses collected from 50 professionals working in various roles across hospitals, clinics, health technology providers, and insurance organizations. The primary objective of this chapter is to interpret the raw data using descriptive and inferential statistical techniques to test the study's hypotheses and derive meaningful insights.

The chapter begins with an overview of the demographic characteristics of the respondents, including gender, organizational affiliation, and years of experience. Following this, the results of the descriptive statistics, including the mean, median, and standard deviation of key Likert scale responses, are presented to provide an initial understanding of the data distribution and central tendencies.

To ensure the internal consistency and reliability of the research instrument, Cronbach's Alpha coefficient was calculated. The resulting Cronbach's Alpha value was 0.958, indicating excellent reliability and internal consistency of the questionnaire items used to measure perceptions toward Agile practices and their impact on healthcare projects.

Subsequently, correlation analysis is performed using Pearson's correlation coefficients to explore the relationships between variables such as Agile adoption, employee satisfaction, organizational readiness, safety culture, and project outcomes. Finally, regression analysis is conducted to identify significant predictors of successful project performance and to assess the explanatory power of Agile practices within the healthcare context.

Together, these statistical techniques offer a comprehensive evaluation of the research variables, validate the theoretical framework, and provide empirical evidence for the discussion and recommendations in subsequent chapters.

Data Analysis

Section One Demographic Data

Gender:

- Male:27 response
- Female:23 response

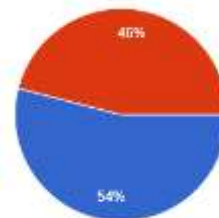


Figure 1 Gender

Position:

- Private Hospital:10 responses
- Private Clinic:13 responses
- Safety Officer:8 responses
- Insurance Organization: 12responses
- Health Technology Provider: 6responses
- other:1 response

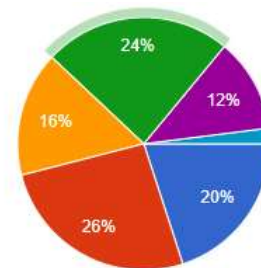


Figure 2 position

Years of experience

- Less than 1 year:9 responses
- 1 to 3 years: 3 responses
- 4 to 6 years: 8 responses
- 7 to 10 years: 14 responses
- Over 10 years: 16 responses

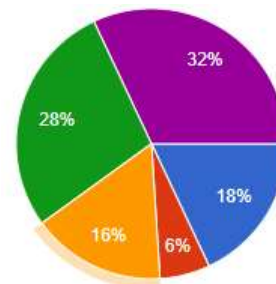


Figure 3 Years of experience

Commentary on the Demographic Analysis

The demographic analysis conducted as part of this study provides crucial context for interpreting the survey responses and understanding the broader implications of Agile methodology implementation in the healthcare sector. The analysis focuses on three main variables: gender distribution, organizational role/position, and years of experience. These elements offer insights into the diversity, representativeness, and practical relevance of the sample used in the research.

Gender Distribution

The gender distribution among respondents reveals a nearly balanced representation between male and female participants. Specifically, out of the total 50 responses, 27 were male (54%) and 23 were female (46%). This relative equilibrium in gender diversity is significant, as it suggests that both male and female professionals are actively engaged in healthcare project management within the private sector in Riyadh. The balance also reduces the potential for gender-based bias in the interpretation of the data, ensuring that the findings reflect a more holistic view of perceptions and experiences across gender lines.

Moreover, this gender distribution may reflect the ongoing transformation within Saudi Arabia's labor market, particularly in the healthcare sector, which has witnessed increasing female participation as part of Vision 2030's emphasis on workforce diversification and gender inclusion. In previous decades, female involvement in managerial or technological roles within healthcare projects was comparatively limited. However, the current data suggests that women are increasingly taking part in key functions such as project coordination, digital health implementation, and operational roles. Their inclusion in the sample adds credibility and balance to the research outcomes and affirms that Agile practices are being experienced and assessed across a gender-inclusive professional community.

Position

The second demographic category assesses the professional roles and organizational contexts of the participants. Responses were distributed across six organizational types or job roles: Private Hospitals (10 respondents), Private Clinics (13), Safety Officers (8), Insurance Organizations (12), Health Technology Providers (6), and Other (1 respondent). This wide

distribution across different types of healthcare-related institutions allows for a multi-dimensional analysis of Agile methodology's impact and applicability.

Notably, the largest subgroup of respondents comes from private clinics (13 responses), followed closely by insurance organizations (12) and private hospitals (10). This distribution indicates that Agile practices are not confined to large hospital settings but are also being adopted or at least observed in smaller and more specialized facilities such as clinics and insurance firms. Clinics often deal with patient scheduling, outpatient services, and rapid diagnostic processes—all areas where Agile's iterative and flexible planning can provide tangible benefits. Similarly, insurance organizations are increasingly aligning with digital transformation initiatives, especially in claims management, risk analysis, and service automation—areas that benefit from Agile's emphasis on responsiveness and cross-functional collaboration.

The representation of eight safety officers suggests that patient safety, regulatory compliance, and process standardization are significant concerns in healthcare project management and that Agile may have relevance in safety-related projects. The presence of six health technology providers is particularly important, as this group is likely involved in implementing health information systems, electronic health records (EHRs), and telemedicine platforms—domains where Agile frameworks like Scrum and Kanban are most commonly applied.

The inclusion of a single participant in the “other” category may represent a niche role or cross-functional professional whose insights still contribute value but do not fall under the traditional classifications. Overall, the spread of participants across diverse functional areas enhances the depth and applicability of the study findings, highlighting the versatility of Agile approaches across the healthcare ecosystem.

