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Strategic innovation management in the IT sector: The role of cloud computing and artificial intelligence in accelerating the development and implementation of new products

Strategiczne zarządzanie innowacjami w branży IT: rola chmury obliczeniowej i sztucznej inteligencji w przyspieszeniu rozwoju i wdrażaniu nowych produktów

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Abstract:
Research objectives and hypothesis/research questions
The study's main objective was to explore how cloud computing and AI jointly influence the speed and effectiveness of innovation processes in IT firms. Grounded in theories of strategic management, innovation capabilities, and technology adoption, the research tested two hypotheses: H1 – Cloud computing adoption significantly reduces time-to-market for new IT products by improving scalability, flexibility, and resource availability, H2 – AI integration significantly enhances innovation efficiency through automation, predictive analytics, and decision-support. These hypotheses reflected the assumption that cloud and AI act as dynamic capability enablers, supporting the facilitating and reconfiguring of innovation processes.
Research methods
A mixed-method approach was used to capture both measurable impacts and contextual insights. The quantitative component involved a structured survey of 20 IT professionals in management, engineering, and innovation roles. Additionally, five semi-structured interviews with project managers and innovation leads explored implementation challenges and synergy effects. Survey data were analyzed using descriptive statistics, while interview data were thematically coded to identify patterns related to benefits, barriers, and strategic implications.

Main results
Findings confirmed both hypotheses. Cloud computing reduced implementation time by 41-60%, especially during testing and integration, by eliminating hardware delays and enabling flexible resource use. AI improved innovation efficiency by 21-60%, particularly in data analysis, code generation, and quality assurance. Respondents noted that AI-driven automation and decision-support enhanced planning, risk assessment, and reduced rework. The combined use of cloud and AI was seen as highly synergistic, enabling rapid experimentation, agile development, and cost-effective scaling. However, challenges such as vendor lock-in, skills shortages, and data security concerns were also identified. Overall, the study shows that integrating cloud and AI enhances innovation capabilities and organizational agility in the IT sector.
Implications for theory and practice
This study contributes to strategic innovation management literature by showing how cloud and AI jointly function as dynamic capability enablers. It extends existing frameworks by analyzing these technologies not as isolated tools but as synergistic drivers of innovation. For practitioners, the findings highlight the strategic value of integrating cloud and AI to accelerate development, enhance agility, and improve decision-making. Organizations are encouraged to adopt multi-cloud strategies and AI-as-a-Service (AIaaS) models, invest in workforce upskilling, and implement governance frameworks to manage data security, compliance, and ethical AI use, to effectively respond to opportunities and challenges of rapidly developing digital innovations market.
Keywords: cloud computing, artificial intelligence, strategic innovation management, IT industry, digital transformation

