



Managerial Perceptions of AI Integration in Agile Frameworks toward Understanding Benefits, Challenges, and Adoption Readiness

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ABSTRACT

This study investigates the perceived benefits and challenges of integrating Artificial Intelligence (AI) tools within Agile frameworks from a managerial perspective. As AI technologies become increasingly embedded in software development, understanding how Agile professionals perceive their adoption is crucial for guiding digital transformation initiatives. Using a quantitative survey-based approach, data were collected from 56 professionals working in Agile environments to examine their familiarity with AI and Agile methodologies, perceived benefits and challenges, and willingness to adopt AI tools. Text-mining techniques were applied to analyze open-ended responses, and statistical methods such as correlation and ANOVA were employed to explore relationships among variables. The results reveal that respondents generally hold a positive attitude toward AI adoption, with a mean willingness score of 3.64 out of 5, emphasizing benefits such as faster development cycles, enhanced efficiency, improved decision-making, and higher product quality. However, several challenges were identified, including ethical concerns, cost implications, and lack of technical expertise. A strong positive correlation was found between familiarity and willingness to adopt ($r = 0.61$ for Agile familiarity and $r = 0.80$ for AI familiarity), while role-based analysis showed that Project Managers and Scrum Masters exhibit greater readiness compared to Developers. These findings highlight that successful AI integration depends not only on technological readiness but also on human, ethical, and organizational alignment. The study contributes to the growing discourse on AI-driven Agile management by emphasizing the need for training, ethical governance, and change management strategies to ensure responsible and effective AI adoption.

Keywords Artificial Intelligence Adoption, Agile Frameworks, Digital Transformation, Managerial Perception, Socio-Technical Challenges

INTRODUCTION

AI has emerged as one of the most transformative technologies in modern organizations, reshaping how teams operate, make decisions, and deliver value [1]. The growing integration of AI into business operations has introduced new possibilities for automation, analytics, and intelligent decision support. In software development, AI is increasingly used to enhance accuracy, improve productivity, and accelerate delivery cycles [2]. At the same time, Agile frameworks have become the dominant approach to managing software projects due to their emphasis on flexibility, collaboration, and iterative improvement. The convergence of AI and Agile represents an important opportunity for organizations to combine human creativity with machine intelligence, thereby achieving more efficient and adaptive workflows. However, the effectiveness of this integration depends not only on technological capability

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but also on the readiness, trust, and perception of those who manage and implement these systems.

AI tools have the potential to support Agile teams in multiple ways, including automating repetitive tasks, assisting in sprint planning, prioritizing backlogs, and providing predictive insights that enhance decision-making [3]. These capabilities align closely with the Agile principles of continuous improvement and responsiveness to change. Despite these advantages, the process of adopting AI in Agile environments is complex. The success of integration depends on how managers and team members understand, accept, and utilize AI to complement existing Agile practices. In many cases, organizations face uncertainty about the appropriate role of AI in human-driven processes, raising questions about autonomy, accountability, and ethical responsibility. Therefore, understanding how Agile professionals perceive the benefits and challenges of AI integration is essential for ensuring that adoption efforts are both effective and sustainable.

Current developments show that AI adoption in Agile frameworks is often discussed from a technological perspective, focusing on tools, algorithms, and performance optimization [4]. While such discussions are valuable, they tend to overlook the human and managerial dimensions that influence implementation outcomes. The dynamics of Agile management depend heavily on collaboration, trust, and adaptability—factors that are deeply influenced by perception and experience. Yet, limited research has explored how professionals interpret AI's role in Agile processes, how familiar they are with its use, or how their organizational roles affect their readiness to adopt it. These issues form a critical gap in understanding how AI can be integrated in ways that align with Agile values and organizational realities. Without addressing this gap, organizations risk approaching AI adoption as a purely technical upgrade rather than a holistic transformation involving people, processes, and culture.

Bridging this gap requires a shift toward viewing AI adoption as a socio-technical process that blends technological innovation with human and organizational factors [5]. Familiarity with both Agile and AI appears to be a decisive factor in determining the willingness to adopt new tools and methods. Individuals and teams who understand how AI can enhance Agile practices are more likely to embrace its implementation confidently. Conversely, a lack of understanding or awareness can result in resistance, ethical concerns, or inefficient use of technology. Managerial perspectives are particularly important, as leaders often set the direction for digital transformation and determine how change is communicated and managed across teams. Analyzing these perceptions provides valuable insight into how organizations can build readiness and address challenges before adopting AI on a larger scale.

The objective of this study is to examine the perceived benefits and challenges of integrating AI tools within Agile frameworks from a managerial perspective. The research explores how familiarity with Agile and AI influences readiness to adopt, how professional roles affect perception, and what organizational factors support or hinder implementation. By combining text-mining analysis of open responses with statistical examination of correlations and group differences, this study offers a comprehensive view of AI adoption as both a technological and managerial process. The results are expected to contribute to a more balanced understanding of how AI can be responsibly and effectively integrated into Agile environments. From a practical standpoint, the findings provide actionable insights for organizations seeking to strengthen their digital transformation

strategies by aligning technological innovation with human capability, ethical awareness, and leadership engagement.