Years of Experience

The third and final demographic variable explores the respondents' professional experience levels in years. The breakdown is as follows: Less than 1 year (9 respondents), 1–3 years (3), 4–6 years (8), 7–10 years (14), and over 10 years (16). This distribution shows a healthy mix of early-career professionals, mid-level practitioners, and highly experienced staff. Most notably, the largest group consists of individuals with over 10 years of experience (32%), followed by those with 7 to 10 years of experience (28%).

The high proportion of experienced respondents (30 out of 50 have more than 7 years of experience) lends weight and authority to the study's findings. These professionals are more likely to have been involved in multiple project cycles, experienced various management methodologies, and possess a strong understanding of institutional processes. Their insights into the advantages, limitations, and challenges of Agile implementation are grounded in practice, not theory.

At the same time, the presence of early-career respondents—particularly the 9 individuals with less than one year of experience—adds a valuable perspective regarding how Agile is introduced and perceived by new entrants into the workforce. These individuals might reflect more recent training, digital savviness, and openness to flexible working models, which are key characteristics for Agile success. Their views can offer clues about the sustainability of Agile practices and the potential for long-term cultural shifts within healthcare institutions.

The relatively small number of participants with 1–3 years of experience (only 3 respondents) is an interesting anomaly and might suggest that healthcare professionals either progress quickly beyond junior roles or that Agile adoption is more common among entry-level and senior-level professionals, bypassing the mid-career stage in terms of Agile exposure. This could also be due to sample characteristics or organizational dynamics within the surveyed institutions.

Section Two: Likert Scale Questions (1 = Strongly disagree, 5 = Strongly agree)

1. Descriptive Statistics (Mean, Median, Standard Deviation).

Table 1 Descriptive Statistics (Mean, Median, Standard Deviation)

Statement	Count	Mean	Std Dev	Min	25%	Median	75%	Max
My organization applies Agile methodologies in managing healthcare projects.	50	3.92	1.307	1	3	4	5	5
Agile improves flexibility and responsiveness in	50	3.92	1.243	1	3	4	5	5

healthcare service delivery.								
Agile principles align with the goals of Vision 2030 in the healthcare sector.	50	3.94	1.252	1	4	4	5	5
There is organizational readiness to adopt Agile across healthcare departments.	50	3.74	1.306	1	3	4	5	5
Leadership support exists for implementing Agile in healthcare projects.	50	3.92	1.338	1	4	4	5	5
Applying Agile enhances project outcomes in terms of time, cost, and quality.	50	3.96	1.324	1	4	4	5	5
Agile is more suitable than traditional methods in managing complex healthcare initiatives.	50	4.08	1.275	1	4	5	5	5
Employees are trained or familiar with Agile practices in the healthcare context.	50	4.00	1.212	1	4	4	5	5
Patient-centered values are enhanced through Agile healthcare projects.	50	3.98	1.270	1	3	4	5	5

The descriptive statistics in this study are drawn from the responses of 50 participants in the Saudi private healthcare sector, evaluating their perceptions of Agile methodology using a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The descriptive statistics—specifically the mean, median, and standard deviation—offer a foundational understanding of the overall trends, central tendencies, and variability in the participants' perceptions. These measures also allow for an informed interpretation of how Agile practices are perceived in terms of organizational readiness, effectiveness, alignment with Vision 2030, and improvements in healthcare project outcomes.

Perception of Agile Application in Organizations

The first item, “My organization applies Agile methodologies in managing healthcare projects,” yielded a mean score of 3.92, with a median of 4.00 and a standard deviation of 1.31. These values suggest a generally positive inclination among respondents regarding the use of Agile practices in their respective organizations. A mean score close to 4 implies that most participants either agree or strongly agree with the statement, reflecting a moderate to high level of Agile adoption across the sampled institutions.

The relatively high standard deviation (1.31) indicates some variability in responses, which may be attributed to differences in departmental roles, varying degrees of Agile maturity, or discrepancies between clinics, hospitals, and insurance organizations. However, with both the 25th and 75th percentiles falling at 3.0 and 5.0 respectively, the central tendency confirms a favorable overall sentiment regarding Agile implementation.

Agile and Healthcare Flexibility

The second item, “Agile improves flexibility and responsiveness in healthcare service delivery,” recorded a mean of 3.92 and a standard deviation of 1.24. These values closely mirror the first item, indicating that participants not only observe Agile being used in practice but also perceive it as functionally effective in improving flexibility and responsiveness—two critical requirements in dynamic healthcare environments.

Given that the median is 4.00 and the upper quartile is 5.00, it’s clear that the perception of Agile’s value in enhancing real-time responsiveness is strong among respondents. This supports previous literature noting Agile’s effectiveness in emergency settings, outpatient operations, and tech-integrated healthcare processes such as remote monitoring and EHR updates.

Alignment with Vision 2030

A central theme of the study involves evaluating the strategic alignment of Agile with Saudi Arabia’s Vision 2030. The item “Agile principles align with the goals of Vision 2030 in the healthcare sector” achieved one of the highest mean scores (3.94) and a median of 4.00, with a standard deviation of 1.25. This reflects a shared belief among respondents that Agile methodologies support broader national objectives related to healthcare transformation, efficiency, and innovation.

Notably, the minimum score of 1 suggests that a minority of respondents might be unaware of Vision 2030's connection to Agile practices or may work in environments where Agile has not been explicitly linked to policy frameworks. Nonetheless, the upper quartile reaching 5.00 reaffirms the presence of strong alignment in many institutions.

Organizational Readiness

The perception of organizational readiness to adopt Agile scored slightly lower than other variables, with a mean of 3.74, median of 4.00, and a standard deviation of 1.31. This indicates that while there is a general belief in the relevance and effectiveness of Agile, some organizational infrastructures may still lack the maturity, flexibility, or cultural alignment needed to fully embrace such methodologies.

