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PROMPT COMPETENCIES IN AI-DRIVEN MANAGEMENT: A LITERATURE REVIEW AND THEORETICAL MODEL FOR DIGITAL TRANSFORMATION

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This study examines prompt competence as an emerging managerial capability supporting purposeful and critical interaction with generative artificial intelligence. It aims to distinguish prompt competence from prompt engineering, digital competence, and AI literacy and to develop a theoretical model linking its antecedents with AI-supported managerial decision-making and organizational outcomes. A systematic review of Scopus and Web of Science records was updated on 1 September 2026.

The search retrieved 891 records. After excluding two records assigned to 2027 and consolidating 56 duplicates, 833 unique titles and abstracts were screened, of which 466 were included in the broad analytical corpus. Bibliometric mapping was combined with structured, non-exclusive thematic coding, with particular attention paid to 44 prompting-related publications, including five explicitly addressing prompt competence. Because 2026 was incomplete, records from that year were treated as a partial qualitative snapshot rather than a complete annual dataset.

While the literature on AI-enabled management is extensive, research directly conceptualizing prompt competence remains limited and fragmented. The synthesis suggests that prompt competence may support managerial problem formulation, contextualization, alternative generation, and output verification. Its potential relationships with innovation and

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organizational effectiveness appear indirect and contingent on domain knowledge, data quality, digital maturity, organizational learning, and AI governance.

The study conceptualizes prompt competence as a distinct, multidimensional managerial capability within AI-enabled management and digital transformation and proposes a framework for its future measurement and empirical testing.

Keywords: management, innovation, digital transformation, artificial intelligence, prompt engineering, prompt competencies

1. INTRODUCTION

Prompt competencies (PCs) refer to the ability to formulate effective prompts for AI interaction and are becoming increasingly relevant with the diffusion of GenAI in organizations (Noy, Zhang, 2023). Effective prompting involves adapting inputs to obtain contextually appropriate outputs (Liu et al., 2023), while advanced techniques can further improve their accuracy and consistency (Tang et al., 2022).

Combined with domain knowledge, prompting can support faster and more accurate decision-making from limited data (Korzyński et al., 2023; Nazary et al., 2024), real-time analysis (Bai et al., 2024), and access to information and recommendations (Taherdoost, Madanchian, 2023; Fakfare et al., 2025; Garg et al., 2025). However, effective AI-supported decisions still require contextualization and human judgment (Cruz, 2024).

Despite growing interest in prompting, theoretical models of PCs in management remain limited. Research focuses mainly on technical prompt-engineering applications (Desmond, Brachman, 2024) and often lacks standardized theoretical frameworks (Debnath et al., 2026). GenAI literacy models treat prompt engineering as one of several AI competencies (Annapureddy et al., 2025), while broader AI competency frameworks do not specifically conceptualize PCs in management (Valencia-Barrero, 2026; Asemota, 2026). Research has also focused largely on education (Bozkurt, Sharma, 2023; Knoth et al., 2024), including ethical aspects of prompting (Rana et al., 2024), leaving managerial and organizational contexts underexplored.

This study addresses this gap by conceptualizing PCs as a distinct managerial competency domain and identifying their dimensions in organizational GenAI use. It aims to develop a theoretical model explaining the role of PCs in AI-enabled management.

Accordingly, the following research questions are formulated:

RQ1. What are the sources and determinants of competencies required for effective GenAI use?

RQ2. How do PCs affect managerial decision-making quality?

RQ3. How does prompting mediate the relationship between AI use and business performance?

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RQ4. What future research is needed to better understand the role of PCs in managerial decision-making, organizational effectiveness, and innovation?

2. LITERATURE REVIEW

From AI-enabled management to prompt competencies

The rapid development of GenAI and LLMs is part of the broader digital transformation reshaping organizational processes, managerial practices, and knowledge work (Verhoef et al., 2021; Noy, Zhang, 2023; Dell'Acqua et al., 2026). Consequently, organizations increasingly require competencies for effective and critical interaction with AI (Long, Magerko, 2020; Ng et al., 2021). A key element of this interaction is the prompt, whose formulation affects the quality and relevance of AI-generated outputs (Sahoo et al., 2024).

Digital competence involves the confident, critical, responsible, and safe use of digital technologies (Vuorikari et al., 2022). In AI-enabled environments, this is complemented by AI literacy, which supports understanding and evaluating AI (Long, Magerko, 2020; Ng et al., 2021); data literacy, which enables data interpretation and evaluation (Mandinach, Gummer, 2013); algorithmic thinking, which supports structured problem-solving (Futschek, 2006); and decision intelligence, which integrates data, technology, and human judgment (Pratt, 2019).

In this study, prompt competencies (PCs) refer to the knowledge, skills, and abilities required to formulate, contextualize, and refine prompts and critically evaluate AI-generated outputs to achieve task- or decision-related objectives. This conceptualization draws on GenAI literacy (Annapureddy et al., 2025) but extends beyond prompt engineering, which primarily concerns prompt design and optimization (Sahoo et al., 2024; Liu et al., 2026). PCs additionally involve contextual understanding, awareness of AI capabilities and limitations, and critical output evaluation (Annapureddy et al., 2025). Korzyński et al. (2023) similarly conceptualize AI prompt engineering as a digital competence involving clear instructions, specification of expected outputs, contextualization, refinement, and links with data literacy, communication, content creation, and problem-solving. Thus, PCs integrate digital, analytical, linguistic, and contextual capabilities for purposeful GenAI interaction.