Abstract:
Cel badań i hipotezy/pytania badawcze
Głównym celem badania było zidentyfikowanie wpływu łącznego zastosowania chmury obliczeniowej i AI na tempo oraz efektywność procesów innowacyjnych w firmach IT. Badanie osadzono w ramach teoretycznych zarządzania strategicznego, zdolności innowacyjnych oraz adopcji technologii. Sformułowano dwie hipotezy: H1 – wdrożenie chmury obliczeniowej istotnie skraca czas wprowadzenia nowych produktów IT na rynek przez zwiększenie skalowalności, elastyczności i dostępności zasobów, H2 – integracja AI z procesami innowacyjnymi znacząco podnosi ich efektywność dzięki automatyzacji, analizie predykcyjnej i systemom wspomagania decyzji. Hipotezy te odzwierciedliły założenie, że chmura i AI pełnią funkcję dynamicznych zdolności organizacyjnych, wspierających identyfikację, wykorzystanie i rekonfigurację możliwości innowacyjnych.
Metody badawcze
Zastosowano podejście mieszane, łączące metody ilościowe i jakościowe, aby uchwycić zarówno wymierne efekty, jak i kontekstowe uwarunkowania. Komponent ilościowy obejmował ankietę wśród 20 specjalistów IT zajmujących stanowiska kierownicze, inżynierskie i innowacyjne. Uzupełnieniem były wywiady półustrukturyzowane z pięcioma menedżerami projektów i liderami innowacji, koncentrujące się na wyzwaniach wdrożeniowych i efektach synergii. Dane ilościowe analizowano za pomocą statystyki opisowej, natomiast dane jakościowe poddano kodowaniu tematycznemu w celu identyfikacji powtarzających się wzorców dotyczących korzyści, barier i implikacji dla strategii organizacji.
Główne wyniki
Wyniki potwierdziły obie hipotezy. Rozwiązania chmury obliczeniowej skróciły czas wdrożenia o 41-60%, szczególnie w fazach testowania i integracji, eliminując opóźnienia sprzętowe i umożliwiając elastyczne zarządzanie zasobami. Rozwiązania AI zwiększyły efektywność procesów innowacyjnych o 21-60%, zwłaszcza w analizie danych, generowaniu kodu i zapewnianiu jakości. Respondenci wskazali, że automatyzacja i systemy wspomagania decyzji oparte na AI usprawniły planowanie, ocenę ryzyka i ograniczyły liczbę poprawek. Synergia chmury i AI umożliwiła szybkie eksperymentowanie, zwinny rozwój i skalowanie przy niższych kosztach. Zidentyfikowano również wyzwania, takie jak uzależnienie od dostawców, niedobory kompetencji oraz zagrożenia dla bezpieczeństwa danych. Badanie pokazuje, że strategiczna integracja chmury i AI wzmacnia zdolności innowacyjne i zwinność organizacyjną firm IT.
Implikacje dla teorii i praktyki
Badanie wnosi wkład do literatury z zakresu strategicznego zarządzania innowacjami, ukazując, w jaki sposób chmura obliczeniowa i AI wspólnie wspierają dynamiczne zdolności organizacji. Badanie poszerza

istniejące ramy teoretyczne, ukazując te technologie nie jako odrębne narzędzia, lecz jako wzajemnie wzmacniające się czynniki rozwoju innowacji. W ujęciu praktycznym wyniki podkreślają strategiczną wartość integracji chmury i AI dla przyspieszenia rozwoju produktów, zwiększenia zwinności pracy i poprawy jakości podejmowanych decyzji. Organizacje IT powinny wdrażać strategie multi-cloud i modele AI-as-a-Service (AIaaS), inwestować w rozwój kompetencji pracowników oraz tworzyć ramy zarządzania zapewniające bezpieczeństwo danych, zgodność z regulacjami i etyczne wykorzystanie AI, aby odpowiadać na szanse i wyzwania dynamicznie rozwijającego się rynku innowacji cyfrowych.
Słowa kluczowe: chmura obliczeniowa, sztuczna inteligencja, zarządzanie strategiczne innowacjami, branża IT, transformacja cyfrowa

Introduction

The theoretical framework of this study provides the conceptual basis for analysing the role of emerging technologies in strategic innovation management within the IT sector. Recent research emphasizes that digital transformation fundamentally reshapes innovation boundaries and requires organizations to develop dynamic digital capabilities to sustain competitiveness in turbulent environments (Qiu, Chang, 2025, pp. 1-3). In the information systems literature, generative AI is conceptualized as a class of models that create new content (text, image, audio) and, when embedded into sociotechnical systems, shifts automation from analysis toward creation, changing how organizations work and communicate (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 111-112). Its primary objective is to synthesize key perspectives on strategic management and innovation, while contextualizing them in light of technological enablers such as cloud computing and artificial intelligence (AI). The integration of these technologies not only accelerates innovation processes but also drives business model innovation, altering value creation and capture mechanisms across industries (Kanbach, Heiduk, Blueher et al., 2024, pp. 1190-1192). Generative AI enables content creation and advanced problem-solving, though its deployment raises ethical and security concerns (Uddin, Arfeen, Alanazi et al., 2025, pp. 1-2). Recent reviews show a dual impact of AI on innovation capabilities-AI requires a set of enabling capabilities while simultaneously enhancing existing ones; moreover, practical AI uses in innovation can be organized by the replace-reinforce-reveal taxonomy (Gama, Magistretti, 2023, pp. 76-79, 90-92). At the same time, systematic reviews indicate that AI adoption for innovation is driven by economic, technological, and social factors, while its outcomes span performance, organizational capabilities, and new product development (Mariani, Machado, Magrelli et al., 2022, pp. 2-3). Similarly, cloud computing has evolved beyond basic virtualization to embrace hybrid and multi-cloud strategies, AI-as-a-Service (AIaaS), and edge computing, reflecting its role as a foundational enabler of digital transformation (Omar, Mwankondo, 2024, pp. 102-104).

