

УДК 005.8:001.895:004.8  
DOI 10.47049/2226-1893-2024-1-117-130

## СИНКРЕТИЧНЕ УПРАВЛІННЯ ІННОВАЦІЙНИМИ ПРОЄКТАМИ В ЕПОХУ РОЗВИТКУ ШІ

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**Анотація.** *Оскільки технологічний ландшафт швидко розвивається, конвергенція інновацій та штучного інтелекту (ШІ) відкриває безпрецедентні можливості та проблеми для управління проєктами.*

*У цій статті представлено комплексну математичну модель синкретичного управління інноваційними проєктами в епоху бурхливого розвитку штучного інтелекту. Синкретизм у цьому контексті відноситься до плавної інтеграції різних елементів, включаючи міждисциплінарну співпрацю, технології штучного інтелекту та адаптивні методології для оптимізації результатів проєкту.*

*Запропонована модель охоплює різні аспекти управління проєктами, інновацій та інтеграції штучного інтелекту. У ній окреслено етапи управління життєвим циклом проєкту, особлива увага приділяється розподілу ресурсів, оцінці ризиків та адаптивним стратегіям. У галузі управління інноваціями модель включає методологію генерації ідей, пошуку технологій та відкритих інновацій, визнаючи роль ШІ у формуванні інноваційного ландшафту. Найважливішим аспектом моделі є інтеграція технологій штучного інтелекту протягом усього проєкту. Це включає визначення відповідних варіантів використання, ефективне управління даними, вибір відповідних моделей ШІ і створення систем підтримки прийняття рішень.*

*Синкретичний підхід наголошує на міжфункціональній співпраці, створюючи середовище, в якому різні дисципліни органічно сприяють успіху проєкту. Оптимізація ресурсів – це ключовий момент, що дозволяє використовувати штучний інтелект для ефективного розподілу ресурсів, прогнозування потреб в обслуговуванні та підвищення загальної продуктивності проєкту. У модель включені етичні та юридичні міркування, що забезпечують відповідальне використання ШІ, а в документі описуються механізми постійного навчання та розвитку, що дозволяють озброїти команди необхідними навичками.*

*Ефективність моделі оцінюється через призму моніторингу та оцінки з використанням певних ключових показників ефективності, безперервного моніторингу та циклів зворотного зв'язку для інтеративних покращень. Особлива увага приділяється комунікації та співпраці з використанням сучасних інструментів для полегшення взаємодії із зацікавленими сторонами та ефективної командної роботи. Цей документ робить внесок у дискурс про управління проектами, що розвивається, надаючи надійну основу, яка адаптується до динамічного характеру штучного інтелекту та інновацій. Він служить керівництвом для менеджерів проєктів, міждисциплінарних команд та осіб, які приймають рішення, що вирішують проблеми та можливості, які відкриваються завдяки синкретичному управлінню інноваційними проєктами в епоху бурхливого розвитку штучного інтелекту.*

**Ключові слова:** синкретика, менеджмент, інноваційні проєкти, вибух ШІ.

UDC 005.8:001.895:004.8

DOI 10.47049/2226-1893-2024-1-117-130

## SYNCRETIC MANAGEMENT OF INNOVATIVE PROJECTS IN THE AGE OF AI EXPLOSION

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**Abstract.** *As the technological landscape rapidly evolves, the convergence of innovation and artificial intelligence (AI) presents unprecedented opportunities and challenges for project management.*

*This paper introduces a comprehensive mathematical model for the syncretic management of innovative projects in the age of the AI explosion. Syncretism in this context refers to the seamless integration of diverse elements, including interdisciplinary collaboration, AI technologies, and adaptive methodologies, to optimize project outcomes.*

*The proposed model encompasses various facets of project management, innovation, and AI integration. It delineates stages of project lifecycle management, emphasizing resource allocation, risk assessment, and adaptive strategies. In the innovation management domain, the model incorporates methodologies for idea generation, technology scouting, and open innovation, recognizing AI's role in shaping the innovative landscape. A crucial aspect of the model lies in the integration of AI technologies throughout the project. This includes identifying relevant use cases, managing data effectively, selecting appropriate AI models, and establishing decision support systems.*