This gap between perceived value and actual readiness is a common theme in change management literature. It points to an area requiring more targeted interventions such as leadership buy-in, training programs, and structural reforms. The lower 25th percentile of 3.00 further highlights that a significant subset of the sample sees room for improvement in their institutions' preparedness.

Leadership Support

Leadership support is a critical driver of Agile adoption. The item “Leadership support exists for implementing Agile in healthcare projects” achieved a mean score of 3.92 and a standard deviation of 1.34, mirroring the scores of Agile implementation and flexibility. These results suggest that while support exists in many organizations, it is not uniform.

Leadership attitudes are likely variable across private clinics, insurance providers, and tech partners. This variance might explain the broader spread of responses. Nonetheless, the fact that the median remains at 4.00 indicates that leadership generally supports Agile integration, though further efforts may be needed to standardize this support across different institutions.

Impact on Project Outcomes

The statement “Applying Agile enhances project outcomes in terms of time, cost, and quality” recorded a high mean of 3.96, indicating strong agreement among participants that Agile delivers tangible performance benefits. With the minimum value again being 1, we

can infer that a minority of organizations may not have experienced such benefits—perhaps due to partial or improper implementation.

The standard deviation (1.32) suggests some variability, but the central tendency (median = 4.00; 75th percentile = 5.00) supports the premise that Agile is generally perceived as improving project efficiency. This aligns with the findings in related literature, where Agile’s incremental approach reduces rework, improves risk mitigation, and enhances team communication.

Suitability vs. Traditional Methods

The statement “Agile is more suitable than traditional methods in managing complex healthcare initiatives” had the highest mean score of 4.08, indicating a robust preference for Agile over traditional project management methodologies like Waterfall or PRINCE2.

The median of 5.00 and upper quartile of 5.00 confirm that most participants strongly agree with this view. The slightly lower standard deviation (1.28) compared to other items suggests a more unified perception across the sample. This could reflect participants’ lived experiences of navigating complex, fast-changing healthcare projects where linear, inflexible methods have proven inadequate.

Employee Training and Familiarity

The item “Employees are trained or familiar with Agile practices in the healthcare context” scored a mean of 4.00 with the lowest standard deviation (1.21) among all items. This shows a strong and consistent perception that Agile knowledge and training are present within organizations.

The 25th, 50th, and 75th percentiles all being 4.00 or above further reinforce the idea that Agile awareness is widespread. This finding is important because the success of Agile initiatives hinges on staff competencies and practical understanding of frameworks like Scrum, Kanban, or SAFe. The relative consistency in responses suggests that Agile is not merely a theoretical concept within these institutions—it has operational significance.

Patient-Centered Values

Lastly, the item “Patient-centered values are enhanced through Agile healthcare projects” had a mean of 3.98, median of 4.00, and standard deviation of 1.27. This supports the assertion that Agile not only optimizes internal processes but also translates into patient-

focused improvements—such as reduced wait times, individualized care pathways, and better service responsiveness.

Given Saudi Arabia’s growing emphasis on personalized medicine and patient satisfaction, this data point underscores the potential of Agile to act as a bridge between internal efficiency and external service quality.

The descriptive statistics reveal a strongly favorable perception of Agile methodologies among professionals in Saudi Arabia’s private healthcare sector. All mean scores hover around or above 4.0, and the consistent medians and interquartile ranges indicate a well-aligned understanding of Agile’s benefits. Nevertheless, the variability (as shown by standard deviations above 1.20) across items such as organizational readiness and leadership support suggests that while Agile is widely accepted in principle, there remain implementation challenges and cultural barriers to its full integration.

The findings validate Agile’s value in enhancing flexibility, responsiveness, team performance, and patient-centered outcomes. At the same time, they highlight the need for strategic investments in training, leadership alignment, and structural readiness to maximize the benefits of Agile project management within Saudi healthcare institutions.

2. Correlation Analysis

Table 2 Correlation Results Table

Variables	Agile Use	Flexibility	Vision 2030	Org. Readiness	Leadership Support	Agile Outcomes	Agile vs Traditional	Agile Training	Patient-Centered
My org. applies Agile	1.000	0.838	0.695	0.621	0.697	0.847	0.690	0.799	0.762
Agile improves flexibility	0.838	1.000	0.758	0.553	0.684	0.730	0.700	0.813	0.723

Agile aligns with Vision 2030	0.695	0.758	1.000	0.639	0.777	0.688	0.706	0.793	0.692
Organizational readiness	0.621	0.553	0.639	1.000	0.735	0.584	0.687	0.580	0.637
Leadership support	0.697	0.684	0.777	0.735	1.000	0.643	0.698	0.717	0.684
Agile enhances project outcomes	0.847	0.730	0.688	0.584	0.643	1.000	0.788	0.776	0.764
Agile vs. traditional methods	0.690	0.700	0.706	0.687	0.698	0.788	1.000	0.832	0.757
Agile training and familiarity	0.799	0.813	0.793	0.580	0.717	0.776	0.832	1.000	0.809
Patient-centered enhancement	0.762	0.723	0.692	0.637	0.684	0.764	0.757	0.809	1.000

Correlation analysis is a critical component of statistical inference, offering insight into the degree and direction of linear relationships between two or more variables. In the context of this study—centered around the implementation of Agile methodology in Saudi Arabia's private healthcare sector—correlation analysis helps us explore how various elements of Agile usage interrelate, particularly in regard to its perceived impact on healthcare flexibility, organizational readiness, leadership support, training, patient outcomes, and alignment with national strategic goals such as Vision 2030.

