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**ЗБІРНИК ПРАЦЬ
МІЖНАРОДНОЇ
НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ
«ІНФОРМАЦІЙНІ СИСТЕМИ
ТА ІННОВАЦІЙНІ ТЕХНОЛОГІЇ
УПРАВЛІННЯ ПРОЄКТАМИ І ПРОГРАМАМИ»**

Харків – Коблево, 2025

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PATTERN-BASED FRAMEWORK FOR MANAGING ARTIFICIAL INTELLIGENCE INNOVATION IN SCALED AGILE ENVIRONMENTS

This paper addresses the systemic challenges of integrating Artificial Intelligence (AI) into products within scaled Agile environments. It proposes a pattern-based organizational framework to manage the high uncertainty and complexity of AI projects. The framework introduces a dual-track system, utilizing a specialized best practices (patterns) AI Leading Team for discovery and Feature Teams for delivery, alongside a new AI Product Owner role. This process model offers a structured, de-risked approach on artificial intelligence (AI) in team management to managing innovation, ensuring development flow is maintained.

1. Introduction

The integration of Artificial Intelligence (AI) and Machine Learning (ML) capabilities represents a paradigm shift in software development and project management. While project management has been optimized for a delivery of well-understood features, they are often ill-equipped to handle the systemic challenges posed by AI innovation. Organizations operating with multiple teams frequently encounter significant hurdles, including:

- High uncertainty regarding the business value and technical feasibility of AI initiatives.
- A lack of concentrated AI expertise, with knowledge sparsely distributed across teams.
- Architectural and ethical complexity that traditional development does not account for.
- An inherent need for experimentation that can disrupt the velocity and flow of established feature teams.

These challenges indicate that a simple extension of existing project management practices is insufficient. A new model is required – one that embraces experimentation while protecting the predictable delivery of value. This paper proposes a practical framework for structuring teams and processes to manage AI-driven projects effectively in complex environment within a scaled Agile context. The objective is to present a process model that de-risks innovation,

clarifies roles and responsibilities, and provides a scalable pathway from initial idea to full implementation.

2. Approach: a framework based on Agile patterns and organizational design

The approach employed in this paper is rooted in established Agile principles and organizational design patterns. It addresses the challenges of AI project management by restructuring not the ceremonies of Agile frameworks, but the very composition and interaction of the teams involved. The core of this framework is a dual-track approach that separates the function of discovery from the function of delivery.

This model synthesizes foundational research on team performance with proven Scrum patterns to create a new process flow for AI innovation. The primary components of this framework are:

1. **Optimal Team Sizing:** Adherence to research-backed principles on team size to maximize communication and effectiveness.

2. **Structural Differentiation:** The creation of two distinct team types – an AI Leading Team and AI-Enabled Feature Teams - each with a specialized mission.

3. **Role Specialization:** The introduction of the AI Product Owner role to manage the unique demands of the AI/ML lifecycle.

4. **Process Modeling:** The definition of clear interaction protocols, handoff mechanisms, and responsibilities to ensure seamless collaboration between the specialized teams.

This approach transforms the management of AI from an ad-hoc, high-risk activity into a disciplined and repeatable process.

3. A dual-track framework for AI project management

3.1. Foundational Principle: Optimal Team Sizing

Effective project management begins with effective teams. Research and practitioner consensus overwhelmingly support small team sizes. The Scrum Guide recommends a range of 3–9 developers, as teams larger than this face excessive coordination overhead, while smaller teams often suffer from skill gaps. For the complex and collaborative work required in AI, the optimal size is often reported as 5–7 members to maintain high-quality communication. Furthermore, research shows that smaller teams augmented with AI tools can match or exceed the performance of larger, conventional teams, suggesting a strategy of keeping teams lean and augmenting them with technology rather than personnel.

3.2. Core Structural Components: The Explorer and The Builder Teams

The central thesis of this framework is that no single team can efficiently manage both uncertain exploration and predictable delivery. Therefore, we model two distinct team types:

- The AI Leading Team (The Explorer): A specialized, cross-functional Scrum team established to explore, validate, and de-risk AI-driven opportunities. Its focus is on discovery and learning, and its primary output is knowledge, validated prototypes, and clear recommendations, not production-ready code. This team operates on a short-term, hypothesis-driven backlog, tackling work that is new, high-risk, or technically unvalidated.

- The AI-Enabled Feature Team (The Builder): A traditional, long-term Scrum team focused on the delivery and scaling of well-defined features into the product. This team consumes the validated concepts and reusable components prepared by the AI Leading Team, integrating them into the production environment. Their backlog is prioritized by business value, and their success is measured by deployed features and user feedback.

This separation of concerns allows the organization to innovate safely by containing the risks of experimentation within the Leading Team, freeing the Feature Teams to do what they do best: deliver value predictably.

3.3. A New Role for a New Paradigm: The AI Product Owner

The unique nature of AI projects necessitates a specialized leadership role: the AI Product Owner (AI PO). This is an extension of the traditional PO role, tailored to the unique challenges of the machine learning lifecycle. While a traditional PO focuses on well-defined features, an AI PO navigates high uncertainty, manages probabilistic outcomes, and champions data as a core product component. You need an AI PO when a product integrates ML-driven features, requires significant experimentation, or operates in a regulated domain. Organizations can develop this capability internally by creating a structured development roadmap for existing Product Owners.

4. A modeling the process flow and interactions

For this dual-team structure to function, clear process models and interaction protocols are required to prevent the AI Leading Team from becoming a knowledge silo or a bottleneck. Effective collaboration is achieved through a combination of Agile practices and Scrum patterns like Dual-Track Scrum, Enabling Specifications, Scrum of Scrums, and knowledge transfer practices like Swarming. To formalize

interactions, a RACI (Responsible, Accountable, Consulted, Informed) matrix is an invaluable process modeling tool.

5. Conclusion

The adoption of AI presents both a significant opportunity and a profound challenge to established project management approaches. The framework presented in this paper offers a structured and disciplined approach for scaled Agile organizations to manage innovative AI projects. By grounding the model in the foundational principle of optimal team size, differentiating teams by their core function, and introducing the specialized AI Product Owner role, this framework directly addresses the primary challenges of uncertainty, complexity, and risk. However, its success depends on strong leadership, a commitment to cultural change, and a realistic understanding of its limitations. This framework allows for a continuous flow of innovation, enabling organizations to build a sustainable and responsible capability for AI-driven development.

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