*The syncretic approach emphasizes cross-functional collaboration, fostering an environment where different disciplines seamlessly contribute to project success. Resource optimization is a key focus, leveraging AI to allocate resources efficiently, predict maintenance needs, and enhance overall project performance. Ethical and legal considerations are embedded within the model to ensure responsible AI usage, and the paper outlines mechanisms for ongoing training and development to equip teams with the necessary skills.*

*The model's effectiveness is evaluated through the lens of monitoring and evaluation, with defined key performance indicators, continuous monitoring, and feedback loops for iterative improvements. Communication and collaboration are underscored, utilizing modern tools to facilitate stakeholder engagement and effective teamwork. This paper contributes to the evolving discourse on project management by providing a robust framework that adapts to the dynamic nature of AI and innovation. It serves as a guide for project managers, interdisciplinary teams, and decision-makers navigating the challenges and opportunities presented by the syncretic management of innovative projects in the era of the AI explosion.*

**Keywords:** *syncretic, management, innovative projects, AI explosion*

**Introduction.** In an era marked by the rapid proliferation of artificial intelligence (AI) technologies, the landscape of project management has undergone a profound transformation. The synthesis of innovation and AI has given rise to unprecedented possibilities, shaping the way projects are conceived, executed, and ultimately, succeed. This paper delves into the paradigm of syncretic management, an approach that seamlessly integrates diverse elements, ranging from interdisciplinary collaboration to cutting-edge AI technologies, to navigate the complexities of innovative projects in the age of the AI explosion.

The backdrop of this discussion is set against a backdrop of dynamic technological evolution, where the relentless pace of AI advancements has become a catalyst for ground breaking innovations. As organizations seek to harness the potential of AI, traditional project management paradigms must evolve to accommodate the intricacies and opportunities presented by this technological revolution. Syncretism, in the context of this paper, signifies the harmonious amalgamation of various disciplines, methodologies, and technologies. Our focus is on developing a comprehensive mathematical model that not only acknowledges the symbiotic relationship between innovation and AI but also leverages this synergy to optimize project outcomes. From the conceptualization of ideas to the execution of projects, the syncretic management model aims to be a guiding framework that adapts to the evolving landscape of AI technologies and fosters an environment conducive to innovative success.

**Formulation of the problem.** This paper unfolds by delineating the key components of the proposed syncretic management model. We explore the stages of project lifecycle management, incorporating adaptive strategies, risk assessment, and resource allocation. The innovation management aspect emphasizes the role of AI in idea generation, technology scouting, and open innovation, recognizing the transformative impact of AI on the creative process.

Central to our discussion is the seamless integration of AI technologies throughout the project lifecycle. We delve into the identification of AI use cases, effective data management strategies, model selection, and the establishment of decision support systems. The syncretic approach we advocate extends beyond technological considerations to embrace cross-functional collaboration, recognizing the diverse expertise required for project success.

Resource optimization, a critical facet of our model, harnesses the power of AI to allocate resources efficiently, predict maintenance needs, and enhance overall project performance. Ethical and legal considerations are woven into the fabric of the model, emphasizing the responsible use of AI technologies. Continuous training and development initiatives are embedded to ensure teams are equipped with the requisite skills for navigating the AI-infused landscape.

Through the lens of monitoring and evaluation, we examine the effectiveness of the syncretic management model, employing defined key performance indicators, real-time monitoring, and feedback loops for iterative enhancements. Communication and collaboration, facilitated by modern tools, are positioned as integral components to foster stakeholder engagement and effective teamwork.

As we embark on this exploration of syncretic management in the age of the AI explosion, it is our endeavour to contribute a robust framework that resonates with project managers, interdisciplinary teams, and decision-makers navigating the intricate intersections of innovation and AI.