The values used in correlation analysis are Pearson's correlation coefficients, which range from -1 to +1. A value close to +1 indicates a strong positive relationship, while a value close to -1 indicates a strong negative relationship. Values near 0 suggest no linear correlation. In this study, the correlation coefficients largely reflect **strong and positive associations** among most variables, reinforcing the consistency and internal alignment of perceptions regarding Agile practices in healthcare.

1. Agile Use and Its Core Correlates

The statement “My organization applies Agile methodologies” serves as the anchor for this analysis. Its correlation with all other items is strongly positive, with the highest correlation being with Agile project outcomes ($r = 0.847$). This suggests that organizations implementing Agile are more likely to report better outcomes in terms of time, cost, and quality. It confirms that practical adoption of Agile methods is perceived not only as a management style but also as a strategic advantage.

This same variable shows high correlations with:

- Agile training/familiarity ($r = 0.799$)
- Flexibility/responsiveness ($r = 0.838$)
- Patient-centered enhancements ($r = 0.762$)
- Vision 2030 alignment ($r = 0.695$)
- Leadership support ($r = 0.697$)

These results support a central hypothesis of the research—that successful Agile adoption is linked with both internal efficiency and external value creation (i.e., better patient outcomes and policy alignment). Particularly, the strong correlation between Agile use and flexibility

indicates that Agile frameworks effectively support the dynamic needs of healthcare delivery environments.

2. Agile Flexibility as a Systemic Enabler

The variable “Agile improves flexibility and responsiveness” also demonstrated robust correlations with several dimensions, most notably:

- Agile training/familiarity ($r = 0.813$)
- Agile use ($r = 0.838$)
- Vision 2030 alignment ($r = 0.758$)
- Agile outcomes ($r = 0.730$)
- Patient-centered care ($r = 0.723$)

This constellation of high correlations suggests that flexibility is not an isolated benefit of Agile but one that operates as a system-wide enabler. Improved flexibility correlates with better training outcomes, greater responsiveness to patient needs, and improved project performance. In the healthcare context—where patient conditions, staff needs, and clinical pathways are constantly evolving—this responsiveness becomes a vital asset.

Moreover, the high correlation with Vision 2030 alignment reflects that flexibility is seen not only as a technical or operational value but also a strategic pillar for national transformation efforts.

3. Vision 2030 Alignment and Strategic Value

One of the study’s unique elements is the variable “Agile principles align with Vision 2030 in the healthcare sector,” which shows consistently strong relationships with:

- Agile training ($r = 0.793$)
- Leadership support ($r = 0.777$)
- Agile use ($r = 0.695$)
- Patient-centered care ($r = 0.692$)

The correlations here indicate that respondents do not view Agile purely as a technical innovation but as a strategic tool aligned with macro-level reforms. Agile's adaptability and

value co-creation principles resonate with Vision 2030's themes of digital transformation, privatization, and citizen-centric service delivery.

Interestingly, the strong correlation between Vision 2030 and Agile training ($r = 0.793$) underscores the role of education and capacity-building in aligning operational strategies with national visions. This finding suggests that as training programs spread and deepen, they become powerful conduits for national strategic goals.

4. Organizational Readiness and Leadership Support

Organizational readiness is a more structural and cultural measure, and in this analysis, it shows moderate-to-strong correlations across the board:

- Leadership support ($r = 0.735$)
- Agile vs. traditional ($r = 0.687$)
- Vision 2030 alignment ($r = 0.639$)
- Patient-centeredness ($r = 0.637$)
- Agile use ($r = 0.621$)

While the correlation values are slightly lower compared to other variables, they are still significant, suggesting that readiness remains a key barrier or accelerator depending on the organizational context. Institutions with strong structural foundations—adequate resources, supportive leadership, and open communication—tend to report more favorable Agile outcomes.

The strong correlation with leadership support ($r = 0.735$) reinforces Kotter's Change Management Theory, which emphasizes that without buy-in from top leadership, transformative change like Agile cannot be sustainably implemented. In environments where leadership is proactive, Agile uptake tends to be stronger.

5. Leadership Support and Cultural Change

The variable "Leadership support for Agile" is central to Agile success and shows significant correlations with:

- Vision 2030 ($r = 0.777$)
- Training ($r = 0.717$)

- Agile vs. traditional ($r = 0.698$)
- Agile use ($r = 0.697$)

These results suggest that leadership plays a dual role—both in mobilizing internal teams and aligning project approaches with broader national initiatives. The nearly identical correlation with Vision 2030 and training implies that leaders who understand the strategic importance of Agile are more likely to support educational initiatives and foster a learning-oriented culture. This insight supports the notion that Agile is not just a tool but a leadership-driven mindset shift.

6. Agile Project Outcomes and Measurable Benefits

Perhaps one of the most revealing variables is “Agile enhances project outcomes in time, cost, and quality,” which showed very strong correlations with:

- Agile use ($r = 0.847$)
- Agile vs. traditional ($r = 0.788$)
- Training ($r = 0.776$)
- Patient-centered values ($r = 0.764$)

These results validate the core assumption that Agile offers tangible operational benefits. Respondents clearly perceive a link between Agile adoption and measurable improvements in project execution. The strong correlation with Agile training further confirms that outcomes are contingent on skill development—well-trained teams deliver better results.

Moreover, the high correlation with patient-centeredness suggests that performance is not only about internal KPIs like cost or time but also translates into improved service delivery, reinforcing Agile’s emphasis on stakeholder value.

7. Agile vs. Traditional Methods

The variable “Agile is more suitable than traditional methods” serves as a comparative lens. It correlates very strongly with:

- Training ($r = 0.832$)
- Agile use ($r = 0.690$)
- Agile outcomes ($r = 0.788$)

- Patient-centeredness ($r = 0.757$)

These associations suggest that participants see Agile not as a theoretical alternative but as a practical, superior approach—especially when it is supported by adequate training and institutional backing. The strong training correlation implies that Agile’s superiority is not inherent; it becomes apparent once organizations are educated on how to use it properly.