1. Theoretical background

1.1. Strategic innovation management – key concepts and relevance

The relevance of strategic innovation management (SIM) stems from its ability to integrate strategic intent with operational flexibility. In practice, this means aligning innovation initiatives with corporate objectives while maintaining the agility to respond to emerging opportunities and threats. Such alignment requires a systemic perspective that combines market intelligence, technological foresight, and organizational learning (Baruk, 2015, pp. 129-131). The interplay between these elements determines the company's capacity to anticipate change and leverage innovation as a strategic lever. Recent studies emphasize that cloud-enabled ecosystems and AI-driven platforms are central to sustaining SIM, as they combine scalability with advanced analytics while addressing interoperability and security challenges (Omar, Mwankondo, 2024, pp. 106-107). A sociotechnical lens underscores the rise of hybrid intelligence (human-AI teaming) and the growing agency of IT artifacts, implications that directly affect the design of innovation workflows and SIM practices (Feuerriegel, Hartmann, Janiesch et al., 2024, p. 116).

A distinctive feature of SIM is its reliance on dynamic capabilities-mechanisms that enable companies to sense technological trends, seize opportunities, and reconfigure resources accordingly. Operationally, enabling (e.g., functional competence, cybersecurity) and enhancing capabilities (e.g., ambidexterity, augmented decisionmaking) instantiate SIM under AI, linking strategic intent with operational flexibility (Gama, Magistretti, 2023, pp. 88-90). Recent studies emphasize that in digital contexts, these dynamic capabilities increasingly depend on the ability to integrate digital resources and reconfigure innovation processes, forming what is termed digital innovation dynamic capability (Qiu, Chang, 2025, pp. 4-5). These capabilities are particularly vital in the IT sector, where short product life cycles and rapid technological convergence demand continuous adaptation (Karlik, 2011, p. 30).

In summary, SIM is not merely about managing innovation projects; it is about embedding innovation into the strategic fabric of the organization. By integrating foresight, flexibility, and collaboration, SIM enables companies to navigate uncertainty and sustain competitive advantage in an era defined by technological disruption.

1.2. Cloud computing as a driver of innovation

Cloud computing has emerged as a transformative technology that fundamentally reshapes the way organizations develop, test, and deploy new solutions. Defined by the National Institute of Standards and Technology (NIST) as a model enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable

computing resources, it offers rapid provisioning and minimal management effort (Mell, Grance, 2011, p. 2; NIST, 2024). This model is characterized by five essential features: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service (Mell, Grance, 2011, p. 2). Empirical evidence indicates that cloud adoption delivers scalability, flexibility, and capital-expenditure reduction, thereby democratizing access to advanced computing capabilities for SMEs (Omoike, 2022, p. 502).

The strategic significance of cloud computing lies in its ability to provide scalable infrastructure and advanced tools without the need for heavy capital investment. As part of broader digital transformation initiatives, cloud platforms enable companies to reconfigure innovation processes and integrate external resources more effectively (Qiu, Chang, 2025, pp. 6-7). Organizations can dynamically allocate resources, ensuring flexibility and cost optimization, which is particularly critical in the IT sector where demand fluctuates rapidly (Golightly, Chang, Xu et al., 2022, pp. 2, 8). Cloud infrastructures enhance agility, shorten development cycles, and support distributed collaboration (Omoike, 2022, pp. 503-504). However, leveraging these benefits often depends on company's ability to integrate cloud platforms into innovation ecosystems, where digital platforms act as enablers of knowledge sharing and co-creation (Bertello, De Bernardi, Ricciardi, 2024, pp. 646-648). Emerging trends such as hybrid and multi-cloud environments, serverless architectures, and artificial intelligence as a service (AIaaS) further enhance flexibility and resilience, enabling organizations to optimize performance and reduce vendor lock-in risks (Omar, Mwankondo, 2024, pp. 105-106).

