The Applicability and Adaptability of Using the Agile Methodology by Healthcare Organisations in the UK

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Abstract

The research investigated the application and adaptability of the Agile methodology within UK healthcare organisations, aiming to identify the challenges, benefits, and solutions to its successful deployment. Using a survey-based method with a sample size of 117, the study employed descriptive statistics and the Pearson Chi-squared test to analyse the primary data in SPSS. The findings indicated an increasing adoption of Agile in the UK healthcare sector, with demographic factors such as gender, age, role, and experience influencing this trend. Enhanced stakeholder participation and improved project outcomes are notable reported advantages. However, constraints like regulatory compliance and risk aversion remain significant barriers. The results underscore the potential of Agile to transform healthcare project management in the UK, emphasising the need for adjustments that account for legislative and cultural nuances, as well as the establishment of a supportive organisational structure. These findings hold value for academia, industry, and policymakers seeking to enhance the effectiveness of healthcare delivery and project management, ultimately contributing to better healthcare outcomes.

Keywords: Agile methodology, Healthcare, Project management.

1. INTRODUCTION

The Agile methodology, defined as an iterative and incremental framework for managing complex projects, emphasising teamwork, self-organisation, and accountability (Beck et al., 2001), has increasingly gained attention for its flexible approach to project management. This is particularly noticeable in the healthcare sector, where it addresses resource constraints and effectively meets patient expectations (Fitzgerald, Hartnett and Conboy, 2006). Healthcare organisations are pursuing project management strategies that prioritise flexibility, collaboration, and responsiveness to navigate the complex healthcare landscape (Dingsøyr et al., 2012). The 15th State of Agile Report of 2021 reinforces this trend, revealing a growing adoption of Agile techniques across various sectors, including healthcare, and underscoring Agile's versatility beyond its origins in IT (Serrador and Pinto, 2015). However, the specific challenges and effectiveness of Agile's implementation in the UK healthcare context have not been well studied or reported, indicating a knowledge gap that prompts further investigation (Russell and Hebson, 2025). Historically, the UK healthcare sector has struggled with change management due to budget constraints and resource scarcity (Durdy and Bradshaw, 2014). The implementation of recent advancements in digital health technologies warrants adaptable change management solutions (Etikan, Musa and Alkassim, 2016).

The quest for advancements in digital health technologies informs the clear rationale for assessing the implementation of Agile methodologies in the UK healthcare sector, especially as traditional Waterfall approaches have failed to keep pace with rapid innovation. The Agile methodologies promise enhanced organisational alignment, cost savings, and increased customer satisfaction through rapid feedback and iterative processes (Beck et al., 2001). Despite its recognised potential, existing literature primarily investigates the adoption of Agile in other countries' healthcare systems, predominantly the US, leaving a critical 'impact' gap in the UK context (Ahmad and Wasim, 2023). This prompted the following research questions:

- RQ1: How conversant are operators in the UK healthcare sector with Agile methodologies?
- RQ2: How will Agile benefit the UK healthcare sector?
- What barriers would hinder the implementation of Agile in the UK healthcare sector?

In response to these questions, the research being reported thus aimed to examine the applicability and adaptability of Agile methodologies in UK healthcare organisations, with the associated objectives of identifying the benefits, challenges, and areas for improvement.

2. LITERATURE REVIEW

2.1. Background and development of the Agile methodology

The Agile methodology is a concept rooted in the Agile Manifesto, which delineates the values and principles guiding Agile development over traditional Waterfall models (Cockburn, 2016). It encourages adaptive planning, evolutionary development, early delivery, and continuous improvement. (Cockburn, 2007) further posits that Agile embodies a mindset of valuing individuals and interactions, customer collaboration, and flexibility over rigid planning. (Fowler, 2001) adds that Agile is a set of principles that enable teams to adapt quickly to changing requirements while delivering high-quality software.