**Analysis of recent research and publications.** AI may replace humans in innovation management, requiring companies to rethink their innovation processes and consider digital transformation [1]. AI can enhance project management by managing stakeholder expectations, resolving conflicts, and ensuring flawless project delivery [2].

Technical advancements within the subject of artificial intelligence (AI) leads towards development of human-like machines, able to operate autonomously and mimic our cognitive behavior. The progress and interest among managers, academics and the public has created a hype among many industries, and many firms are investing heavily to capitalize on the technology through business model innovation [3]. However, managers are left with little support from academia when aiming to implement AI in their firm's operations, which leads to an increased risk of project failure and unwanted results.

AI has the potential to revolutionize industries and society, but challenges and research agendas must be addressed to ensure its successful implementation and future impact [4-6].

The convergence of rapid AI advancements and the need for adaptable project management to fuel innovation creates a fertile ground for research [7-10]. While a dedicated field of «syncretic management» for AI-driven projects is still emerging, we can find relevant insights scattered across several areas:

1. Strategic Management in the Age of AI:

– «Competing in the Age of AI. Strategy and Leadership for the Next Paradigm» by Marco Iansiti and Karim R. Lakhani [11]. This book explores how AI reshapes competitive landscapes and proposes strategic frameworks for organizations to thrive in this new environment.

– «The AI Advantage. How to Put the Artificial Intelligence Revolution to Work» by Andrew Ng, Erik Brynjolfsson, and Jeremy Schrage [12]. This book focuses on practical strategies for organizations to leverage AI across various functions and departments.

– «HBR Guide to Managing in the Age of Artificial Intelligence» by Harvard Business Review [13]. This collection of articles delves into specific challenges and opportunities of managing AI initiatives, including workforce upskilling, ethical considerations, and risk management.

#### 2. Project Management & Innovation:

– «The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm» by Tom Kelley [14]. This book by IDEO founder Tom Kelley provides practical frameworks for fostering innovation within organizations, emphasizing user-centricity and iterative prototyping.

– «Project Management for Agile. Adaptive and Iterative Strategies for Software Development» by James Shore and Shane Warden [15]. This book explores agile project management methodologies well-suited for navigating the uncertainties of innovation projects.

– «The Innovator's Dilemma. When New Technologies Cause Great Firms to Fail» by Clayton M. Christensen [16]. This classic book highlights the challenges established organizations face when adapting to disruptive technologies, offering valuable insights for managing innovation during rapid technological change.

#### 3. AI & Project Management Integration:

– «Artificial Intelligence in Project Management. A Comprehensive Guide» by Jack Welch [17]. This book outlines various ways AI can be used to improve project management processes, with case studies and practical implementation advice.

– «Project Management in the Age of Disruption. Using AI and Automation to Deliver Value» by Paul D. Algatt [18]. This book explores how AI-powered tools can streamline project workflows, enhance decision-making, and automate repetitive tasks.

– «The Human Advantage in the Age of AI: Leading, Learning, and Growing in a Changing World» by Tom Davenport and Brooke Harrington [19]. This book emphasizes the importance of human intuition and leadership skills in successful AI implementation, urging organizations to focus on developing a "hybrid workforce" that leverages both human and AI capabilities.

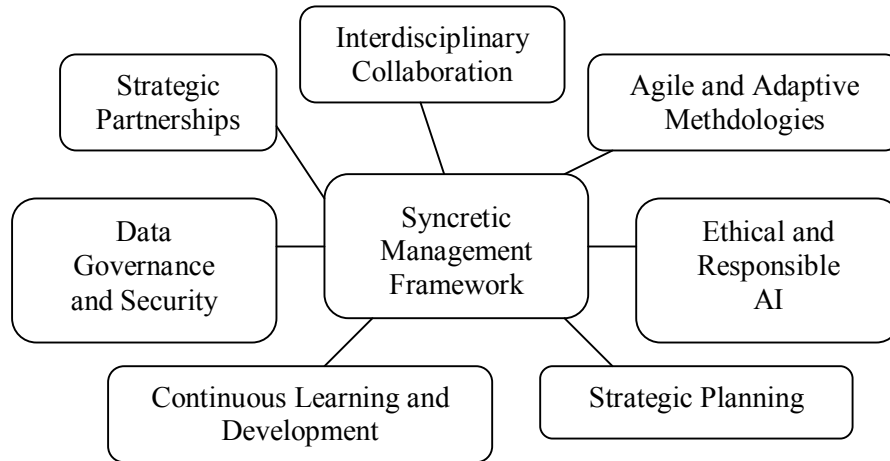
It's important to understand that the field of syncretic management for AI-driven projects is still evolving, and the available literature is fragmented. However, by drawing insights from related areas like strategic management, project management, and AI integration, you can build a solid foundation for understanding and implementing this emerging approach to innovation.