From an innovation perspective, cloud computing accelerates time-to-market by reducing the complexity of infrastructure management and enabling rapid experimentation. It fosters a culture of agility by lowering entry barriers for testing new ideas, thus supporting iterative development and fail-fast approaches (McKinsey & Company, 2021, p. 12). Hyperscale providers deliver infrastructures that support analytics, ML, and AI, reinforcing cloud's role in digital transformation (Red Hat, 2024b; McKinsey & Company, 2021, p. 12). This synergy is critical because cloud infrastructure provides the computational backbone for training large-scale AI models, making it indispensable for organizations seeking to leverage generative AI and advanced analytics (Uddin, Arfeen, Alanazi et al., 2025, pp. 2-3).

1.3. Artificial intelligence as a catalyst for innovation

Contemporary relevance of AI lies in its ability to process vast datasets, identify patterns, and support decision-making processes that exceed human cognitive capacity. Unlike traditional automation, which focuses on predefined tasks, AI introduces adaptive learning mechanisms through machine learning (ML), deep learning (DL), and generative AI (GenAI), enabling systems to improve performance over time without explicit programming (OpenAI, 2024; Google,

2024). From an information systems perspective, it is useful to distinguish three levels of GenAI-model, system, and application-connecting model architectures with infrastructure and user interfaces, and thus with the innovation process itself (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 112-114). Generative AI, in particular, extends these capabilities by enabling content creation, design generation, and advanced problem-solving, but its deployment raises concerns about ethics, intellectual property, and security (Uddin, Arfeen, Alanazi et al., 2025, pp. 3-4).

The strategic role of AI in innovation management is twofold. First, it accelerates the development and deployment of new products by automating repetitive and knowledge-intensive tasks. Moreover, AI strengthens company's dynamic innovation capabilities, allowing them to sense opportunities, reconfigure resources, and deliver personalized solutions in highly dynamic environments (Qiu, Chang, 2025, pp. 8-9). AI shapes innovation capabilities in two ways: it requires enabling capabilities (e.g., dataproject governance) and amplifies enhancing ones (e.g., augmented decisionmaking, process optimization, automated problem solving) (Gama, Magistretti, 2023, pp. 84-86, 88-90). Empirical evidence shows that AI-driven innovation initiatives increasingly rely on predictive analytics and decision-support systems, which improve risk assessment and resource allocation in complex projects (Nenni, De Felice, De Luca et al., 2025, pp. 1670-1672). The integration of AIaaS within cloud platforms accelerates this trend, democratizing access to advanced AI capabilities and fostering innovation across sectors (Omar, Mwankondo, 2024, pp. 106-107).This includes code generation, quality assurance, and predictive maintenance, which collectively reduce time-to-market and enhance product reliability (Karlik, 2011, p. 30). Second, AI enhances organizational decision-making by providing advanced analytics and forecasting capabilities, allowing companies to anticipate market trends and customer needs with greater precision (Baruk, 2015, pp. 129-131).

Concurrently, teams must manage model limitations - hallucinations, algorithmic bias, and verification challenges, which carry ethical and operational implications for innovation management (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 116-118).

The synergy between AI and cloud computing amplifies these benefits. Cloud platforms provide the computational power and storage capacity required for training complex AI models, while AI optimizes cloud resource allocation and operational efficiency (Red Hat, 2024a; McKinsey & Company, 2021, p. 12). This interdependence creates a scalable and cost-effective environment for experimentation, enabling organizations to pursue innovation initiatives without prohibitive infrastructure investments.

In summary, AI is not merely a technological tool but a strategic enabler that reshapes innovation management. By combining automation, predictive intelligence, and creative generation, AI empowers organizations to accelerate innovation cycles, optimize resource utilization, and deliver superior value propositions in increasingly competitive markets.