Literature Review and Related Works

AI has increasingly become a fundamental driver of digital transformation in software development and project management. Its integration into Agile frameworks has introduced new opportunities for enhancing flexibility, collaboration, and data-driven decision-making [6]. Recent studies highlight that AI applications such as predictive analytics, natural language processing, and intelligent automation improve task allocation, sprint planning, and project forecasting within Agile environments [7]. These advancements allow teams to identify risks early, optimize workflows, and enhance overall product quality [8]. Furthermore, organizations implementing AI within Agile contexts have reported improved responsiveness and efficiency, suggesting that the combination of adaptive methodologies and intelligent tools yields tangible performance benefits [9].

While the technological potential of AI integration in Agile settings is widely recognized, the process of adoption remains complex and multifaceted. Research indicates that technical readiness alone is insufficient for successful adoption, as organizational and human factors such as leadership, culture, and communication strongly influence implementation outcomes [10]. Agile teams thrive on collaboration and adaptability, yet introducing AI tools often challenges existing norms of autonomy and human judgment [11]. Effective AI adoption therefore requires maintaining a balance between automation and human oversight to ensure that Agile values such as transparency, trust, and continuous improvement are preserved [12]. These findings underscore the importance of managing the socio-technical dimensions of AI deployment, where technology and human behavior must evolve together to achieve sustainable innovation [13].

Another critical theme in existing research concerns the role of familiarity and user competence in shaping adoption readiness. Studies have shown that individuals with prior exposure to AI technologies and Agile practices are more willing to engage with new digital tools and processes [14]. Familiarity increases confidence, reduces uncertainty, and fosters a more positive attitude toward technological change [15]. Conversely, a lack of experience or understanding can lead to resistance, ethical concerns, and ineffective implementation [16]. This relationship between knowledge and willingness highlights that education, awareness, and training programs play a crucial role in bridging the gap between technological innovation and practical adoption [17]. For organizations seeking to integrate AI, cultivating a culture of learning and experimentation is therefore essential to long-term success.

Despite the growing body of work exploring AI adoption, there is still limited empirical research addressing managerial perceptions and decision-making perspectives within Agile contexts. Much of the existing literature focuses on technical feasibility, tool efficiency, and algorithmic performance rather than the behavioral and organizational factors influencing readiness for adoption [18]. This gap in the literature limits understanding of how professionals evaluate AI's strategic benefits and ethical challenges, particularly in environments that rely on high levels of human collaboration. Understanding these perceptions is

critical, as managerial decisions shape how AI is implemented, communicated, and governed within Agile organizations [19]. Addressing this limitation requires a holistic approach that integrates both technical and managerial insights to achieve responsible and sustainable AI-enabled Agile management [20].

Methodology

This study adopted a quantitative research design supported by text mining and inferential statistical analysis to examine how Agile professionals perceive the integration of AI tools within Agile frameworks. The research design was developed to capture both perceptual and behavioral dimensions of AI adoption, with a specific focus on managerial readiness, organizational implications, and differences in adoption attitudes across professional roles. The study integrated three major analytical components: descriptive statistical analysis, exploratory text mining, and inferential testing using correlation and variance analysis. The combination of these methods provided both numerical and contextual understanding, enabling the interpretation of statistical patterns alongside qualitative insights drawn from participant responses. The overall process of the research was structured into sequential phases as illustrated in figure 1. The stages began with data collection through an online survey, followed by data preparation and cleaning, descriptive statistical analysis, text mining for qualitative exploration, and inferential testing using correlation and ANOVA. Each phase was systematically executed to ensure analytical rigor, consistency, and coherence between the quantitative and qualitative findings. Figure 1 illustrates the workflow of this study, showing how raw survey data were transformed into meaningful insights through integrated computational and statistical methods.