**Formulation of the goal of the article.** Aim of this paper to serves guiding stakeholders through the uncharted territories of contemporary project management, where the fusion of innovation and AI promises to redefine the boundaries of what is achievable.

**Presentation of the main research material.** Syncretic management of innovative projects in the period of exponential growth of artificial intelligence involves

integrating diverse approaches, methodologies, and perspectives to effectively navigate the complexities and uncertainties associated with AI-driven projects.

Let's look on the key principles of the Syncretic Management Framework (Figure 1). Let's look on the scope of each principle of the Syncretic Management Framework.



*Fig. 1. Syncretic Management Framework*

1. Interdisciplinary Collaboration:

– Team Composition. Build cross-functional teams with members possessing diverse skills, including AI expertise, domain knowledge, project management, and communication skills.

– Collaborative Spaces. Create environments that facilitate open communication and collaboration between technical and non-technical team members.

2. Agile and Adaptive Methodologies:

– Agile Frameworks. Implement agile methodologies such as Scrum or Kanban to foster flexibility and adaptability in response to rapidly changing AI technologies and project requirements.

– Iterative Development. Break down projects into smaller, manageable iterations, allowing for continuous improvement and adjustments based on emerging AI trends.

3. Ethical and Responsible AI:

– Ethics Framework. Develop and adhere to an ethics framework that guides the responsible use of AI, considering factors such as bias mitigation, transparency, and accountability.

– Human-Centered Design. Prioritize human needs and experiences in the design and implementation of AI solutions, ensuring alignment with ethical principles.

4. Strategic Planning:

– Futurism. Regularly assess and anticipate AI trends, ensuring that projects align with the future trajectory of AI technologies.

– Risk Management. Implement robust risk management strategies to address uncertainties associated with exponential growth, considering technical, regulatory, and market risks.

5. Continuous Learning and Development:

– Training Programs. Invest in ongoing training programs for team members to keep them updated on the latest AI advancements and best practices.

– Knowledge Sharing. Facilitate knowledge-sharing sessions within the team and encourage participation in industry conferences and events.

6. Data Governance and Security:

– Data Management. Establish effective data governance practices to ensure the quality, privacy, and security of data used in AI projects.

– Security Protocols. Implement robust cyber security measures to safeguard AI systems from potential threats and attacks.

7. Strategic Partnerships:

– Ecosystem Engagement. Collaborate with external partners, research institutions, and industry experts to tap into a broader pool of knowledge and resources.

– Open Source Collaboration. Leverage open-source initiatives and contribute to the community to accelerate innovation and stay aligned with industry standards.

Developing a comprehensive mathematical model for syncretic management of innovative projects in the age of AI explosion is a complex task, as it encompasses a wide range of qualitative and quantitative factors. However, we can explore building a framework that incorporates various dimensions of syncretic management using mathematical components. Let's look on the Model Components:

1. Strategic Vision.

– Define quantitative metrics for your innovation goals (e.g., increased revenue, customer satisfaction, efficiency improvements).

– Assign weights to these metrics based on their strategic importance (e.g., revenue growth might carry a higher weight than user engagement).

– Develop a scoring system based on these metrics and weights to evaluate the «strategic alignment» of potential projects.