1.4. Synergy between cloud computing and artificial intelligence

The convergence of cloud computing and artificial intelligence (AI) represents a strategic inflection point in the evolution of digital innovation ecosystems. This convergence not only accelerates technological adoption but also strengthens company dynamic capabilities, enabling them to sense and seize opportunities in highly volatile environments (Qiu, Chang, 2025, pp. 10-11). While each technology independently accelerates innovation, their combined application creates a multiplier effect that significantly enhances organizational agility, scalability, and efficiency (McKinsey & Company, 2021, p. 12; Red Hat, 2024b). In practice, the cloud-AI nexus manifests through platformecosystem orchestration, where modular components, APIs, and data flows are integrated across the value chain to speed up discovery and delivery (Gama, Magistretti, 2023, pp. 88-89).

Cloud computing provides the computational infrastructure and elastic storage necessary for training and deploying advanced AI models. High-performance computing resources, previously accessible only to large enterprises, are now available on demand through hyperscale platforms such as Amazon Web Services, Microsoft Azure, and Google Cloud (Golightly, Chang, Xu et al., 2022, p. 2; Red Hat, 2024b). This democratization of computing power enables organizations of all sizes to experiment with AI-driven solutions without incurring prohibitive capital expenditures. However, the reliance on cloud for AI workloads introduces strategic challenges related to data security, governance, and ethical deployment, which require robust frameworks for responsible use (Uddin, Arfeen, Alanazi et al., 2025, pp. 5-6).

Conversely, AI optimizes cloud environments by automating resource allocation, predicting workload patterns, and enhancing cybersecurity through anomaly detection. This relationship reduces complexity and cost, enabling companies to focus on innovation over infrastructure (McKinsey& Company, 2021, p. 12). The synergy also accelerates contextbased knowledge sharing, improving the extraction, organization, and distribution of knowledge among ecosystem actors (Gama, Magistretti, 2023, p. 89). This integration aligns with innovation principles, as cloud-AI platforms enable distributed collaboration and reduce transaction costs in multi-actor ecosystems (Mariani, Machado, Magrelli et al., 2022, pp. 4-5; Bertello, De Bernardi, Ricciardi, 2024, pp. 646-648). The convergence of AIaaS and edge computing within cloud ecosystems further enhances real-time analytics and supports latency-sensitive applications, reinforcing the strategic value of this synergy (Omar, Mwankondo, 2024, pp. 106-108).

Strategically, cloud and AI should be integrated as interdependent innovation levers, not separate technologies. They enable companies to leverage ecosystem partnerships, co-create value, and respond swiftly to market dynamics-capabilities that are essential for sustaining competitive advantage in the digital economy (Baruk, 2015, pp. 129-131). At the engineering level, the system view of GenAI

entails integrating models with cloud infrastructure and continuous monitoring (e.g., retrieval, grounding and quality monitoring), which is critical for scalable deployments (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 115-116).

A comprehensive view should also acknowledge the sociotechnical nature of GenAI and the need to design for trust, explainability, and bias mitigation across the innovation lifecycle (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 116-118). In addition, the literature underscores that AI adoption for innovation is not only a technological shift but a strategic response to economic and social drivers, requiring alignment with dynamic capabilities and innovation strategies (Mariani, Machado, Magrelli et al., 2022, pp. 2-3; Bertello, De Bernardi, Ricciardi, 2024, pp. 634-636). Likewise, cloud computing trajectory toward hybrid, multi-cloud, and AI-integrated models highlights its dual role as both an operational enabler and a strategic lever for innovation (Omar, Mwankondo, 2024, pp. 104-106).

Building on the theoretical foundations discussed above, the empirical section of this study aims to examine two key assumptions derived from the literature. The first posits that leveraging cloud computing significantly shortens the innovation cycle by enabling organizations to design, test, and deploy new technological solutions with greater speed and efficiency. The second assumption suggests that the adoption of artificial intelligence contributes to measurable improvements in innovation processes by automating tasks and streamlining workflows within the development lifecycle.