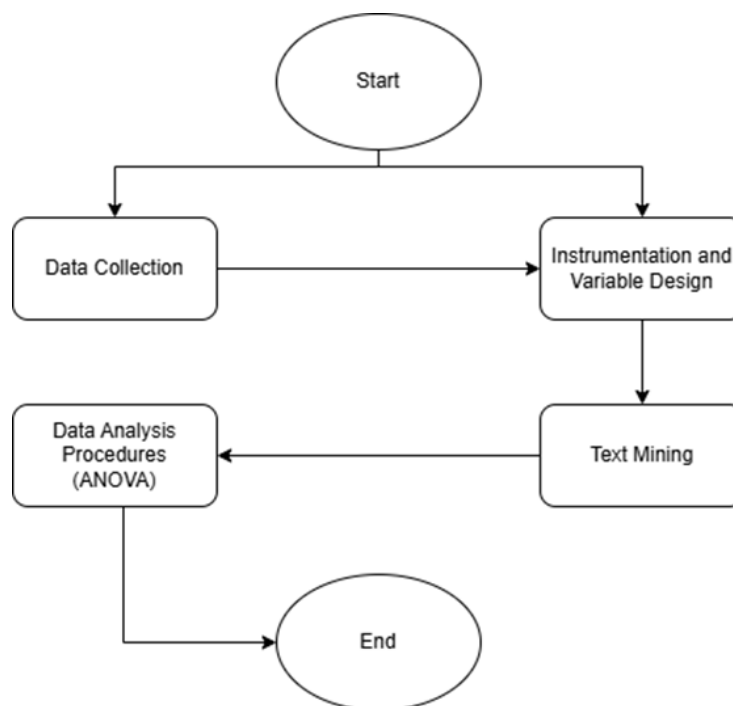


Figure 1 Research Steps

The study employed a cross-sectional design in which data were collected at a

single point in time through a structured online questionnaire. This design was appropriate for identifying existing patterns of perception and readiness without manipulating variables or requiring longitudinal observation. The study addressed three key research questions: (1) What benefits and challenges do Agile professionals perceive in integrating AI tools within Agile frameworks? (2) How does familiarity with Agile frameworks and AI tools influence willingness to adopt AI? (3) Do perceptions of willingness to adopt AI differ based on professional roles within Agile teams? These questions guided the overall analytical sequence, beginning with descriptive analysis, continuing with text-based exploration, and culminating in statistical hypothesis testing.

Data were collected using a structured online questionnaire distributed across Agile and software development communities. A purposive sampling technique was employed to ensure that respondents were individuals actively engaged in Agile environments such as software firms, technology startups, and digital project teams. All participants were required to have at least basic familiarity with Agile methodologies and varying degrees of exposure to AI tools such as ChatGPT, Jira AI assistants, or predictive analytics plugins. After screening for completeness, 56 valid responses were retained for analysis. The sample included Developers (41%), Project Managers (32%), Scrum Masters (18%), and Product Owners or Analysts (9%), representing a balance between managerial and technical perspectives. The survey was conducted anonymously and voluntarily, and informed consent was obtained from all participants prior to data collection.

The questionnaire consisted of four major sections. The first section gathered demographic and professional data such as current role and years of Agile experience. The second section assessed familiarity with Agile and AI tools using an ordinal three-point scale where “Not Familiar” = 1, “Somewhat Familiar” = 2, and “Very Familiar” = 3. The third section measured willingness to adopt AI using a five-point Likert scale ranging from 1 (“Not willing at all”) to 5 (“Highly willing”). The fourth section contained open-ended questions asking respondents to describe perceived benefits and challenges associated with integrating AI into Agile workflows. These qualitative responses were analyzed using text mining and word frequency methods. The three main quantitative variables were Agile Familiarity (AF), AI Familiarity (AIF), and Willingness to Adopt AI (WA). Statistical analyses were conducted using Python (version 3.12) and relevant analytical libraries such as Pandas, Matplotlib, Seaborn, WordCloud, Scikit-learn, and SciPy. Descriptive statistics, including mean, standard deviation, and frequency distributions, were used to summarize the data. The mean willingness score was 3.64 (SD = 1.13), indicating moderately high readiness among Agile professionals to adopt AI tools. Visual representations were created using bar charts to depict the distribution of willingness scores.

The open-ended responses were preprocessed through text normalization, including case folding, tokenization, and removal of stop words, to prepare data for computational analysis. Text mining was conducted using WordCloud and CountVectorizer to identify dominant themes. The most frequent words in the “benefits” category were “faster,” “development,” “improved,” “enhanced,” and “decision making,” reflecting perceived gains in efficiency and productivity. In contrast, the most frequent words in the “challenges” category were “ethical,”

“cost,” “expertise,” “team,” and “resistance,” indicating that concerns were more socio-technical and organizational than purely technological. These findings provided the basis for qualitative interpretation in the discussion section.

To examine the relationships between familiarity and willingness variables, a Pearson correlation coefficient was computed. The Pearson correlation (r) measures the degree of linear association between two continuous variables and is expressed as:

$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{i=1}^n (Y_i - \bar{Y})^2}} \quad (1)$$

X_i and Y_i represent individual scores, while \bar{X} and \bar{Y} are their respective means. The results showed a strong positive correlation between familiarity variables and willingness to adopt AI: $r = 0.61$ ($p < 0.001$) for Agile Familiarity and $r = 0.80$ ($p < 0.001$) for AI Familiarity. These results indicate that higher familiarity with Agile and AI tools significantly increases readiness for adoption. The correlation matrix was visualized using a Seaborn heatmap with clearly labeled axes for interpretability.

To test whether willingness differed by professional role, a one-way Analysis of Variance (ANOVA) was performed. The ANOVA determines whether there are statistically significant differences among group means and is expressed as:

$$F = \frac{SS_B / (k - 1)}{SS_W / (N - k)} \quad (2)$$

SS_B denotes the between-group sum of squares, SS_W denotes the within-group sum of squares, k represents the number of groups, and N represents the total number of observations. The analysis yielded a significant result, $F = 4.15$ ($p = 0.003$), confirming that differences in willingness existed among roles. Post-hoc interpretation indicated that Project Managers and Scrum Masters exhibited greater willingness to adopt AI tools than Developers, suggesting that managerial experience and decision-making responsibilities influence adoption readiness.

