Evolution of IT Project Management Methodologies: Adaptability of Modern Methodologies

Iwona Chomiak-Orsa

Wroclaw University of Economics and Business

e-mail: iwona.chomiak-orsa@ue.wroc.pl

ORCID: 0000-0003-3550-8624

Violetta Arutiunian

Wroclaw University of Economics and Business

e-mail: 183947@student.ue.wroc.pl

ORCID: 0009-0001-9950-3331

Abstract

Aim: The purpose of this article is to explore and present modern IT project management methodologies that have emerged over the past decade. The article aims to fill a research gap regarding contemporary, innovative methodologies that go beyond widely used and well-studied approaches such as Scrum and Kanban. By analysing new trends and approaches, the article seeks to provide up-to-date information and tools for IT project managers looking to stay current with the latest industry practices.

Methodology: The article employs a comparative analysis of traditional and modern IT project management methodologies, examining their fundamental principles, unique features, and adaptability across various organizational contexts. The methodology includes an analysis of reports such as the *State of Agile* to highlight practical applications and challenges faced by practitioners.

Results: The findings indicate the growing popularity of modern methodologies, emphasizing their benefits, such as flexibility, collaboration, and alignment with business needs. The analysis also discusses implementation barriers, such as resistance to change and lack of leadership support, as well as emerging trends like hybrid work models.

Implications and recommendations: Organizations are encouraged to foster a culture of openness to change, provide training on modern methodologies, and leverage support from the Agile community. The importance of leadership engagement and adapting methodologies to hybrid work models is highlighted to enhance project outcomes.

Originality/value: This work provides a comprehensive overview of modern IT project management methodologies, bridging theory and practice. Its originality lies in linking global changes, such as hybrid work trends, with practical challenges in adapting methodologies.

Keywords: modern IT project management methodologies, IT project management, innovation in project management, contemporary project management methodologies, development of Agile methodologies

1. Introduction

IT project management has undergone a significant evolution over the past few decades, moving from simple, haphazard attempts to organise software development work to the sophisticated methodologies that are the industry standard today. The origins of IT projects date back to the 1950s and 1960s, when computers were a novelty and software development was more like an art than a science. As technology evolved, so did the complexity and scale of projects, forcing the need for a more structured approach to managing them.

From the earliest attempts, such as the Waterfall model, to modern Agile methodologies, the evolution of IT project management is a story of constant adaptation to challenges and changing needs. In this article, we provide an overview of the evolution of IT project management concepts, focusing attention on modern methodologies and trends in today's organisations.

The purpose of this article is to explore and present modern IT project management methodologies that have emerged in the market over the last decade. The article aims to fill the research gap on modern, innovative methodologies that go beyond commonly used and already well researched approaches such as Scrum and Kanban. By analysing new trends and approaches, the article aims to provide up-to-date information and tools for IT project managers who want to keep up to date with the latest practices in the industry.

The research problem that will be addressed in the article concerns the identification and assessment of the adaptability of modern IT project management methodologies that have emerged over the last decade. There is a need to understand how these modern approaches affect the effectiveness of IT project delivery in the context of rapidly changing requirements and technologies.

Research questions:

1. What modern IT project management methodologies have emerged over the last decade and what are their key features and differences from traditional methodologies?
2. What are the main challenges and barriers related to the implementation of modern IT project management methodologies in different industries and in the context of different organisational environments?
3. What factors influence the adaptability of modern IT project management methodologies in the face of changing requirements and technologies?

Research gap: current research and articles on IT project management overwhelmingly focus on Agile methodologies such as Scrum and Kanban, which, although popular, have been around for more than 20 years. However, there is a lack of research and studies dedicated to modern methodologies that have emerged in the last 10 years and that may better address today's IT challenges. This article aims to fill this gap by providing analysis and conclusions on current trends in IT project management.

2. Literature Review

Modern IT project management has been based on methods such as Agile, Scrum and Kanban for years, which, despite their long presence in the industry, are still considered innovative. These approaches have revolutionized project management, introducing flexibility and iteration, which allows for quick adaptation to changing market requirements. Nevertheless, research indicates the need for further development of these methods in order to meet modern IT challenges. It is therefore important to study how these classic approaches evolve to meet new requirements, and what other, more advanced project management techniques are gaining importance in the era of digital transformation.