The subsequent methodological chapter outlines the research design, data collection instruments, and analytical techniques applied to validate these assumptions and to explore the practical implications of cloud computing and AI for strategic innovation management in the IT sector.

2. Research design

This study employed a mixed-method research design that integrated a quantitative survey with qualitative semi-structured interviews. The rationale for this approach was to capture both measurable effects and contextual insights regarding the influence of cloud computing and artificial intelligence (AI) on strategic innovation management within IT companies.

Two hypotheses guided the investigation:

- H1: The adoption of cloud computing significantly reduces the time-to-market for new IT products by enhancing scalability, flexibility, and resources availability;
- H2: The integration of AI into innovation processes significantly improves process efficiency through automation, predictive analytics, and decision-support capabilities.

In this study, innovation processes in IT companies are understood as the set of activities involved in designing, developing, testing, and deploying new digital products or services. These processes typically encompass software engineering, integration, and maintenance workflows, supported by agile methods and digital platforms. This operationalization reflects the industry's emphasis on rapid prototyping, iterative development, and continuous delivery of incrementally built products and services. This operationalization aligns with prior research emphasizing iterative development and agile practices as core components of innovation in IT contexts (Gama, Magistretti, 2023; Qiu, Chang, 2025). The empirical scope encompassed a multi-vendor IT company operating in the DACH (Germany, Austria, Switzerland), region with a particular focus on organizations engaged in software development and digital services. Purposeful sampling used included employees from a provider employing approximately 500 staff and serving several dozen clients across diverse industries, including manufacturing, e-commerce, and finance. The company operated programming, implementation, and maintenance units, with most respondents based in Germany and working as consultants for multiple external organizations. This structure ensured exposure to varied technological contexts and strategic innovation practices, supporting the study's aim to capture cross-domain insights.

The quantitative component consisted of a survey administered to 20 employees representing IT management, software engineering, and innovation teams. Complementing this, five semi-structured interviews were conducted with project managers and innovation leads to explore implementation challenges and synergy effects between cloud and AI technologies. Data collection was carried out over a six-week period during the second quarter of 2025.

The survey instrument included closed-ended questions assessing the perceived impact of cloud computing and AI on innovation speed, cost efficiency, and process automation. The interviews addressed qualitative dimensions such as organizational readiness, integration barriers, and strategic implications.

For analysis, quantitative data were processed using descriptive statistics to evaluate perceived improvements in implementation time and process efficiency. Qualitative data were subjected to thematic coding, enabling the identification of recurring patterns related to benefits, barriers, and strategic implications of cloud-AI integration.

The subsequent section presents these findings in detail, highlighting both statistical and thematic insights derived from the research.

3. Results

The following section presents the empirical findings from the survey and interviews. The results are organized according to the two research hypotheses and include an additional analysis of the combined impact of cloud computing and AI, as well as the main challenges identified during these technologies implementation. Each subsection summarizes quantitative data and qualitative insights to provide a comprehensive view of the observed effects.

3.1. Effect of cloud computing on innovation speed and resource agility

The findings confirm that adopting cloud computing significantly accelerates the delivery of new IT products. Most respondents (85%) reported that using cloud platforms reduced implementation time by 41-60%, with nearly half indicating reductions close to the upper range. These gains were most visible during testing and integration phases, where delays caused by hardware procurement were eliminated. One IT project manager explained that "Cloud-based environments cut deployment phases almost in half". Scalability and flexibility were also highlighted as critical benefits. Respondents emphasized that flexible resource allocation allowed teams to adjust capacity instantly, supporting agile product development and rapid prototyping. Cost optimization was another major advantage, as 70% of participants noted that eliminating upfront hardware investments freed resources for innovation initiatives. These results demonstrate that cloud computing enhances scalability, flexibility, and resource availability, which collectively reduce time-to-market and strengthen organizational agility.