To ensure data reliability and validity, several verification procedures were employed. The questionnaire was reviewed by Agile experts to confirm construct clarity and content relevance. Coding consistency was maintained through uniform numerical mappings for ordinal data. Text-mining outputs were validated for semantic coherence, and all statistical analyses were conducted with a 95% confidence level. Ethical considerations were fully adhered to: participation was voluntary, anonymity was preserved, and all responses were stored securely for academic purposes. No personally identifiable information was collected. Although the relatively small sample size limits external generalizability, the integration of quantitative and qualitative data enhances internal validity and provides a comprehensive understanding of managerial perceptions toward AI adoption in Agile frameworks.

In summary, this methodological framework combines quantitative modeling and computational text analysis to provide a multidimensional view of AI

adoption in Agile management. By integrating descriptive, inferential, and linguistic analyses, the research captures both the statistical relationships (what) and the underlying perceptions (why), ensuring analytical rigor and contextual depth. This approach strengthens the study’s contribution to both theoretical understanding and practical application of AI-driven Agile transformation.

Algorithm 1: AI–Agile

Input: Survey dataset $D = \{R_1, R_2, \dots, R_n\}$ containing variables: AF (Agile Familiarity), AIF (AI Familiarity), WA (Willingness to Adopt AI), B (Perceived Benefits text), C (Perceived Challenges text)

Output: Descriptive statistics, text-mining themes, correlation coefficients, ANOVA results, managerial insights

Process:

Start

Data Collection and Preparation

Collect online survey responses D .

Remove incomplete or invalid entries:

$$D' = \{R_i \in D \mid R_i \text{ is complete}\}.$$

Encode categorical values numerically:

$$AF, AIF \in \{1,2,3\}, WA \in \{1,2,3,4,5\}.$$

Normalize text responses B, C (lowercase, tokenize, remove stop words).

Descriptive Analysis

Compute mean and standard deviation:

$$\mu_{WA} = \frac{1}{n} \sum_{i=1}^n WA_i$$

$$\sigma_{WA} = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (WA_i - \mu_{WA})^2}$$

Visualize distribution of WA using a bar chart.

Text Mining and Thematic Extraction

Compute word frequencies:

$$TF_B(w_j) = \sum_{i=1}^n \text{count}(w_j, B_i)$$

$$TF_C(w_j) = \sum_{i=1}^n \text{count}(w_j, C_i)$$

Identify top keywords for benefits (W_B) and challenges (W_C).

Generate word clouds and frequency plots.

Correlation Analysis

Compute Pearson correlation coefficients:

$$r(AF, WA) = \frac{\sum (AF_i - \bar{AF})(WA_i - \bar{WA})}{\sqrt{\sum (AF_i - \bar{AF})^2 \sum (WA_i - \bar{WA})^2}}$$

$$r(AIF, WA) = \frac{\sum (AIF_i - \bar{AIF})(WA_i - \bar{WA})}{\sqrt{\sum (AIF_i - \bar{AIF})^2 \sum (WA_i - \bar{WA})^2}}$$

Visualize correlation matrix using a heatmap.

If $p < 0.05$, conclude that correlation is statistically significant.

ANOVA Analysis (Role Differences)

Partition data into k groups based on professional role.

Compute:

$$SS_B = \sum_{j=1}^k n_j (\bar{X}_j - \bar{X})^2$$

$$SS_W = \sum_{j=1}^k \sum_{i=1}^{n_j} (X_{ij} - \bar{X}_j)^2$$

$$F = \frac{SS_B / (k - 1)}{SS_W / (N - k)}$$

If $p < 0.05$, conclude that role-based differences in willingness are significant.

Managerial Insight Generation

Interpret quantitative and qualitative findings.

If $r(AIF, WA) > r(AF, WA)$, infer that AI familiarity has a stronger influence.

Identify key managerial implications regarding training, readiness, and ethical considerations.

End

Result

The analysis began with an examination of the respondents' overall willingness to adopt AI tools within Agile frameworks. As illustrated in [figure 2](#), the distribution of responses indicates a clear positive attitude toward AI integration. The mean score of willingness was 3.64 out of 5 (SD = 1.13), suggesting a generally favorable disposition among Agile professionals. The majority of participants selected level four on the scale, which represents a high level of readiness to incorporate AI into Agile development processes. This concentration of responses around the upper end of the scale shows that most professionals in Agile environments recognize the potential of AI to enhance productivity, decision-making, and team efficiency. In contrast, only a small proportion of respondents (around 5 percent) rated their willingness at levels one or two, indicating minimal enthusiasm or possible skepticism toward AI integration.