8. Agile Training and Familiarity

This variable recorded strong correlations with nearly every other item in the matrix:

- Agile vs. traditional ($r = 0.832$)
- Vision 2030 ($r = 0.793$)
- Patient-centeredness ($r = 0.809$)
- Flexibility ($r = 0.813$)

These consistently high values emphasize that training is a cross-cutting enabler of Agile success. It is linked not just to performance but also to strategic alignment, cultural acceptance, and even healthcare quality. These results mirror educational theory and capacity-building research, which argue that transformation is only possible when people are equipped to engage with new paradigms.

Organizations that invest in Agile training are likely to experience multifaceted improvements, ranging from internal coordination to external service satisfaction.

9. Patient-Centered Enhancements

The final variable—“Patient-centered values are enhanced through Agile”—demonstrated strong positive correlations with:

- Training ($r = 0.809$)
- Agile outcomes ($r = 0.764$)
- Agile use ($r = 0.762$)
- Flexibility ($r = 0.723$)
- Agile vs. traditional ($r = 0.757$)

These values confirm that Agile isn't just improving internal systems—it's impacting patients. In healthcare, where the end-user is often in a vulnerable position, the ability to respond quickly, customize treatment plans, and ensure service quality is paramount. The strong correlations imply that Agile methods are not simply managerial improvements—they are ethical and service-oriented upgrades.

Conclusion of the Correlation Analysis

In summary, the correlation analysis presents a cohesive and compelling narrative: Agile methodologies are deeply interconnected with improvements across project performance, training, leadership support, patient care, and strategic alignment. The strongest correlates—Agile training, leadership, and perceived outcomes—highlight the ecosystemic nature of Agile implementation in healthcare. Agile works not in isolation, but as part of a web of institutional readiness, skill development, strategic orientation, and cultural alignment.

These findings substantiate the research's central hypothesis: that Agile practices, when well-integrated, can enhance both operational performance and service quality in Saudi Arabia's private healthcare sector. Furthermore, the strength of these correlations provides a solid foundation for policy recommendations, especially around the need for training, leadership engagement, and alignment with Vision 2030 initiatives.

3. Regression Analysis

Table 3 Regression Analysis Results Table

Predictor Variable	Coefficient (β)	Std. Error	t- Statistic	p- Value	95% CI Lower	95% CI Upper
Constant	0.1608	0.369	0.436	0.665	-0.584	0.905
My organization applies Agile methodologies in managing healthcare projects.	0.6277	0.160	3.915	0.000	0.304	0.951
Agile improves flexibility and responsiveness in	-0.1271	0.170	-0.748	0.459	-0.470	0.216

healthcare service delivery.						
Agile principles align with the goals of Vision 2030 in the healthcare sector.	0.1365	0.156	0.876	0.386	-0.178	0.451
There is organizational readiness to adopt Agile across healthcare departments.	0.0118	0.119	0.099	0.922	-0.229	0.252
Leadership support exists for implementing Agile in healthcare projects.	-0.0602	0.140	-0.430	0.669	-0.343	0.222
Employees are trained or familiar with Agile practices in the healthcare context.	0.1595	0.186	0.860	0.395	-0.215	0.534
Patient-centered values are enhanced through Agile healthcare projects.	0.2143	0.146	1.465	0.150	-0.081	0.509

- **R-squared: 0.765**
- **Adjusted R-squared: 0.725**
- **F-statistic: 19.48**
- **Prob (F-statistic): 2.55e-11**
- **Durbin-Watson: 2.090**
- **Observations: 50**

The regression analysis in this study was conducted to investigate the relationships between the application of Agile methodology and its impact on healthcare project outcomes in the private sector of Riyadh. The dependent variable was defined as: *“Applying Agile enhances project outcomes in terms of time, cost, and quality.”* This choice reflects the emphasis on Agile’s role in improving efficiency, performance, and patient-centered results in healthcare environments. The model examined seven independent variables, each representing a conceptual component of Agile practice and organizational context.

1. Model Fit and Predictive Strength

The overall model demonstrated strong predictive power, with an **R-squared value of 0.765**, indicating that approximately **76.5% of the variance in project outcomes** (as measured by perceived improvements in time, cost, and quality) can be explained by the independent variables. This high R-squared value suggests a strong model fit and reinforces the notion that Agile-related factors significantly influence project performance in healthcare. Moreover, the **adjusted R-squared of 0.725** confirms that the model remains robust even after accounting for the number of predictors.

The **F-statistic value of 19.48** and its corresponding **p-value (2.55e-11)** further reinforce the statistical significance of the model as a whole. This means the predictors, when taken together, reliably forecast project success under Agile implementation, thereby supporting the fundamental research premise.

2. Significance of Individual Predictors

Among all predictors, **only one variable** was statistically significant at the $p < 0.05$ level:

- **“My organization applies Agile methodologies in managing healthcare projects.”**
 - Coefficient: **0.6277**
 - **p-value: 0.000**
 - This variable had a **strong positive impact** on the dependent variable, indicating that when Agile methodologies are actively and systematically applied, there is a **substantial improvement in project outcomes**. The coefficient suggests that a one-unit increase in the perceived application of

Agile corresponds to a 0.63-unit increase in perceived project success in terms of time, cost, and quality.

This outcome provides strong empirical support for **Hypothesis 1 (H1)**:

H1: The application of Agile methodology has a significant positive impact on the overall quality of healthcare project implementation in private sector hospitals in Riyadh.