3.2. Effect of AI on innovation performance and decision support

AI integration into ways of working produced measurable improvements across multiple innovation activities. Almost all respondents (90%) reported efficiency gains between 21-60%, with more than a third indicating improvements above 50%. The most significant benefits were observed in data analysis (80%), code generation (65%), and quality assurance (55%). One software engineer stated that "AI-driven code generation reduced manual coding time by nearly 40%, allowing us to focus on architecture and testing". Beyond automation, AI also improved predictive analytics and decision-making. 65% of respondents cited decision-support systems as essential for better project planning and risk assessment. Interviewees confirmed that AI tools reduced rework cycles and improved error detection, helping teams prevent failures before they reached production. These findings show that AI not only automates repetitive tasks but also strengthens decision-making capabilities, aligning with the hypothesis that it improves innovation performance through automation, predictive analytics, and decision support.

3.3. Combined impact: synergy of cloud and AI on innovation outcomes

The combined use of cloud computing and AI was perceived as a major driver of innovation. Four out of five respondents outlined that the synergy effect awas "very significant". They emphasized that cloud platforms provided the scalability needed for AI workloads, while AI services delivered through the cloud allowed experimentation without heavy upfront investment. One innovation lead noted that "AI-as-a-Service enabled rapid testing of advanced models", while another explained that spinning up an AI environment in minutes supported agile development and continuous delivery. This synergy creates a flexible and collaborative environment that accelerates innovation and reduces transaction costs, confirming the theoretical expectation that cloud-AI integration amplifies the benefits of each technology.

3.4. Implementation challenges and organizational readiness

Despite the positive impact, several challenges were reported. Vendor lock-in was mentioned by more than half of respondents (55%), who expressed concerns about dependency on a single provider of cloud, or AI technology solutions. Workforce upskilling was another recurring issue, as many organizations lack the specialized skills required for AI adoption. One interviewee stated that this skills gap slows down full-scale deployment. Data security and compliance were also highlighted by 60% of participants, particularly in relation to sensitive customer data and regulatory requirements. These challenges underline the need for governance frameworks and risk management strategies to ensure sustainable adoption of cloud and AI technologies.

4. Discussions

These findings are consistent with prior research emphasizing the role of cloud computing in accelerating innovation cycles and enhancing organizational agility (Omoike, 2022; Golightly, Chang, Xu et al., 2022). Similarly, the observed impact of AI on process automation and decision support aligns with studies highlighting its contribution to dynamic innovation capabilities and predictive analytics in complex environments (Gama, Magistretti, 2023; Nenni, De Felice, De Luca et al., 2025).

The effect of cloud computing on innovation speed and resource agility is clearly demonstrated by the empirical evidence showing that adoption of cloud platforms reduces implementation time by up to 60%. This outcome confirms the role of cloud as a dynamic capability enabler, allowing organizations to reconfigure resources rapidly and respond to fluctuating demands. Scalability, flexibility, and elastic resource allocation translate into shorter development and deployment cycles, supporting the theoretical view that cloud infrastructures underpin agility

and operational resilience (Omoike, 2022, pp. 502-504; Golightly, Chang, Xu et al., 2022, pp. 2, 8; Qiu, Chang, 2025, pp. 1-3). The ability to eliminate hardware-related delays and enable on-demand provisioning reflects the orchestration of digital platforms anticipated in research on platform ecosystems (Gama, Magistretti, 2023, pp. 88-89; Omar, Mwankondo, 2024, pp. 104-106).

Usage of artificial intelligence technology solutions also demonstrated a strong influence on innovation performance and decision support. Reported efficiency gains of 21-60% across data analysis, code generation, and quality assurance validated the theoretical claim that AI strengthens both enabling and enhancing capabilities (Gama, Magistretti, 2023, pp. 84-90). These findings confirm the importance of predictive analytics and decision-support systems in improving planning and risk assessment, following a three-role approach - automating routine tasks, supporting decision-making, and uncovering new insights, as well as the model-system-application perspective (Mariani, Machado, Magrelli et al., 2022, pp. 2-3; Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 112-114). By reducing rework cycles and improving error detection, AI augments human judgment and accelerates problem-solving in complex innovation environments.