A closer interpretation of these results suggests that Agile practitioners are already developing a positive mindset toward digital transformation supported by AI technologies. This level of acceptance implies that many teams view AI not as a disruptive force but as a complementary tool that can strengthen Agile principles such as continuous improvement, flexibility, and collaboration. The high willingness scores also indicate organizational maturity and openness to technological innovation, particularly among teams that are accustomed to iterative development and adaptive management. Overall, these findings highlight that the Agile community is not only aware of the strategic value of AI tools but also prepared to adopt them to improve project outcomes and maintain competitive advantage in dynamic software development environments.

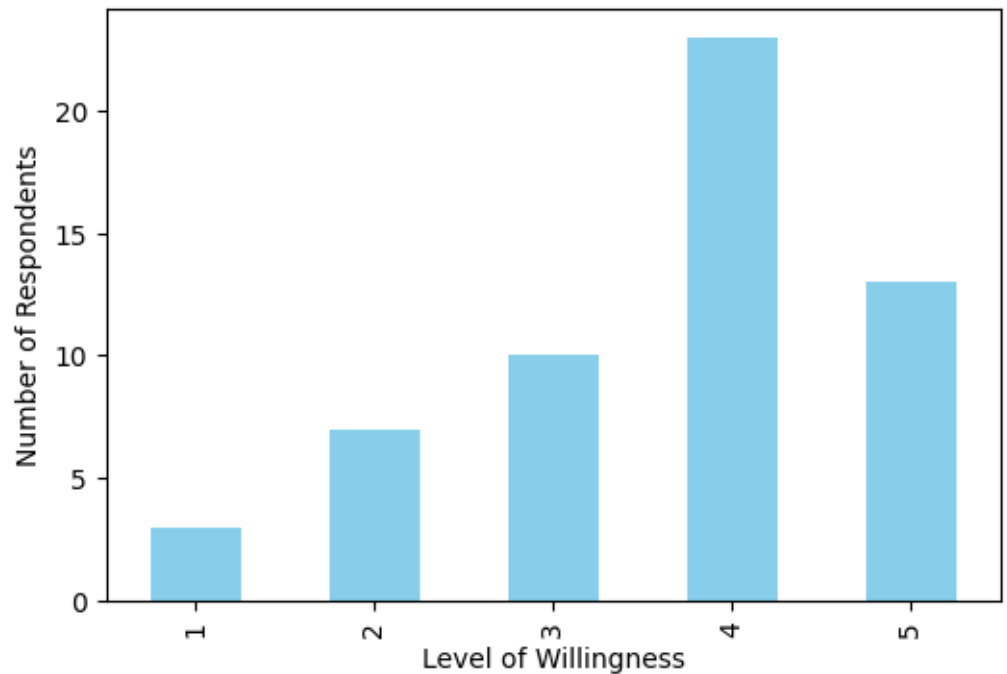


Figure 2 Distribution of willingness to adopt AI tools within Agile frameworks

The analysis of perceived benefits of AI integration produced several strong and consistent themes, particularly around the ideas of efficiency, speed, and quality improvement. As shown in [figure 3](#), the words that appeared most frequently through text mining were “faster,” “development,” “cycles,” “improved,” “enhanced,” and “decision making.” These results indicate that participants primarily view AI as a tool that enables faster project delivery and more efficient Agile workflows. The presence of words such as “faster development” and “improved processes” suggests that many respondents perceive AI as a solution to common bottlenecks in software development, such as time delays and repetitive manual tasks. Furthermore, terms like “enhanced” and “decision making” reflect a belief that AI contributes to more data-informed decisions, enabling teams to make better judgments about project priorities, risks, and performance metrics.

The frequency distribution illustrated in [figure 4](#) reinforces these insights by emphasizing that efficiency-related expressions dominate the responses, particularly those related to development speed and product quality. Respondents consistently emphasized the value of AI in improving project outcomes through automation, predictive analytics, and intelligent assistance. This perception aligns with the Agile philosophy of continuous improvement, where feedback and adaptation drive performance gains. Many participants appear to recognize AI as a supportive mechanism that strengthens Agile practices, helping teams make more precise estimations, manage workloads effectively, and enhance collaboration. Overall, these findings indicate that within Agile environments, AI is not perceived as a replacement for human expertise but as a strategic tool that empowers teams to achieve higher quality outcomes in less time.



Figure 3 Word cloud of perceived benefits of integrating AI into Agile frameworks

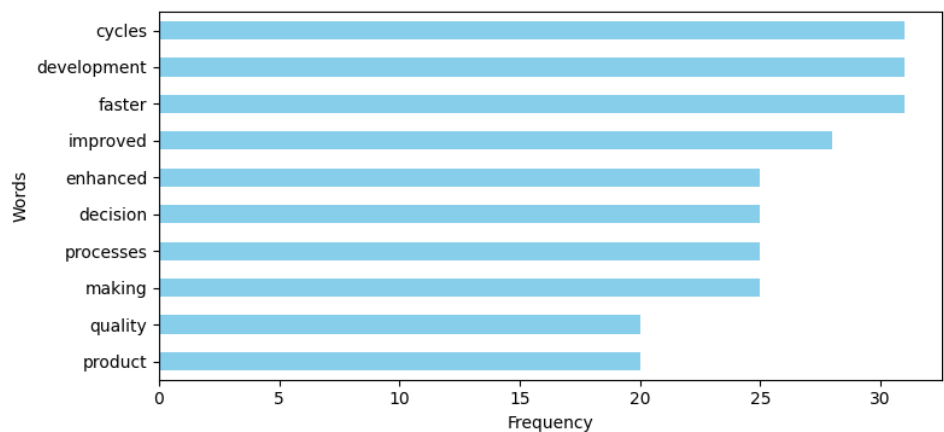


Figure 4 Frequency distribution of the top ten words describing perceived benefits