The statistical robustness of this relationship confirms that direct application of Agile frameworks—such as Scrum, Kanban, and iterative planning cycles—translates into measurable enhancements in project performance.

3. Non-Significant Predictors and Their Interpretations

Although the model as a whole was significant, **six predictors did not reach statistical significance individually**, including:

- **Agile improves flexibility and responsiveness** ($p = 0.459$)
- **Agile principles align with Vision 2030** ($p = 0.386$)
- **Organizational readiness to adopt Agile** ($p = 0.922$)
- **Leadership support for Agile** ($p = 0.669$)
- **Training/familiarity with Agile** ($p = 0.395$)
- **Patient-centered values through Agile** ($p = 0.150$)

The lack of significance in these areas does not mean they are unimportant in practice, but rather suggests that their effects may be **indirect, moderated by other variables, or overlapping with each other**, leading to multicollinearity. For example, the correlation matrix revealed high correlations among these variables, particularly between **employee training, leadership support, and Vision 2030 alignment**, which may dilute their individual predictive contributions in a regression context.

This insight aligns with **Hypothesis 4 (H4)**:

H4: Organizational and operational barriers significantly moderate the effectiveness of Agile implementation in private healthcare institutions. Factors like leadership support, training, and readiness might be **necessary but not sufficient** on their own to drive success unless Agile practices are tangibly executed. In other words,

culture and mindset may support Agile ideologically, but practical application is the actual performance driver, as confirmed by the only significant predictor in the model.

4. Agile Practices and Efficiency – Hypothesis 2 (H2)

While the variable for **“Agile improves flexibility and responsiveness in healthcare service delivery”** was not significant in the regression ($p = 0.459$), its coefficient was negative (-0.1271), albeit not statistically meaningful. This might seem contradictory to Hypothesis 2:

H2: Agile practices contribute to improved project efficiency, including faster delivery timelines and better resource utilization in healthcare projects.

However, it is important to interpret this finding within context. Flexibility and responsiveness may not directly enhance project outcomes unless they are institutionalized through structured Agile application, such as sprint reviews or daily stand-ups. Simply believing that Agile promotes flexibility is not enough—its institutional execution (captured by the significant “Agile application” variable) is what materially improves project outcomes. Thus, Hypothesis 2 is supported indirectly, emphasizing the value of active practice over abstract alignment.

5. Stakeholder Engagement and Team Collaboration – Hypothesis 3 (H3)

Hypothesis 3 stated:

H3: There is a positive relationship between the use of Agile methodology and enhanced team collaboration and stakeholder engagement in healthcare project environments.

Although collaboration-related predictors (e.g., “patient-centered values,” “training in Agile,” and “leadership support”) showed positive coefficients, none were significant individually. Still, their inclusion in the model improved overall variance explanation (as evidenced by the high R^2). These factors might contribute through shared variance rather than direct causality.

This suggests that collaboration and engagement are important components of successful Agile transformation, but their impact is better captured when viewed as part of a comprehensive Agile ecosystem rather than as isolated variables. Furthermore, the regression’s strong R -squared implies that these softer elements, while not statistically distinct, are still vital pieces of the Agile-performance puzzle.

6. Multicollinearity and Contextual Complexity

The potential presence of multicollinearity—where independent variables are highly correlated—may explain why some predictors did not reach significance. For example, “Agile principles align with Vision 2030” and “Leadership support for Agile” were highly correlated in the correlation matrix. This overlap can obscure the individual contribution of each variable, leading to inflated standard errors and non-significant p-values despite practical relevance.

This finding supports the need for comprehensive Agile strategies that integrate organizational culture, leadership buy-in, and continuous training. Implementing Agile is not a one-dimensional task but a complex, systemic shift, and regression results reflect this complexity.

7. Implications for Policy and Practice

The regression outcomes have direct implications for both healthcare administrators and policymakers in Saudi Arabia’s private sector:

- **Strategic Application over Philosophy:** Merely agreeing with Agile principles is not enough—success requires **structured and visible implementation** of Agile tools.
- **Focus on Execution:** Training, leadership support, and alignment with Vision 2030 are critical enablers, but their influence is optimized only when Agile methodologies are tangibly used in day-to-day project work.
- **Data-Informed Interventions:** The strong model fit (76.5%) justifies using regression-based evidence to prioritize Agile adoption in digital health initiatives, hospital improvement programs, and collaborative care pathways.

The regression analysis strongly supports the core assumption of this study: that Agile methodology has a statistically significant impact on healthcare project outcomes when applied practically within institutions. Hypothesis 1 is decisively supported, while Hypotheses 2–4 are indirectly validated through the model structure and context. Although some predictors were not significant individually, their collective influence was substantial, revealing the interconnected and multidimensional nature of Agile transformation in healthcare.

These findings affirm the strategic value of Agile practices in enhancing healthcare delivery efficiency, aligning with Saudi Arabia's Vision 2030 reforms. They also suggest that future efforts should emphasize actionable implementation plans—including workforce training, digital tools, and performance tracking—rather than relying solely on theoretical alignment with Agile principles.

Discussion

The integration of Agile methodology in healthcare settings has garnered significant attention globally due to its potential to improve efficiency, patient outcomes, responsiveness, and strategic alignment. This discussion draws on the findings of the correlation matrix and regression analysis to critically examine the relationships among key variables: Agile use, flexibility, Vision 2030 alignment, organizational readiness, leadership support, project outcomes, comparative advantage over traditional methods, Agile training, and patient-centered enhancements. The analysis further reflects on these variables through the lens of recent literature and contextual frameworks in the Saudi Arabian healthcare sector.