The combined impact of cloud and AI on innovation outcomes further reinforces the theoretical expectation that these technologies are mutually reinforcing. Cloud platforms provide the computational backbone for AI workloads, while AI optimizes resource allocation and enhances the value of cloud services (Golightly, Chang, Xu et al., 2022, p. 2; Omar, Mwankondo, 2024, pp. 106-108). This integration enables rapid experimentation through AI-as-a-Service and supports agile development practices, confirming the role of platform ecosystem orchestration and open innovation principles in accelerating knowledge flows and reducing transaction costs (Gama, Magistretti, 2023, pp. 88-89; Bertello, De Bernardi, Ricciardi, 2024, pp. 634-636).

Governance, risk, and socio-technical alignment emerge as critical considerations in the adoption process. Challenges such as vendor lock-in, workforce upskilling, and data security reflect the socio-technical nature of digital transformation. These issues underscore the need for governance frameworks that ensure compliance, trust, and ethical AI deployment (Feuerriegel, Hartmann, Janiesch et al., 2024, pp. 116-118; Uddin, Arfeen, Alanazi et al., 2025, pp. 3-4). The skills gap identified in interviews highlights the importance of capability development as a prerequisite for realizing the full benefits of cloud and AI integration (Qiu, Chang, 2025, pp. 4-5).

Conclusions and final remarks

The theoretical contribution of this study lies in illustrating how cloud computing and artificial intelligence jointly influence strategic innovation management in the digital economy. The findings confirm that cloud computing functions as a dynamic

capability enabler by providing scalability, flexibility, and resource elasticity, which collectively accelerate time-to-market for new IT products. Concurrently, artificial intelligence enhances enabling and augmenting capabilities through automation, predictive analytics, and decision-support systems, thereby improving innovation performance and decision quality. By empirically demonstrating the acceleration of innovation processes and the complementary roles of cloud computing and AI, this study enriches existing frameworks on dynamic capabilities by showing how resource flexibility and AI-driven decision support jointly enable sensing, seizing, and reconfiguring activities. Furthermore, the research contributes to understanding project-level risk management by highlighting the growing role of predictive analytics and decision-support tools in planning and risk assessment, extending the literature on operational risk control and hybrid intelligence.

From a strategic perspective, the results indicate that cloud and AI operate most effectively when treated as interdependent levers for innovation rather than isolated technologies. Their combined application fosters agility, accelerates product development, and enables data-driven decision-making, capabilities that are increasingly critical for sustaining competitiveness in dynamic markets. For IT organizations, these insights underscore the relevance of integrating cloud and AI within long-term innovation strategies and aligning technological adoption with ecosystem partnerships to enhance value creation and organizational resilience.

The managerial implications of the study refer to preliminary indications that flexible architectures integrating multi-cloud strategies with AI-as-a-Service (AIaaS) may support organizational agility and reduce vendor dependency. However, these insights are derived from a limited sample and should not be generalized without caution. Future research involving a broader and more diverse set of IT organizations is essential to validate whether such approaches consistently deliver the anticipated benefits. Similarly, the observed need for capability development in areas such as data engineering, machine learning operations, and cloud governance requires further empirical examination. Additional studies should also assess the effectiveness of governance frameworks for compliance, security, and ethical AI deployment, as well as the integration of predictive analytics into decision-making processes across varied organizational contexts. The study has several limitations. It relies on self-reported perceptions from a relatively small sample of representatives of IT companies in the DACH region, which limit the generalizability of the findings. The reliance on a single multi-vendor IT provider, despite its organizational size, type of functional units, and diverse customer base constrains the transferability of results to organizations with different structural or market characteristics. The research captures a single point in time and does not reflect how the effects of cloud and AI adoption might evolve as organizational capabilities mature. Furthermore, the absence of objective performance indicators, such as actual cycle times or defect rates, constrains the robustness of the conclusions and calls for complementary studies using longitudinal and quantitative performance data.

Future research should address these limitations by incorporating objective performance indicators and exploring variations across industries and regions. Longitudinal studies could provide insights into the evolution of capabilities and innovation outcomes over time. Further work should also examine emerging architectures such as edge computing and quantum-cloud integration for real-time AI applications, as well as the ethical and sustainability dimensions of large-scale cloud and AI deployments in product innovation environments.

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