(Vidgen and Wang, 2006) highlight Agile's focus on iterative development cycles to deliver quality outcomes in shorter time frames, supported by continuous customer feedback and collaborative task management. The key values of Agile include customer involvement, adaptive planning, early delivery, transparency, and teamwork (Beck et al., 2001). Its focus on customer-centric development allows for a more responsive approach to dynamic demands (Beck et al., 2001) and fosters a more engaged development process (Moe, Dingsøyr and Dybå, (2010).

Agile is characterised by iterative development, where work is divided into time-boxed iterations, or sprints (Beck et al., 2001). Agile enables regular feedback, early detection of issues, and a prompt response to changing requirements. Agile promotes self-organising teams that foster creativity and accountability (Cockburn, 2007). Continuous feedback from stakeholders in an Agile methodology improves product quality, while its adaptive planning aligns evolving requirements with customers' needs (Cockburn, 2016). By encouraging collaboration and adaptability, Agile enhance project outcomes and customer satisfaction.

Agile originated in the early 1990s as a response to inadequacies in traditional software development approaches (Fowler, 2001). In 2001, a group of developers, including Kent Beck and Martin Fowler, crafted the Agile Manifesto, a guiding document advocating for flexibility and collaboration (Beck et al., 2001). The principles outlined in this manifesto have transcended software development and are now applicable across sectors such as healthcare and education (Cockburn, 2016).

The early 2000s marked a significant advancement in Agile techniques, with Scrum emerging as a dominant project management framework (Beck et al., 2001). Extreme Programming (XP), introduced by Kent Beck, further promoted engineering practices essential to Agile (Beck and Andres, 2004). The integration of Kanban, which aims to enhance workflow efficiency, into Agile principles was yet an important evolution of the approach (Anderson, 2010).

Agile methodologies present several advantages, particularly in healthcare contexts: Flexibility and Cost-Effectiveness (Conforto et al., 2014), Risk Reduction and Efficiency (Dingsøy et al., 2012), Greater Stakeholder Engagement (Abrahamsson et al. 2017), Iterative Development (Cockburn, 2016),

Collaborative Environment, Faster Time-to-Market of solutions, and Enhanced Communication and Shared Responsibility between team members (Cockburn, 2016).

Despite its numerous benefits, the Agile methodology poses certain disadvantages in healthcare settings: Difficulties arise in managing change involving diverse stakeholder expectations (Conforto et al., 2014), Agile's processes may complicate collaboration with numerous stakeholders (Conforto et al., 2014), Resistance to Cultural Change can impede its adoption especially in hierarchical healthcare structures (Thombare et al. 2025), Rapid feature delivery may compromise quality where there are no established standards (Cockburn, 2016), and Agile's flexible documentation may conflict with regulatory requirements in healthcare settings (Sommerville and Sawyer, 1997).

2.2. The Agile methodology in the UK healthcare sector

Healthcare organisations are pursuing project management strategies that prioritise flexibility, collaboration, and responsiveness to navigate the complex healthcare landscape (Dingsøy et al., 2012). The 15th State of Agile Report of 2021 reinforces this trend, revealing a growing adoption of Agile techniques across various sectors, including healthcare, and underscoring Agile's versatility beyond its origins in IT (Serrador and Pinto, 2015). However, the specific challenges and effectiveness of Agile's implementation in the UK healthcare context remain poorly understood, indicating a research gap that warrants further investigation (Russell and Hebson, 2025). Entrenched traditional practices within healthcare systems may hinder the adoption of Agile (Greenhalgh et al., 2004). Budgetary constraints and resource scarcity have affected change management in the UK health sector (Durdy and Bradshaw, 2014). Recent advancements in digital health technologies have hastened the need for adaptable change management solutions (World Health Organization, 2025).

Given these challenges, there is a clear rationale for assessing Agile methodologies in the UK healthcare system. There is also a role for training to facilitate the implementation of more effective Agile practices (Chukwunweike and Aro, 2024).