Research on the evolution of IT project management methodologies is crucial to understanding their adaptation to modern challenges. Rahman (2023) analyses the effectiveness of agile methodologies in IT projects, emphasizing their adaptability and flexibility in a changing environment. In turn, Reshetnyak et al. (2023) in the article Risk management of IT projects: PMBoK vs. Agile points to the benefits of the iterative nature of Agile in the context of risk management. Ciric et al. (2019) discuss the challenges and strategies for implementing agile approaches in projects.

Akhmetshin et al. (2019) point to modern approaches in project management education that combine traditional and e-learning elements, preparing students for the challenges of managing projects in a real work environment. Moldagulova and Satybaldiyeva (2019) emphasize the importance of experiential learning and gamification in IT education.

In recent years, there has been growing interest in hybrid methodologies that combine traditional and Agile approaches. Ibrahim and Abdessamad (2019) propose a meta-model of project management that integrates predictive and agile elements. Chen et al. (2023) discuss the hybrid approach as a combination of the traditional software development life cycle and Agile-based product development, emphasizing its role in future sustainability. Jabar et al. (2019a, 2019b), in their works titled "Adaptive and Dynamic Hybrid Model for Software Project Management: A Review on Its Clarity and Usage to Improve Project Success" and "Adaptive and Dynamic Characteristics in Hybrid Agile Management Model for Software Development Project Success", point to the dynamic nature of the hybrid model that enables project success by adapting to changing conditions. Markopoulos (2019) proposes a methodology generator that adapts the approach to the specifics of the project.

Digital transformation has influenced the evolution of IT project management methodologies. Felcenloben (2023) analyses future trends, pointing to the growing importance of digital technologies. Blaskovics (2018) discusses the challenges of digital project management, especially in the context of remote work and virtual teams. Ng (2021) emphasizes the challenges of managing IT projects during the COVID-19 pandemic, pointing to the need to adapt to changing work conditions. Korenkova (2020) suggests using hybrid management systems based on artificial intelligence to support decision-making in conditions of uncertainty.

Agile is gaining popularity not only in IT but also in other sectors. Alam et al. (2018) analyse the transfer of Agile methodology to non-technology sectors, pointing to its adaptive potential. Amajuoyi et al. (2023) note the ability of Agile to adapt product management to changing market conditions, which is also applicable to healthcare. Goodison et al. (2019) discuss the use of Agile in IT implementations in healthcare, pointing to its effectiveness in adapting to dynamic challenges.

The literature also highlights the challenges associated with adapting IT project management methodologies to contemporary realities. Rudenko analyses the evolution of the project management concept in the context of Agile, pointing out the need to adapt processes to the dynamic IT environment. Tous & Freitag (2020) discuss open project-based learning as a way to make IT education more adaptive. Levitskaia (2020) emphasizes modern approaches to IT project management in mobile marketing.

In the context of project manager competencies, Bushuyev et al. (2020) point out the need to integrate different methodologies in a hybrid environment. Niţă et al. (2023) discuss the evolution of project management methodologies, pointing out their adaptation to changing needs and conditions.

Modern IT project management methodologies are evolving in response to the growing complexity and dynamics of projects. Integration of Agile with traditional methods and the use of new technologies, such as artificial intelligence, are becoming crucial for project success. Research indicates many initiatives comparing different methodologies, such as Agile, PRINCE2, and hybrid approaches.

Our study fills the gap in the literature, offering a new perspective on the history of the evolution of IT project management methodologies. It is worth continuing to analyse these methods, especially in the context of the growing importance of digital technologies and remote work. The results can help organizations choose the right project management strategies, according to their needs and operating conditions.

3. Evolution of IT Project Management Methodologies

Modern technological advances and changing market requirements have led to the evolution of IT project management towards more agile and flexible methodologies (Petrović, 2018). Traditional approaches such as Scrum, Kanban or PRINCE2 remain popular, but they do not fully meet the challenges of modern IT projects.

In response to these challenges, modern methodologies have emerged, such as Design Thinking, Hybrid Approaches, Enterprise Agile Delivery, Lean Startup, Scaled Agile Framework (SAFe) and AgileSHIFT. IT project management models can be divided into sequential, iterative, incremental and hybrid.