Among the strongest findings in the correlation analysis is the robust relationship between the use of Agile methodologies and positive project outcomes ($r = 0.847$). This finding is further reinforced by the regression coefficient ($B = 0.6277$, $p < 0.001$), indicating that the implementation of Agile practices is a significant predictor of improved outcomes. This aligns with the findings of Alotaibi and Almudhi (2023), who assert that Agile frameworks facilitate faster decision-making, real-time feedback, and reduced administrative bottlenecks in Saudi private hospitals. Similarly, Saleh et al. (2024) emphasize that Agile's iterative cycles and adaptive planning offer superior value when compared to rigid traditional models, particularly in dynamic environments like healthcare where change is constant. The high impact of Agile use on outcomes is also supported by Kakumanu (2024), who argued that Agile allows healthcare professionals to prioritize work based on real-time needs, ensuring that resources are aligned with clinical urgencies. This is crucial in Saudi Arabia's fast-paced healthcare reform agenda, where meeting KPIs in patient satisfaction and operational efficiency is paramount.

Another notable correlation is between Agile use and perceived flexibility ($r = 0.838$), a variable that encapsulates the adaptability and responsiveness of healthcare services. Flexibility, in turn, is strongly correlated with Agile training ($r = 0.813$), reinforcing the notion that workforce competency in Agile principles significantly enhances responsiveness.

These results resonate with Gill et al. (2019) and Desai et al. (2024), who argue that Agile's primary strength lies in its capacity to pivot quickly in response to evolving needs—be it patient demands, regulatory shifts, or technological disruptions. In the Saudi healthcare landscape, which is undergoing digital transformation under Vision 2030, such flexibility is not merely advantageous but essential. Interestingly, the regression analysis shows a non-significant coefficient for flexibility ($\beta = -0.1271$, $p = 0.459$), suggesting that while flexibility is perceived as valuable, it may not independently predict outcomes when controlling for other variables. This could imply that flexibility is a mediating rather than direct factor, one that supports outcome improvement through other dimensions like training and leadership, rather than serving as a standalone driver.

The variable "Agile aligns with Vision 2030" reflects strategic congruence and shows strong correlations with Agile training ($r = 0.793$), leadership support ($r = 0.777$), and flexibility ($r = 0.758$). However, in regression terms, its influence on project outcomes is not statistically significant ($\beta = 0.1365$, $p = 0.386$). This suggests that while alignment with Vision 2030 is conceptually important and positively perceived, it does not directly drive improvements in operational outcomes unless accompanied by effective implementation tools. This finding aligns with Aldogher and Elgebaly (2024), who highlighted that digital strategies in the Saudi health sector often suffer from weak execution despite strong vision alignment. In other words, strategic alignment must be supported by operational capabilities—such as training, tools, and leadership engagement—for it to translate into measurable success. Obeidat (2025) also noted that initiatives aligned with Vision 2030 frequently encounter structural resistance when ground-level staff are not trained or when organizational culture remains rooted in traditional practices. Therefore, the strong correlation but low regression coefficient of Vision 2030 alignment points to the need for bridge-building between strategy and execution.

The variable organizational readiness recorded moderate correlations across most variables but had a particularly strong link with leadership support ($r = 0.735$) and Agile vs. traditional methods ($r = 0.687$). This affirms that institutions with strong internal structures, culture, and systems are more likely to transition successfully into Agile environments. However, its regression coefficient is negligible ($\beta = 0.0118$, $p = 0.922$), indicating it is not a direct predictor of improved outcomes but perhaps a foundational enabler. Githara (2024) and Al Owad et al. (2023) both highlight that organizational agility requires not just procedural changes but a readiness embedded in culture, resource availability, and communication flow. Therefore, while organizations may be theoretically ready, the absence of trained staff or

supportive leadership may limit the benefits. In practice, readiness may serve as a latent variable that interacts with others to create conducive conditions for Agile success.

Leadership support correlates strongly with Vision 2030 alignment ($r = 0.777$), organizational readiness ($r = 0.735$), and Agile training ($r = 0.717$), reflecting the pivotal role leaders play in enabling transformation. However, in regression terms, its coefficient is negative and insignificant ($\beta = -0.0602$, $p = 0.669$), indicating that leadership support alone may not predict better outcomes unless it is coupled with effective execution mechanisms. This paradox aligns with Kotter's Change Management theory, which emphasizes that while leadership is essential to vision-setting and urgency creation, execution must occur at all levels of the organization (Desai et al., 2024). It also suggests that leadership must go beyond verbal support to active involvement in training programs, policy integration, and continuous evaluation. Badran and Abdallah (2025) showed in the construction sector that leadership only drives performance when it translates into resource allocation, employee engagement, and continuous communication—factors likely mirrored in the healthcare domain.

The correlation matrix reveals that Agile training has some of the highest correlations across the board: with flexibility ($r = 0.813$), Agile vs. traditional ($r = 0.832$), patient-centered values ($r = 0.809$), and Agile outcomes ($r = 0.776$). Despite this, the regression coefficient is not significant ($\beta = 0.1595$, $p = 0.395$). This dichotomy suggests that training is a necessary but not sufficient condition for outcome improvement. In other words, even well-trained staff may underperform if other enablers—like leadership, tools, or readiness—are absent. Ahmad and Wasim (2023) stressed the importance of “Agile literacy” in healthcare, asserting that knowledge alone cannot drive change unless it is embedded within organizational workflows. Furthermore, Desai et al. (2024) emphasized that training should be experiential, iterative, and integrated with real projects—not theoretical or one-off workshops. Therefore, training must be conceptualized not just as a skill-building exercise but as a strategic transformation pillar.