2.3. Limitations of application in the UK healthcare sector

Given its recognised potential, existing literature primarily investigates the adoption of Agile, especially in the US healthcare system, but its critical 'impact' on some countries' health sectors has not been studied, particularly the UK (Ahmad and Wasim, 2023). Thus, our research examined the applicability and adaptability of Agile methodologies in UK healthcare organisations and specifically identified the benefits, challenges, and areas for improvement. It is hoped that the findings will contribute to the understanding of Agile methodologies in the UK healthcare sector, enabling practitioners, policymakers, and academics to enhance project management practices and improve healthcare delivery outcomes.

2.4. Summary of the literature review

The literature review highlights the history of the Agile methodology, its milestones, and its application in the UK healthcare sector. Challenges related to cultural resistance and regulatory compliance are identified as critical factors influencing Agile adoption in this context. Future endeavours should focus on adapting Agile to fit the specific needs of the UK healthcare environment. This will facilitate a deeper understanding of its potential to improve project outcomes and stakeholder satisfaction.

3. METHODOLOGY

The research employed a quantitative approach, utilising a survey-based design to collect data from stakeholders across the UK National Health Service (NHS). Statistical analyses, including descriptive statistics and Pearson Chi-squared tests, were performed using SPSS. This facilitated an in-depth exploration of Agile's current adoption and influence within the NHS. Consequently, a deductive research approach was utilised, aligning with the positivist research philosophy that emphasises objective observation and factual verification (Lincoln, Lynham and Guba, 2011). This approach is particularly effective for examining established theories and existing knowledge (Denscombe, 2017). The positivist philosophy can involve the collection of unbiased data to enhance the validity (Creswell, 2017) and reliability (Yin, 2017) of the findings, ensuring that conclusions are grounded in empirical evidence, and facilitating a logical progression from general principles to specific instances (Bell, Bryman and Harley, 2022).

Data collection was conducted using a survey instrument adapted from Conforto et al. (Conforto et al., 2014) to assess the adoption of Agile across various UK healthcare organisations. Since Conforto et al. had validated their instrument, it was adapted to reflect the specific objectives of our study. Our instrument sought to measure the respondents' understanding of Agile's principles, the application and adaptability of the Agile methodology within UK healthcare organisations, the challenges, benefits, and solutions to its successful deployment. A convenience sampling method, supplemented by a snowball technique, was employed to enhance participation and ensure a comprehensive examination of Agile's current utilisation. Etikan et al. (Etikan, Musa and Alkassim, 2016) suggested that exploratory studies facing time and cost constraints and limited access to respondents could utilise convenience sampling. This reasoning influenced our sampling strategy. Workers in the UK healthcare sector whose contact details were known to the authors' department were initially approached to participate and asked to recommend other potential participants, thereby adding a snowballing element to the data collection.

The survey was delivered online via Google Forms, enabling efficient data collection across a broad demographic range. This instrument included questions on the technical, organisational, managerial, and economic factors influencing the adoption of Agile in healthcare settings.

Ethical approval was secured from the first author's University, in accordance with established ethical guidelines, and confidentiality and anonymity for the participants were ensured. The structured questionnaire utilised nominal, ordinal, interval, and ratio scales to collect comprehensive demographic data, including industry experience, current professional roles, and familiarity with the Agile methodology. The respondents were healthcare professionals, including doctors and nurses, as well as administrative personnel and IT staff. Contact details for 150 potential respondents were obtained, and they were invited to participate in the online survey. Fully completed answers were provided by 117 participants, yielding a 78% response rate. The duration of experience of these respondents is shown in Table 1. Data analysis in the study employed descriptive statistics and the Pearson Chi-squared test. The analysis used the SPSS tool.