The Waterfall model, widely used in the 1970s and 1980s, is characterized by a linear approach, in which each phase must be completed before the next one can begin (Moldagulova et al., 2019). Its rigidity was a limitation in IT projects, where requirements are often subject to change. In response to these shortcomings, the Agile Manifesto was created in 2001, which ushered in a new era of IT project management (Reshetnyak et al., 2023). Agile, thanks to its flexibility and iterative nature, enables faster adaptation to changing market and technological needs.

Agile has evolved into Scrum, Kanban, and Extreme Programming (XP). Scrum focuses on iterative sprints lasting 2-4 weeks, during which the team implements a specific scope of functionality. The Scrum Master oversees compliance with the methodology's principles, while the Product Owner manages requirements. Kanban emphasizes visualizing the workflow and eliminating bottlenecks, while XP promotes techniques such as pair programming and TDD (Kvasha et al., 2024).

Over time, organizations have begun to combine Agile with traditional approaches, creating hybrid methodologies. An example is DevOps which integrates development and operational processes, promoting automation and continuous software delivery. DevOps is based on the principles of continuous integration (CI) and continuous delivery (CD), which enables faster implementation of changes.

Design Thinking, focused on an empathetic approach to the user and iterative improvement of solutions, also stands out among modern methods (Ilin et al., 2019). Enterprise Agile Delivery (EAD) enables the implementation of Agile at the enterprise level, ensuring consistency and integration of processes. Lean Startup, initiated by Eric Ries in 2011, focuses on minimizing risk through rapid testing of market hypotheses (Archer, 2018). SAFe, developed by Dean Leffingwell in 2011, structured the approach to scaling Agile, synchronizing the activities of many teams in large organizations.

One of the latest approaches is AgileSHIFT, introduced by AXELOS in 2018, aimed at promoting agility at the level of the entire organization (Suvvari, 2023). AgileSHIFT enables the adaptation of strategies and processes to changing market conditions, supporting digital transformation.

The choice of the appropriate methodology depends on the characteristics of the project, the specifics of the organization and its strategic goals. Modern approaches to IT project management, thanks to adaptability and innovation, allow for effective response to dynamic market and technological changes (Markopoulos, 2019).
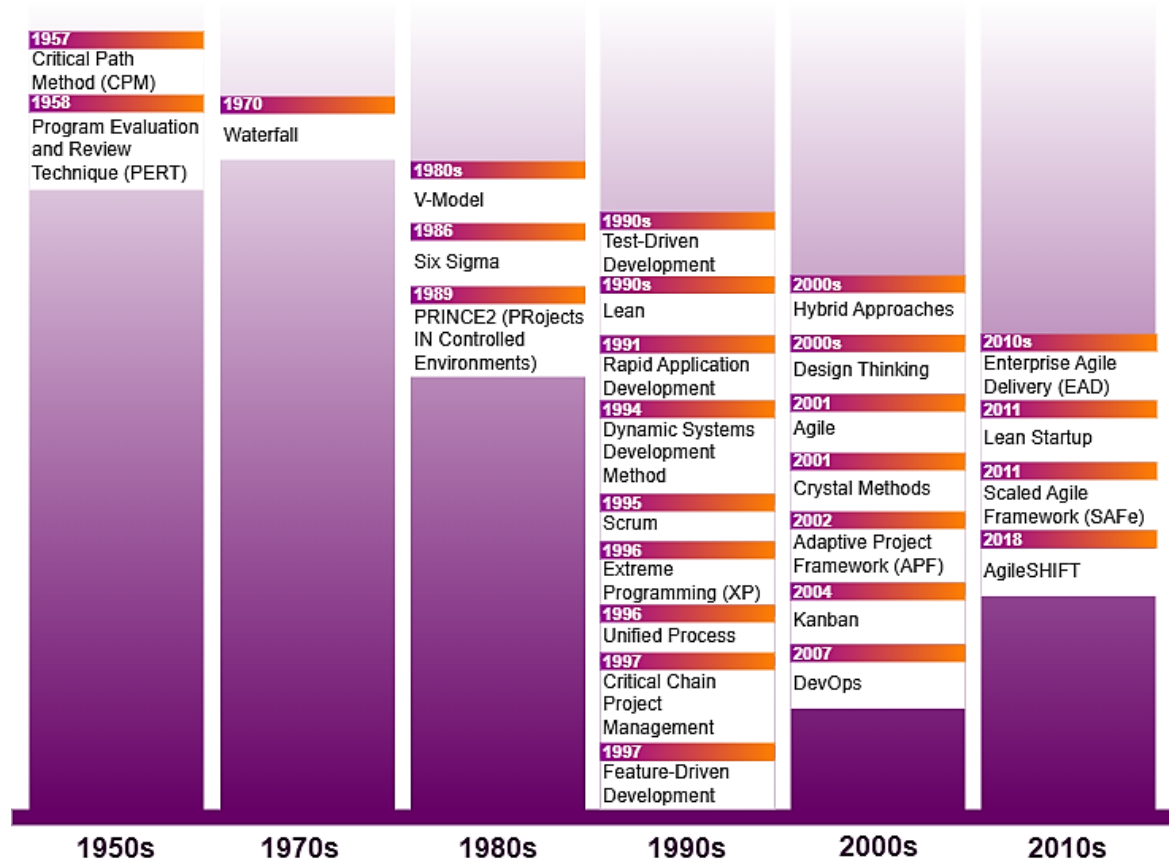
Figure 1. Key methodologies in chronological order