In contrast, the analysis of perceived challenges revealed that respondents were more concerned about ethical, organizational, and human-related issues than purely technical barriers. As shown in [figure 5](#), the most frequently mentioned words were “ethical,” “considerations,” “cost,” “implications,” “expertise,” “lack,” “team members,” and “resistance.” These terms suggest that the introduction of AI tools in Agile environments raises important questions about the ethical use of technology and the readiness of organizations to manage its consequences. Respondents repeatedly mentioned concerns about the potential misuse of AI, data privacy, and accountability in decision-making. The mention of “cost” and “implications” also points to financial and operational constraints, indicating that many organizations may find it difficult to justify the investment required to integrate AI tools effectively. Moreover, the recurring reference to “lack of expertise” suggests that skill shortages remain a major obstacle, particularly in teams where AI literacy and technical competence are still developing.

The frequency distribution in [figure 6](#) further supports these findings, showing that respondents perceive the barriers to AI adoption as largely socio-technical in nature. Many participants acknowledged that while AI technologies are increasingly accessible, successful implementation depends heavily on human readiness, organizational culture, and management support. Issues such as

resistance from team members and uncertainty about how AI fits within existing Agile workflows were frequently mentioned, underscoring the need for clear communication and change management strategies. The concern with ethics also reflects a broader organizational awareness of responsible AI use, suggesting that professionals value transparency, fairness, and accountability in the development process. Taken together, these insights indicate that the greatest challenges to AI integration in Agile contexts arise not from the technology itself but from how people, teams, and organizations adapt to its presence and ensure it aligns with ethical and operational standards.

Perceived Challenges of Integrating AI into Agile Frameworks

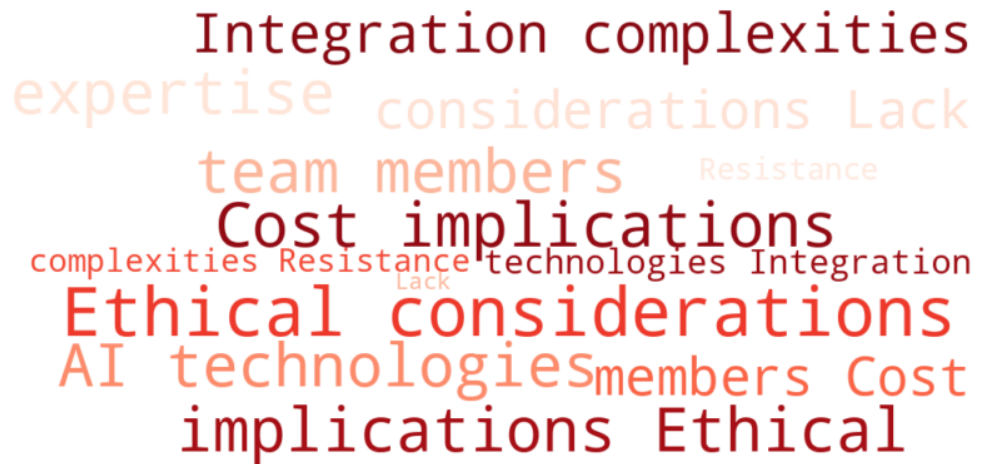


Figure 5 Word cloud of perceived challenges of integrating AI into Agile frameworks

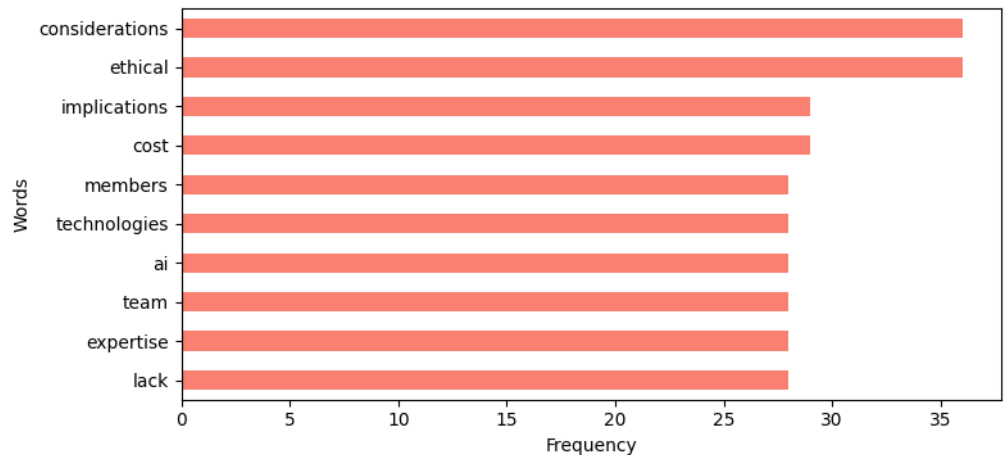


Figure 6 Frequency distribution of the top ten words describing perceived challenges