2. Holistic Assessment.

– Create a multi-criteria decision-making model to assess project opportunities. Assign weights to different criteria like technical feasibility, economic viability, social impact, and ethical considerations.

– Evaluate each project option against these criteria using fuzzy logic, which can handle qualitative and uncertain parameters.

– Aggregate the individual criterion scores into an overall «holistic assessment» score for each project.

3. Collaborative Synergy.

– Model collaboration as a network of individuals and teams with expertise and skill sets relevant to the project.

– Calculate «synergy potential» based on the overlap and complementarity of these skill sets.

– Use network analysis algorithms to identify optimal team compositions for maximizing synergy and knowledge flow.

#### 4. Agile Adaptation.

- Implement Monte Carlo simulations to model potential risks and uncertainties associated with the project.
- Define key performance indicators (KPIs) to track progress and project health.
- Develop a feedback loop mechanism where deviations from KPIs trigger adjustments to project timelines, budgets, or execution strategies.
- Model Outputs.
- Project prioritization. Rank potential projects based on their combined scores from strategic alignment, holistic assessment, and synergy potential.
- Resource allocation. Optimize resource allocation based on team expertise, workload balancing, and project criticality.
- Contingency planning. Generate risk mitigation strategies based on simulated scenarios and identified vulnerabilities.

This is a conceptual framework, and the specific mathematical functions, algorithms, and data inputs will depend on your specific industry, project goals, and available data.

You'll likely need to involve domain experts and data scientists to refine and implement this model effectively. Additionally, remember that a purely mathematical model cannot capture all aspects of syncretic management. Human intuition, leadership, and adaptive decision-making remain crucial for navigating the complexities of AI-driven innovation.

Let's present the proposed mathematical model for the Strategic Vision component of Syncretic Project Management.

Objective – maximize the expected impact of your AI-powered innovation projects, considering their alignment with the organization's goals and their potential for success.

Model Formulation:

$$\sum_{N=1}^{i=1} W_{gi} \times \sum_{M=1}^{j=1} P_j \times I_{jgi} \times U_j - \sum_{N=1}^{i=1} W_{gi} \times \sum_{M=1}^{j=1} P_j \times L_{jgi} \times U_i \rightarrow \max, \quad (1)$$

$$\sum_{M=1}^{j=1} P_i \leq B, \quad (2)$$

where B – budget constraint.

Variables:

$G_i$  – a vector representing the i-th strategic goal of your organization (e.g., revenue growth, customer satisfaction, operational efficiency);

$W_{gi}$  – the weight assigned to the i-th goal, reflecting its relative importance (e.g.,  $Wg\_revenue > Wg\_engagement$ );

$P_j$  – a binary variable indicating whether the j-th project is selected for implementation (1) or not (0);

$I_{jgi}$  – the impact of the j-th project on the i-th goal, quantified using a score or metric (e.g., projected revenue increase, customer satisfaction index improvement);

$U_j$  – the expected utility of the j-th project, incorporating factors like technical feasibility, market potential, and resource requirements.



Each constraint can be tailored to your specific context (e.g., team capacity, risk tolerance).

Explanation of model. The objective function maximizes the weighted sum of impacts across all goals and projects, considering their expected utility as well.

The weights  $W_{gi}$  ensure that projects contributing more to high-priority goals have a higher overall impact.

The selection variables  $P_j$  allow for choosing the best projects within the budget constraint  $B$ .

Proposed model is a tool to inform your decision-making, not a definitive answer. Human judgment and qualitative factors still play a vital role in crafting a successful Strategic Vision for your AI-powered innovations.

Developing a comprehensive framework of Syncretic Project Management is certainly challenging, as adaptability involves a blend of quantitative and qualitative factors.

Explore building a framework (Figure 2) using control theory and decision-making approaches.

This framework is a high-level conceptualization, and the specific model details will depend on your project context, available data, and preferred control strategies.