Table 1: Profile of the respondents

Experience	Frequency	Percentage
Less than 1 year	23	19.7%
1-5 years	39	33.3%
6-10 years	34	29.1%
11-15 years	15	12.8%
16+ years	7	5.1%
Total	117	100%

4. FINDINGS AND DISCUSSION

4.1. Implementation of Agile in the UK healthcare sector

Many respondents (41.9%) indicated that Agile had been employed on a few projects, indicating that Agile practises are being used to some extent in the healthcare industry. A total of 42.7% of respondents affirmed that Agile is highly suitable, and 71.8% recognised its relevance due to its flexibility and collaborative principles, reflecting a positive perception of Agile. Gender, age, experience, job role, and expertise emerged as influencing factors; specifically, 19.7% of male respondents and 20.5% of female respondents acknowledged Agile's suitability. However, only 41.9% of respondents reported having seen Agile implemented in healthcare organisations, suggesting a limited scale of implementation that aligns with the complexities and regulatory constraints characteristic of the healthcare sector.

The study showed a statistically significant positive relationship between respondents' experience and their responses regarding Agile suitability ($\chi 2$ (20)=65.8; n=117; p < .001). The results indicated that respondents with more years of experience are more likely to view the agile methodology as suitable (Table 2).

Table 2: Chi-square of Experience vs Suitability

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	65.802[a]	20	<.001
Likelihood Ratio	61.628	20	<.001
Linear-by-Linear Association	7.602	1	.006

A significant connection between familiarity with Agile's benefits and Expertise was identified, with 72.6% of respondents indicating their awareness of both Agile's merits and methodologies. After 1 year of work experience, the number of people with this awareness is relatively higher than that of those without it (Figure 1).

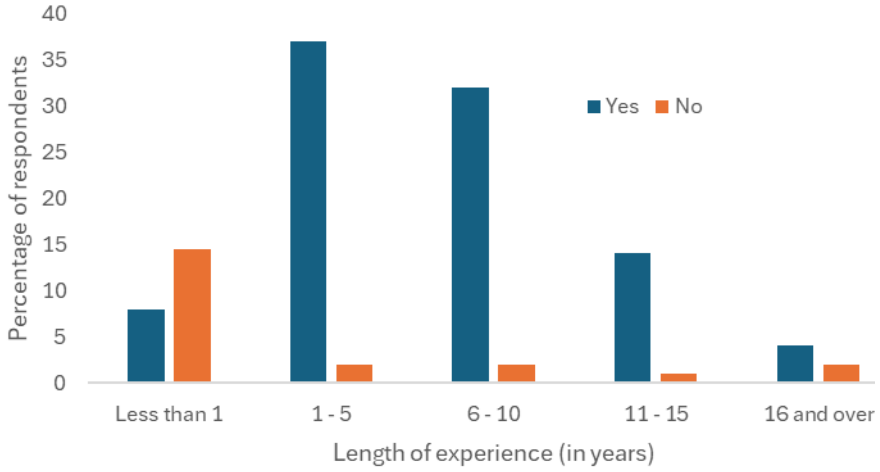

Fig. 1: Familiarity with the benefits of Agile

The Chi-Square test in Table 3 showed a strong statistical association between experience level and Agile Benefits knowledge, indicating a low probability of this connection by chance. This suggests there is a relationship between experience and knowledge of Agile's benefits. People who have worked in a system for longer would (highly) know the technologies they implement, fully understand the impacts of those technologies on their operations, and be able to suggest improvements. Experience is a virtue in this regard.

Table 3: Chi-square of work experience and knowledge of Agile's benefits

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	43.224[a]	4	<.001
Likelihood Ratio	37.410	4	<.001
Linear-by-Linear Association	11.908	1	<.001

4.1.1 Enablers and barriers

Fig. 2 below shows the key enablers for effective Agile use. These include effective communication, training and team collaboration. Specifically, team collaboration and effective communication were perceived as essential to implementing the Agile iterative approach. These attributes are vital for managing the complexities of healthcare projects. These results mirror earlier reports (e.g. (World

Health Organization, 2025)), which indicate that Agile's adaptability is particularly suited to the unpredictable nature of healthcare.