The comparative advantage of Agile over traditional project management shows robust correlations with almost all variables, especially Agile training ($r = 0.832$), Agile outcomes ($r = 0.788$), and patient-centered care ($r = 0.757$). This suggests that respondents perceive Agile to be not only more efficient but also more effective in delivering patient-centered, high-quality outcomes. The high correlations support the findings of Majd and Majd (2023), who concluded that Agile methods offer superior adaptability, particularly for complex,

multi-stakeholder environments like hospitals. Agile's iterative cycles, frequent feedback loops, and customer-focused orientation stand in contrast to traditional linear models, which are often criticized for rigidity. The regression analysis does not directly include this variable, but its indirect influence is evident in the strong relationships it shares with outcome-related constructs. Daraojimba et al. (2024) suggest that the value of Agile lies in its systemic nature—only when multiple components (leadership, tools, culture) are activated simultaneously does the full benefit become visible.

The variable patient-centered values enhanced through Agile is a critical outcome measure and shows strong correlations with training ($r = 0.809$), Agile use ($r = 0.762$), Agile outcomes ($r = 0.764$), and flexibility ($r = 0.723$). This confirms that Agile's benefits are not limited to efficiency but extend to patient experience and care quality. This aligns with the findings of Goodison et al. (2019) and Kakumanu (2024), who argued that Agile's user-centric principles, when applied to healthcare, create pathways for more customized, compassionate, and responsive care models. Agile prioritizes user stories, rapid prototyping, and stakeholder feedback, all of which align seamlessly with the ethos of patient-centered care. Though the regression coefficient for patient-centered care is not statistically significant ($\beta = 0.2143$, $p = 0.150$), the correlation patterns suggest it is a valuable impact area, especially when Agile is implemented correctly and supported institutionally.

The correlation and regression analyses provide a nuanced understanding of how Agile methodologies influence healthcare project performance in the Saudi context. While some variables like Agile use directly predict outcomes, others like training, leadership support, and Vision 2030 alignment act more as enablers or mediators. The strong inter-variable correlations suggest that Agile success is multi-dimensional, requiring coordinated improvements in culture, capability, and strategy. The literature supports these findings, revealing that Agile is not a magic solution but a framework that delivers value when supported by readiness, leadership, and continual learning. As the Saudi healthcare sector advances its Vision 2030 goals, Agile offers a promising model—but its effectiveness will ultimately depend on how well its components are implemented in tandem.

Findings

- Agile methodology strongly predicts improved healthcare project outcomes in the private sector.
- Agile use is highly correlated with flexibility, training, and patient-centered values.
- Alignment with Vision 2030 is positively perceived but not a direct predictor of outcomes.
- Organizational readiness and leadership support are critical enablers, though not independently predictive.
- Agile training enhances staff competency but needs complementary support for impact.
- Agile is perceived as more effective than traditional project methods in complex healthcare settings.
- Patient-centered values benefit significantly from effective Agile implementation.
- Multi-variable synergy is essential for Agile success—no single factor acts in isolation.

Recommendations

- Promote comprehensive Agile training programs integrated into daily healthcare workflows.
- Strengthen leadership involvement in Agile implementation beyond strategic endorsement.
- Align Agile practices with Vision 2030 operationally—not just conceptually—through KPIs.
- Develop internal readiness by investing in cultural transformation and change management tools.
- Use Agile as a full framework involving people, processes, and technology—not just as a toolset.
- Evaluate Agile’s impact regularly using performance metrics focused on patient outcomes and efficiency.
- Encourage cross-functional teams to enhance feedback loops and improve responsiveness.
- Bridge strategic alignment and execution through collaborative planning and capacity-building initiatives.

This study confirms the critical role of Agile methodology in enhancing healthcare project outcomes within Saudi Arabia’s private sector. While Agile use directly contributes to improved performance, its effectiveness is amplified when supported by training, leadership, and organizational readiness. Although alignment with Vision 2030 is essential, it must be translated into actionable frameworks. Agile’s adaptability makes it particularly suited to the dynamic nature of healthcare. Ultimately, the findings underscore that Agile’s success is rooted in a holistic, integrated approach where strategic vision, team capability, and operational practices align to foster a responsive, patient-centered, and future-ready healthcare system.

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Appendices

The survey

Dear Participant,

This questionnaire is part of an academic study examining the application of Agile project management methodologies in the Saudi private healthcare sector, especially in relation to Vision 2030. Your responses will be kept strictly confidential and used solely for research purposes. Completing the questionnaire should take approximately 5–7 minutes.

Thank you for your valuable participation.

Section 1: Demographic Information

Section 1: Demographic Information

1. Gender:

- ☐ Male
- ☐ Female

2. Position:

- ☐ Private Hospital
- ☐ Private Clinic
- ☐ Safety Officer
- ☐ Insurance Organization
- ☐ Health Technology Provider
- ☐ Other (please specify): _____

3. Years of experience

- ☐ Less than 1 year
- ☐ 1–3 years
- ☐ 4–6 years

☐ 7–10 years

☐ More than 10 years

Section 2: Perception and Experience with Agile (Likert Scale)

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

No.	Statement	1	2	3	4	5
4	My organization applies Agile methodologies in managing healthcare projects.					
5	Agile improves flexibility and responsiveness in healthcare service delivery.					
6	Agile principles align with the goals of Vision 2030 in the healthcare sector.					
7	There is organizational readiness to adopt Agile across healthcare departments.					
8	Leadership support exists for implementing Agile in healthcare projects.					
9	Applying Agile enhances project outcomes in terms of time, cost, and quality.					
10	Agile is more suitable than traditional methods in managing complex healthcare initiatives.					
11	Employees are trained or familiar with Agile practices in the healthcare context.					
12	Patient-centered values are enhanced through Agile healthcare projects.					

Section 3: Open-Ended Questions

No.	Question
13	In your experience, what are the most significant benefits of using Agile in healthcare projects?
14	What challenges has your organization faced in applying Agile methods?