Source: own elaboration.

Changes in the economy, technology, and market needs have contributed to the development of approaches that increase the efficiency and flexibility of project management (Volovyk & Harmash, 2022). From the 1950s, when the first attempts at a scientific approach to project management began to be introduced, through the 1960s with tools such as CPM and PERT, to the 1970s, when the Waterfall model appeared. In the 1980s, approaches such as V-Model and Six Sigma were introduced, and the 1990s brought agile methodologies such as Scrum and Extreme Programming, in response to the increasing complexity of IT projects (O. Tkachenko & K. Tkachenko, 2019).

In the 21st century, Agile methodologies became the standard, and over the years, in response to digital transformations and rapid market changes, hybrid approaches began to be introduced. In the 2010s, methodologies such as Enterprise Agile Delivery and Lean Startup appeared, which allowed for faster value delivery. In the 2020s, the COVID-19 pandemic accelerated the digitalization and implementation of flexible work models, including AgileSHIFT, and artificial intelligence began to automate project management processes.

4. Comparison of Modern Methodologies and Traditional Ones

All modern methodologies have elements of flexibility and adaptation to changing conditions, which is key to the Agile approach. They offer an iterative approach to product development and are geared to quickly adapt to the needs of users and the changing market. While methodologies like Enterprise Agile Delivery and Scaled Agile Framework build on the foundation of Scrum by integrating its iterative cycles and teamwork principles, others, such as Design Thinking, leverage these Agile elements to promote a user-centric, iterative approach to development.

In addition to Agile and Scrum principles, some modern methodologies incorporate Kanban elements to streamline workflow visualization and task management. Lean Startup, for example, emphasizes experimentation and rapid pivots, utilizing Kanban to visualize the workflow and ensure efficiency. Hybrid Approaches combine elements of both Scrum and Kanban to create a flexible framework that can be tailored to specific organizational needs, making these methodologies particularly adaptable in dynamic environments (Farahat & Defina, 2022). Overall, the convergence of Agile, Scrum, and Kanban in various modern methodologies highlights a trend toward hybridization, where organizations can select and combine elements that best fit their project requirements.

Unique features of modern methodologies:

- DevOps: focuses on integrating development and operations teams, automating and monitoring the implementation process, which goes beyond the basics of Agile, Scrum and Kanban.
- Design Thinking: has a strong emphasis on empathy, creative problem solving and prototyping, which is not typical of Scrum or Kanban.
- Hybrid Approaches: combine different methodologies, adapting them to the specific needs of the organization, making them more flexible.
- Enterprise Agile Delivery: scales the Agile approach at the organization level, managing larger projects and teams, which goes beyond individual Scrum or Kanban teams.
- Lean Startup: focuses on rapid testing and iterative product development, which is unique compared to more established Agile approaches.
- Scaled Agile Framework: integrates both Scrum and Kanban elements into a broader structure that includes multiple teams and levels of management.
- AgileSHIFT: emphasizes a change in organizational culture and approach to project management, which may be less concrete in traditional Agile, Scrum and Kanban approaches (Koi-Akrofi et al., 2019).