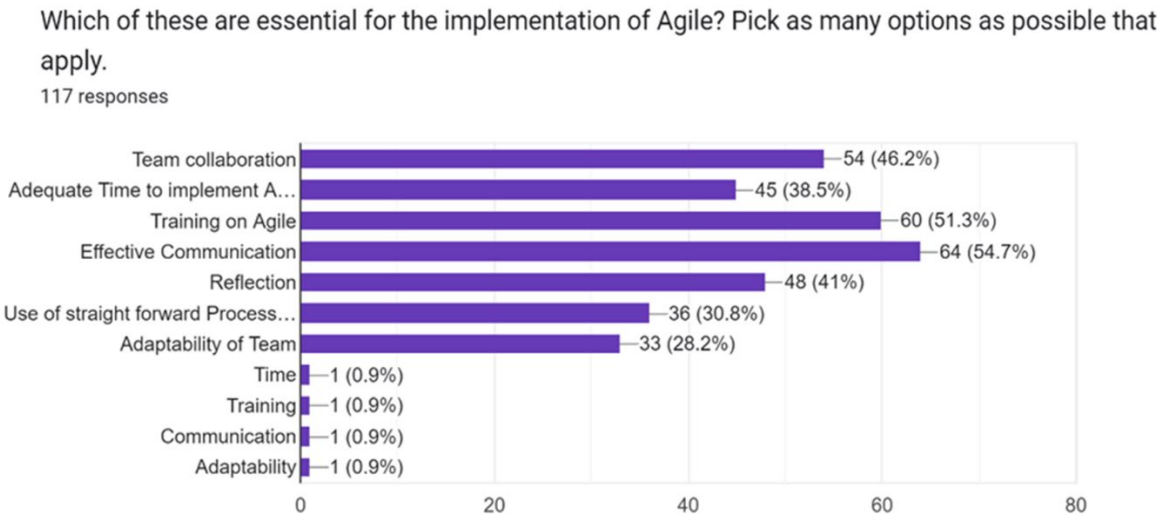

Fig. 2: Enablers of Agile

However, Fig. 3 below showed cultural barriers, followed by resistance to change and lack of training and resources as the most reported barriers by participants. Next to these three was the aspect of regulatory constraints. The UK healthcare provision operates under sector-specific regulations. It is feasible that some fast-paced operations, which Agile may warrant, may struggle with certain regulatory checks and balances.

Incidentally, training came up as both an enabler and a barrier: its provision aids the use of Agile, while its absence works against it. The relationship between the knowledge of the barriers and their work experience was not significant (see Table 4). Meanwhile, the analysis revealed no statistically significant relationship between these barriers and the respondents' experience, suggesting that systemic issues are embedded within organisational culture rather than individual capacities. This aligns with findings from a prior review (Greenhalgh et al., 2004), which suggested that deeply entrenched traditional practices within healthcare systems may hinder the adoption of Agile.