To further examine the relationship between familiarity and the willingness to adopt AI tools, both correlation and variance analyses were performed. The results revealed a strong and statistically significant positive relationship between familiarity with Agile frameworks and willingness to adopt AI tools, with a correlation coefficient of $r = 0.61$ ($p < 0.001$). This finding indicates that individuals who are more comfortable and experienced with Agile practices are also more likely to embrace the use of AI within those processes. The relationship became even stronger when examining familiarity with AI tools,

which showed a correlation of $r = 0.80$ ($p < 0.001$). This suggests that having prior knowledge and exposure to AI technologies significantly increases readiness to adopt them within Agile environments. As shown in [figure 7](#), both familiarity dimensions demonstrate a clear upward trend in relation to willingness, confirming that awareness, training, and experience play a central role in shaping positive attitudes toward AI adoption. Individuals who possess a deeper understanding of Agile principles and AI capabilities appear to have more confidence in their ability to integrate these tools effectively into their workflow.

In addition to correlation analysis, a one-way ANOVA test was conducted to determine whether willingness to adopt AI varied across different professional roles. The results indicated a significant difference among roles, with $F = 4.15$ ($p = 0.003$). Project Managers and Scrum Masters reported the highest levels of readiness, followed by Developers and other technical team members. This finding suggests that those in leadership and coordination positions may have a broader strategic perspective on the benefits of AI integration, as well as greater authority to influence its implementation. In contrast, Developers may be more cautious, possibly due to concerns about changes in their daily work processes or the learning curve associated with new technologies. These differences highlight that professional context and role expectations can strongly shape perceptions of AI adoption. Overall, the combined results from the correlation and ANOVA analyses underscore that familiarity, experience, and role responsibility are key determinants in fostering organizational readiness for AI adoption within Agile frameworks.

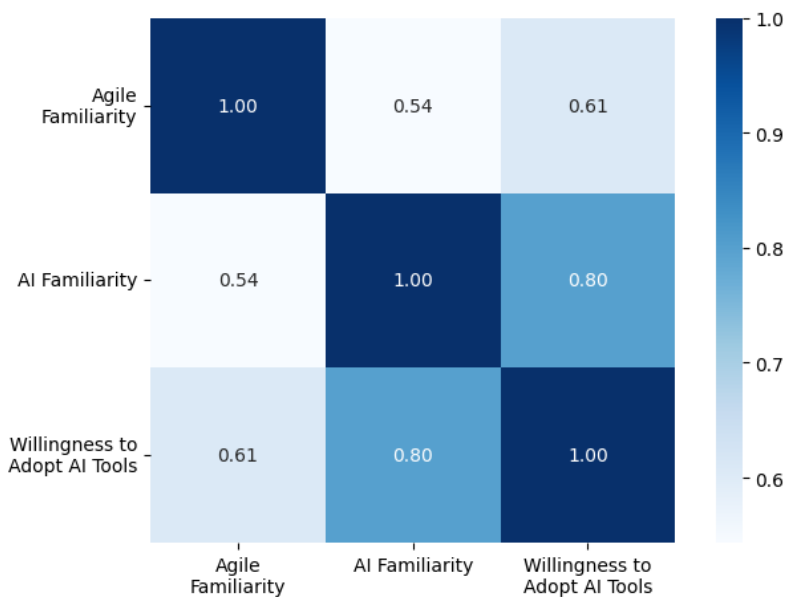


Figure 7 Correlation matrix between familiarity (Agile and AI) and willingness to adopt AI tools

Finally, [table 1](#) presents a summary of the key quantitative findings along with their corresponding managerial implications. The results collectively show that the integration of AI into Agile management practices is largely viewed as a positive and valuable development. Respondents consistently associated AI with increased efficiency, improved productivity, and enhanced decision-making

capabilities, all of which align closely with the core principles of Agile such as adaptability, collaboration, and continuous improvement. However, the findings also reveal that despite the clear potential of AI, its adoption is not without obstacles. Ethical concerns, implementation costs, and the readiness of teams to adapt to new tools were identified as major areas of hesitation. These issues suggest that successful AI integration requires more than technical solutions; it also depends on strong leadership, transparent communication, and careful attention to ethical standards.