**Conclusions.** Syncretic management in the era of exponential AI growth demands a holistic and adaptable approach. By combining technical expertise, ethical considerations, strategic planning, and collaborative practices, organizations can effectively navigate the challenges and opportunities presented by the rapid evolution of artificial intelligence.

The syncretic management framework presented here provides a comprehensive strategy for navigating the challenges and opportunities associated with innovative projects in the era of exponential growth in artificial intelligence. By synthesizing interdisciplinary collaboration, agile methodologies, ethical considerations, and strategic planning, organizations can foster an environment conducive to successful AI-driven initiatives.

The emphasis on team diversity and continuous learning underscores the importance of adapting to rapidly evolving technologies and market landscapes. The ethical and responsible AI principles integrated into the framework prioritize not only technical advancements but also the impact on society and individuals, promoting a holistic and sustainable approach to AI development.

Strategic planning, including futurism and risk management, is essential for anticipating and addressing uncertainties inherent in the AI domain. Furthermore, the recognition of the need for regulatory compliance and legal expertise ensures that projects adhere to evolving standards, fostering trust and accountability.

The collaborative elements of the framework, such as strategic partnerships and open-source collaboration, emphasize the interconnected nature of the AI ecosystem. Leveraging external expertise and contributing to industry-wide initiatives accelerates innovation and fosters a collective approach to addressing common challenges.

Ultimately, the syncretic management approach advocates for a balance between technological advancement and ethical responsibility.

**System Representation.** Define the project as a dynamic system with states representing key performance indicators (KPIs) like progress, budget, resource utilization, and risk level. Model the project environment as a source of uncertainty and disturbances such as market changes, technological advancements, and unexpected obstacles.

**Control Mechanism** Implement a feedback loop where actual KPI values are compared to planned targets. Develop a decision-making function that analyzes deviations and proposes corrective actions based on Rule-based system: Predefined thresholds trigger specific adjustments (e.g., exceeding budget by 10% necessitates resource cuts). Bayesian inference: Update probability distributions for project outcomes based on new data and simulations, guiding strategic adaptations (e.g., adjusting project scope based

**Adaptation Strategies.** Define a set of feasible adaptation actions with associated costs and benefits, such as:

- Adjusting project scope or deliverables.
- Reallocating resources or changing team composition.
- Revising timelines or budgets.
- Adopting new technologies or approaches.

**Optimization Algorithm.** Use a stochastic optimization algorithm like a Markov Decision Process (MDP) or a Partially Observable MDP (POMDP) to choose the optimal adaptation strategy:

- The algorithm considers the cost of actions, potential future states, and uncertainty in the environment.
- It balances short-term goals (meeting immediate deadlines) with long-term project success (achieving overall objectives).

**Model Outputs.** Recommended adaptation actions: Suggestions for adjusting project plans, resource allocation, or strategies based on real-time data and projected outcomes. Risk mitigation strategies: Proactive plans to address potential disturbances based on simulations and updated risk assessments. Dynamic project forecasts: Continuously updated estimates of project completion time, resource needs, and potential challenges.

*Fig. 2. Developing a framework of Syncretic Project Management*

By incorporating these principles into the fabric of project management, organizations can not only harness the transformative power of AI but also contribute to a sustainable and inclusive AI future.

This framework is not a static solution but a dynamic guide, evolving alongside the AI landscape to ensure resilience and success in the face of unprecedented growth and change.

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*Стаття надійшла до редакції 20.01.2024*

**Посилання на статтю:** Бушуєв С.Д., Івко А.В. Синкретичне управління інноваційними проєктами в епоху розвитку ШІ: *Вісник Одеського національного морського університету*: Зб. наук. праць, 2024. № 1 (72). С. 117-130. DOI 10.47049/2226-1893-2024-1-117-130.

*Article received 20.01.2024*

**Reference a journalartic:** Bushuyev S.D., Ivko A.V. Syncretic management of innovative projects in the age of AI explosion: *Herald of the Odesa national maritime university*: Coll. scient. works, 2024. № 1 (72). 117-130. DOI 10.47049/2226-1893-2024-1-117-130.