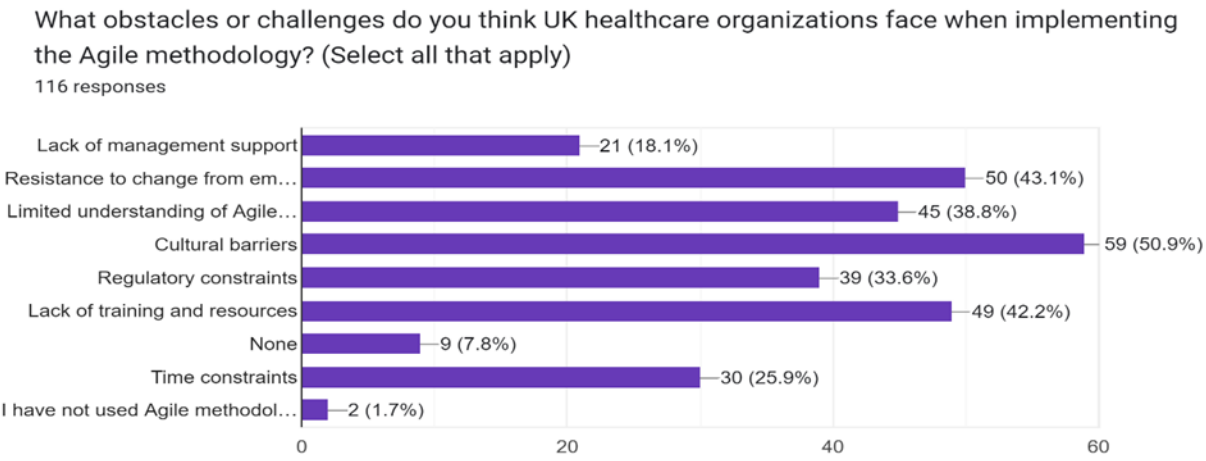

Fig. 3: Barriers to Agile

Table 4: Relationship between Obstacles and Experience

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	227.454[a]	224	.423
Likelihood Ratio	191.293	224	.945

Navigating cultural and stakeholder barriers remains critical for the successful implementation of Agile. Many respondents, 64.7%, underscored the importance of establishing a supportive organisational structure, aligning Agile principles with existing workflows, fostering open communication, and customising practices to healthcare needs. However, no significant correlations were identified between training initiatives and improvements in overcoming barriers to Agile use, in contrast to existing literature highlighting the role of training in facilitating Agile practices (Chukwunweike and Aro, 2024). Thus, while advocacy for a supportive structure is crucial, organisations may need to consider how to align Agile training with its practical implementation strategies to effectively address cultural hurdles.

4.2. Limitations of the study

By addressing identified knowledge gaps, our investigation aimed to facilitate the successful implementation of Agile methodologies tailored to the specific needs of UK healthcare organisations. Data collection was limited to England due to time constraints and the convenience sampling employed. Limitations such as sample size and regional specificity may affect the generalizability of the findings. However, the findings provide original contributions to the understanding of the implementation of Agile methodologies in the UK healthcare sector, enabling practitioners, policymakers, and academics to enhance project management practices and improve healthcare delivery outcomes.

The results indicated the leading barriers to implementing Agile in the UK NHS sector. A deeper study would be necessary to explore how these barriers could be addressed. However, our study could not do that immediately and reserved it for a future investigation.

5. CONCLUSIONS AND FURTHER RESEARCH

This study provided valuable insights into the acceptance and implementation of the Agile methodology in the UK healthcare sector. Organised around four key objectives, the research revealed that a significant majority of respondents view Agile as highly suitable for the healthcare sector, with this view influenced by demographic factors such as gender, age, experience, and expertise. The findings indicate a harmonious relationship between the literature synthesis and data analysis, demonstrating the practical applicability of Agile and confirming its increasing acceptance in the sector.

The research established that the Agile methodology enhances project outcomes, stakeholder engagement, and organisational performance through its iterative development, continuous feedback, and adaptability. While the study highlighted the importance of a supportive organisational structure in overcoming cultural barriers to Agile adoption, factors such as alignment with current procedures and staff training were found to be less significant.

This research contributes to the knowledge base by addressing Agile's suitability, challenges, and cultural adaptation within the UK healthcare sector. The findings and recommendations are applicable to both industry practitioners and researchers. For policymakers, funding for Agile and other technologies that support the efficient delivery of healthcare services in the UK should be prioritised, and their implementation closely monitored to accelerate adoption and achieve maturity.

For practitioners, establishing a supportive organisational structure, aligning practices with existing procedures, and fostering open communication are essential for maximising Agile's effectiveness. Further, practitioners can organise certain workflows using Agile’s frameworks to achieve better health and safety standards. For researchers, future investigations should explore additional Agile frameworks, such as Kanban and Lean methodologies, and the efficacy of various strategies to overcome cultural barriers in healthcare settings. Future research could also investigate the implementation of Agile frameworks beyond Scrum in healthcare organisations and assess the effectiveness of diverse techniques in overcoming cultural barriers. Additionally, examining the long-term impacts of Agile

adoption on project outcomes and stakeholder engagement may provide further insights, contributing to the continued evolution and understanding of the Agile methodology in the UK healthcare context.

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