The table further highlights that familiarity with both Agile methodologies and AI technologies emerged as the most influential factor in determining adoption readiness. This emphasizes the importance of knowledge, experience, and organizational learning as prerequisites for digital transformation. Teams with a higher level of understanding of AI tools are more confident and better prepared to incorporate them into Agile workflows. For managers, this finding underscores the need to invest in structured training programs and professional development initiatives that focus on both technical literacy and Agile practices. Furthermore, organizational alignment ensuring that strategies, structures, and cultures support innovation is crucial to overcoming resistance and maximizing the benefits of AI. In summary, the insights from [table 1](#) reinforce the notion that sustainable AI integration within Agile frameworks depends on balancing technological readiness with ethical governance and human capability development.

Table 1 Summary of key quantitative and managerial insights

Aspect	Key Finding	Managerial Implication
Familiarity (Agile & AI)	Significant positive correlation with willingness ($r = 0.61-0.80$, $p < 0.001$)	Combined Agile–AI training programs enhance adoption readiness.
Professional Role	ANOVA significant ($F = 4.15$, $p = 0.003$)	Tailored adoption strategies needed per role (e.g., Developer vs PM).
Perceived Benefits	Faster development, better decision-making, improved quality	AI supports productivity and enhances Agile decision-making.
Perceived Challenges	Ethics, cost, expertise gaps, team resistance	Focus on AI ethics governance and structured change management.

In summary, the findings reveal that Agile professionals are generally open to adopting AI tools, primarily due to perceived benefits in efficiency and decision quality. However, adoption challenges persist, particularly in ethical considerations, financial investment, and team readiness. The strong relationship between familiarity and adoption willingness underscores that organizational learning and leadership engagement are essential for successful AI integration within Agile environments.

Discussion

The findings of this study provide an in-depth understanding of how Agile professionals perceive the integration of AI tools within Agile frameworks. The results demonstrate a generally positive attitude toward AI, reflected in a relatively high mean score for willingness to adopt these technologies. This finding indicates that most Agile practitioners view AI as an opportunity to

enhance their workflows rather than as a threat to established practices. The perceived benefits identified in the text analysis, such as faster development cycles, improved efficiency, and enhanced decision-making, reveal that respondents associate AI with the potential to strengthen Agile values of adaptability, collaboration, and iterative improvement. These insights suggest that the relationship between Agile methodologies and AI tools is largely complementary, with AI serving as a strategic enabler that enhances decision support, resource allocation, and overall project outcomes. At the same time, the results highlight that the success of AI integration depends on the level of user familiarity and organizational preparedness. Teams that demonstrate higher familiarity with Agile and AI are more confident in adopting these tools effectively, underscoring the importance of training and experiential learning.

The analysis of challenges provides a more nuanced view of the barriers that may hinder AI adoption in Agile environments. Ethical considerations, cost implications, and a lack of expertise emerged as the most frequently cited concerns. These findings indicate that organizational and human factors play a more significant role in shaping adoption outcomes than purely technical limitations. Many respondents expressed concerns about the ethical use of AI, including transparency, accountability, and bias management, while others emphasized the need for clearer governance structures to ensure responsible implementation. Furthermore, the significant influence of professional roles, as shown in the variance analysis, suggests that perceptions of AI are shaped by managerial responsibilities and access to decision-making authority. Project Managers and Scrum Masters tend to demonstrate higher readiness for adoption compared to Developers, reflecting their broader strategic outlook and experience in process optimization. These differences emphasize that AI adoption within Agile frameworks is not a uniform process but a multifaceted transformation that requires managerial commitment, organizational alignment, and a strong ethical foundation. In summary, the discussion highlights that while the potential benefits of AI in Agile management are widely recognized, addressing socio-technical challenges remains essential to achieving sustainable and responsible integration.

Conclusion

In conclusion, this study provides a comprehensive understanding of how Agile professionals perceive the integration of AI tools into Agile frameworks and the factors that influence their readiness for adoption. The results indicate that the majority of respondents view AI as a valuable enabler that enhances efficiency, decision-making, and product quality while aligning closely with Agile values of adaptability and continuous improvement. The significant correlations between familiarity with Agile and AI and willingness to adopt highlight that knowledge, exposure, and experience are essential in shaping confidence and openness toward AI adoption. Furthermore, the analysis revealed that managerial roles such as Project Managers and Scrum Masters demonstrate greater readiness compared to Developers, suggesting that leadership experience and strategic involvement influence attitudes toward digital transformation. Despite the positive outlook, respondents also identified several challenges, including ethical considerations, high implementation costs, lack of expertise, and resistance among team members. These findings underscore that successful AI integration requires not only technological preparedness but also ethical

governance, capacity building, and cultural adaptation. Organizations seeking to adopt AI in Agile environments should therefore focus on developing comprehensive training programs, fostering responsible innovation, and aligning human and technical capabilities to achieve sustainable and effective transformation.

Declarations

Author Contributions

Conceptualization: H.B. and C.R.A.; Methodology: C.R.A.; Software: H.B.; Validation: H.B. and C.R.A.; Formal Analysis: H.B. and C.R.A.; Investigation: H.B.; Resources: C.R.A.; Data Curation: C.R.A.; Writing Original Draft Preparation: H.B. and C.R.A.; Writing Review and Editing: C.R.A. and H.B.; Visualization: H.B.; All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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