For more and details on common and unique features, see Table 1.

Table 1. Comparison of modern methodologies with traditional ones

Modern methodologies	Common features			Unique features of modern methodologies
	Agile	Scrum	Kanban	
DevOps	IT integration, rapid delivery	Iterative delivery, continuous improvement	Workflow management, process visualization	Integration with operations, automation and monitoring of deployments
Design Thinking	Focus on user needs, iteration			Empathetic design, creative exploration, prototyping
Hybrid Approaches	Flexibility, adaptation to changing needs	Ability to use elements of Scrum and Kanban	Ability to use elements of Scrum and Kanban	Combining different methodologies, adapting to specific organizational needs
Enterprise Agile Delivery (EAD)	Agile scaling, managing large projects	Can involve multiple Scrum teams	May include multiple Kanban teams	Coordination of multiple teams, management of complex organizational structures
Lean Startup	Quickly test hypotheses, minimize risks	Can use the iterative Scrum approach	Can use Kanban workflow visualization	Experimentation, quick changes of direction, validation of assumptions
Scaled Agile Framework (SAFe)	Agile scaling, managing large projects	Includes elements of Scrum in a broader framework	Includes elements of Kanban in a broader framework	Work organization at portfolio, program and team level
AgileSHIFT	Change in organizational culture, flexibility	Can be used in an Agile context	Can be used in a Kanban context	Change of culture in the organization, focus on continuous improvement

Source: own elaboration.

Modern IT project management methodologies, such as DevOps, Design Thinking, Hybrid Approaches, Enterprise Agile Delivery (EAD), Lean Startup, Scaled Agile Framework (SAFe) and AgileSHIFT, share common characteristics such as flexibility, adaptation to changing needs and rapid iteration of processes. Each of these methodologies has unique features that address specific organisational and technological challenges. For example, DevOps focuses on IT integration and deployment automation and monitoring, while Design Thinking focuses on understanding user needs and prototyping.

Methods such as Hybrid Approaches and AgileSHIFT offer flexibility by being able to combine elements of different approaches, such as Scrum or Kanban, depending on the specific needs of the organisation. Enterprise Agile Delivery (EAD) and Scaled Agile Framework (SAFe) are methodologies that enable Agile scaling and management of large projects, coordinating the work of multiple teams (Farahat & Defina, 2022). Lean Startup, on the other hand, focuses on rapid hypothesis testing and rapid changes of direction in the process, which promotes risk minimisation. Common to all these methodologies is a focus on adaptation to changing requirements and continuous process improvement.

5. Adaptability of IT Project Management Methodologies

While new project management methodologies present innovative solutions, their applicability to all projects is not always guaranteed due to various challenges. This analysis identifies key barriers to the adoption of modern IT project management methodologies.

First, resistance to change remains a significant obstacle, as many organizations are entrenched in traditional practices and reluctant to transition. Such changes require investments in training, process alignment, and sometimes a shift in organizational culture. Moreover, unfamiliarity with modern methodologies may lead to hesitation in implementation, as organizations may not know how to effectively adopt these approaches. The lack of management support is also critical, as the successful implementation of modern methodologies often hinges on top-down commitment. Furthermore, the costs and resources required for training, adaptation of tools, and process overhaul can determine many organizations, particularly in the short term.

Agile methodologies, notably, have gained widespread popularity due to their flexibility and adaptability to changing requirements, providing benefits such as improved team communication, transparency, and efficiency (Malik et al., 2019). The rise of Agile-related certifications (e.g., Scrum Master) further contributes to its widespread adoption by making candidates more competitive in the job market.

While traditional methodologies remain well-regarded for their stability and familiarity, especially in high-risk projects, the key to modernizing IT project management lies in the growth of the Agile Community. This community plays an essential role in promoting Agile by organizing trainings, workshops, and conferences, fostering collaboration and knowledge sharing.

The 17th State of Agile Report (2023) demonstrates the continued demand for Agile, with 89% of respondents noting the importance of people-centred values, culture, and proper tools in high--performing teams. Agile adoption leads to improvements in collaboration (69%) and alignment with business needs (54%), while challenges such as insufficient managerial support (40%) and organizational culture conflicts persist. The shift towards hybrid and remote work further necessitates adaptations to Agile practices, highlighting the ongoing evolution of Agile methodologies in response to new work environments and market demands.

6. Conclusions

Over the last decade, IT project management has undergone significant changes, mainly due to modern methodologies such as Scrum, Kanban, Design Thinking, Hybrid Approaches, Lean Startup, Scaled Agile Framework and AgileSHIFT. These approaches are flexible and quickly adapt to changing requirements, but they cause difficulties for organizations related to the need to adapt culture, processes and integrate new methods with existing structures. Competency gaps and resistance to change are significant barriers to implementing innovative approaches.

Despite their innovation, new methods do not always gain popularity. Agile, although not the newest method, has gained wide support, which puts other approaches in a difficult competitive position. In practice, different methodologies work well in different areas: Scrum is used in IT teams, but in production-related projects, traditional approaches such as PRINCE2 may be better. Hybrid approaches combining elements of traditional and agile methods increase efficiency in complex environments.

DevOps is suitable for organizations integrating software development and operations, while Design Thinking is effective for innovative, user-centric projects. Enterprise Agile Delivery is suitable for large organizations that want to apply agility on a large scale, while Lean Startup is ideal for startups. Scaled Agile Framework is used in large enterprises that need to scale agile methods, and AgileSHIFT helps organizations gradually implement agility throughout the enterprise.

The future of IT project management will be based on technology integration, sustainability, and adaptation to the needs of the organization and society. Key trends such as automation, personalization of processes, and integration of new technologies such as artificial intelligence will have a significant impact on the future of the methodology in the years 2020-2040.

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Ewolucja metodyk zarządzania projektami IT: adaptacyjność nowoczesnych metodologii

Streszczenie

Cel: Celem artykułu jest zbadanie i przedstawienie nowoczesnych metod zarządzania projektami IT, które pojawiły się na rynku w ciągu ostatniej dekady. Artykuł ma na celu wypełnienie luki badawczej dotyczącej współczesnych, innowacyjnych metodyk, które wykraczają poza powszechnie stosowane i już dobrze zbadane podejścia, takie jak Scrum i Kanban. Poprzez analizę nowych trendów i podejść, artykuł ma na celu dostarczenie aktualnych informacji oraz narzędzi dla menedżerów projektów IT, którzy chcą być na bieżąco z najnowszymi praktykami w branży.

Metodyka: W artykule wykorzystano analizę porównawczą tradycyjnych i nowoczesnych metodyk zarządzania projektami IT, badając ich podstawowe zasady, unikalne cechy oraz zdolność adaptacji w różnych kontekstach organizacyjnych. W metodyce uwzględniono analizę raportów, takich jak *State of Agile*, aby ukazać praktyczne zastosowania i wyzwania stojące przed praktykami.

Wyniki: Wyniki wskazują na rosnącą popularność nowoczesnych metodyk, podkreślając ich zalety, takie jak elastyczność, współpraca i zgodność z potrzebami biznesowymi. Omówiono także bariery wdrożeniowe, takie jak opór wobec zmian i brak wsparcia ze strony liderów, a także nowe trendy, np. modele pracy hybrydowej.

Implikacje i rekomendacje: Zaleca się, aby organizacje wspierały kulturę otwartości na zmiany, zapewniały szkolenia z nowoczesnych metodyk oraz korzystały z wsparcia społeczności Agile. Wskazano znaczenie zaangażowania liderów oraz dostosowania metodyk do modeli pracy hybrydowej w celu poprawy wyników projektów.

Oryginalność/wartość: Praca dostarcza kompleksowego przeglądu nowoczesnych metodyk zarządzania projektami IT, łącząc teorię z praktyką. Jej oryginalność polega na powiązaniu globalnych zmian, takich jak trendy pracy hybrydowej, z praktycznymi wyzwaniami adaptacji metodyk.

Słowa kluczowe: nowoczesne metodyki zarządzania projektami informatycznymi, zarządzanie projektami informatycznymi, innowacje w zarządzaniu projektami, współczesne metodyki zarządzania projektami, rozwój metodyk Agile