PCs in managerial decision-making

Managerial competencies enable managers to perform their roles effectively and contribute to organizational performance (Grenda, Palmunen, 2026), encompassing cognitive, interpersonal, leadership, analytical, and task-related capabilities (Tyrańska, 2017). As AI becomes embedded in managerial work, these

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competencies increasingly involve effective human – AI collaboration (Hillebrand et al., 2025; Kolbjørnsrud, 2024), positioning PCs as a complementary managerial capability.

Managerial decision-making involves identifying and interpreting problems or opportunities, evaluating alternatives, selecting solutions, and assessing their implementation (Schulte, Kanbach, 2026). While GenAI can support these stages, effective use requires awareness of AI limitations and critical evaluation of outputs (Dell'Acqua et al., 2026). AI can improve efficiency and decision quality while creating ethical, integration, and competency challenges (Brynjolfsson, McAfee, 2017; Mikalef, Gupta, 2021; Noy, Zhang, 2023). Its managerial applications include decision support, operational efficiency, knowledge management, marketing, logistics, finance, and project management (Sanchez et al., 2020; Perifanis, Kitsios, 2023; Taherdoost, Madanchian, 2023; Ziakis, 2023; Woschank, 2020; Ridzuan, 2024; Taboada et al., 2023).

Because prompt structure affects model outputs (Knoth et al., 2024; Perifanis, Kitsios, 2023; He et al., 2024), PCs may improve AI-supported decisions by enabling managers to specify problems, provide relevant context, explore alternatives, and critically evaluate results (Korzyński et al., 2023; Giachino et al., 2025).

The role of AI and prompt competencies in innovation

Innovation involves implementing new or significantly improved products or business processes (OECD/Eurostat, 2018). GenAI can foster the generation, evaluation and refinement of ideas, expanding the solution space in divergent and convergent ideation (Shaer et al., 2024). PCs may facilitate these processes by enabling more purposeful and critical interaction with GenAI.

PC development may depend on technological, data analytics, and AI model optimization knowledge (Dwivedi et al., 2021; Wamba et al., 2015; Liu et al., 2023; Tang et al., 2022). These capabilities understand model limitations, evaluate data, and align AI interaction with analytical objectives (Shrestha et al., 2019; Chen et al., 2012; Marvin et al., 2024). Their development is further shaped by digital transformation, as organizational digitalization, GenAI access, AI-supported workflows, and data-driven management create conditions for prompt-related capabilities (Verhoef et al., 2021).

PCs and organizational effectiveness

Organizational effectiveness concerns achieving strategic goals, using resources effectively, and adapting to environmental change, extending beyond financial performance to internal processes, adaptability, and stakeholder outcomes (Negi et al., 2025). In AI-enabled organizations, it depends partly on combining technological

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resources, human competencies, and task requirements (Przegalinska et al., 2025). AI can contribute to productivity, decision quality, new product development, adaptability, and innovation (McAfee, Brynjolfsson, 2017; Sjödin et al., 2021; Giachino et al., 2025; Dwivedi et al., 2021; Haefner et al., 2021).

AI also facilitates process-, product-, organizational-, and marketing innovation through automation, data analysis, human – AI collaboration, and personalization (Kitsios, Kamariotou, 2021; Haefner et al., 2021; Huang, Rust, 2018; Sjödin et al., 2021; Ziakis, 2023). PCs may help translate these capabilities into organizational outcomes by improving the contextualization, refinement, and critical evaluation of GenAI interactions.

Overall, digital transformation and GenAI create new competency requirements. Digital, AI, data, and related competencies provide the foundation for AI use, while PCs specifically enable purposeful and critical GenAI interaction. In managerial settings, PCs may support decision-making and innovation, thereby contributing to organizational effectiveness.

3. RESEARCH METHODS

This study combined a systematic literature review with bibliometric mapping and structured thematic analysis of titles and abstracts. Scopus and Web of Science were searched on 20 January 2025 and updated on 1 September 2026 using database-adapted combinations of AI/GenAI, prompting, competence, management, and decision-making terms (Graczyk-Kucharska et al., 2025).

Two temporal layers were used: 1990-2019 for theoretical background and 2020-2021 September 2026 for GenAI and prompting. Because 2026 was incomplete, it was treated as a partial snapshot and excluded from comparisons of annual growth and citations; indexing delays may also affect coverage.

Eligible records were English-language journal articles relevant to management, organizations, decisions, competencies, prompting, innovation, or organizational outcomes. Technical, medical, educational, mathematical, and engineering studies were retained only when titles or abstracts indicated transferable managerial implications. Conference papers, book chapters, editorials, preprints, and purely technical model studies were excluded. Background sources were not necessarily part of the analytical corpus, and citation counts were not eligibility criteria.

Searches retrieved 891 records (Scopus query 1: 187; Scopus query 2: 368; WoS: 336). Two records dated 2027 were removed and 56 duplicates consolidated, leaving 833 unique records for title-and-abstract screening. After 367 exclusions, 466 publications formed the broad analytical corpus; 44 addressed prompting or prompt engineering and five explicitly linked prompting with competence or skills (fig. 1).

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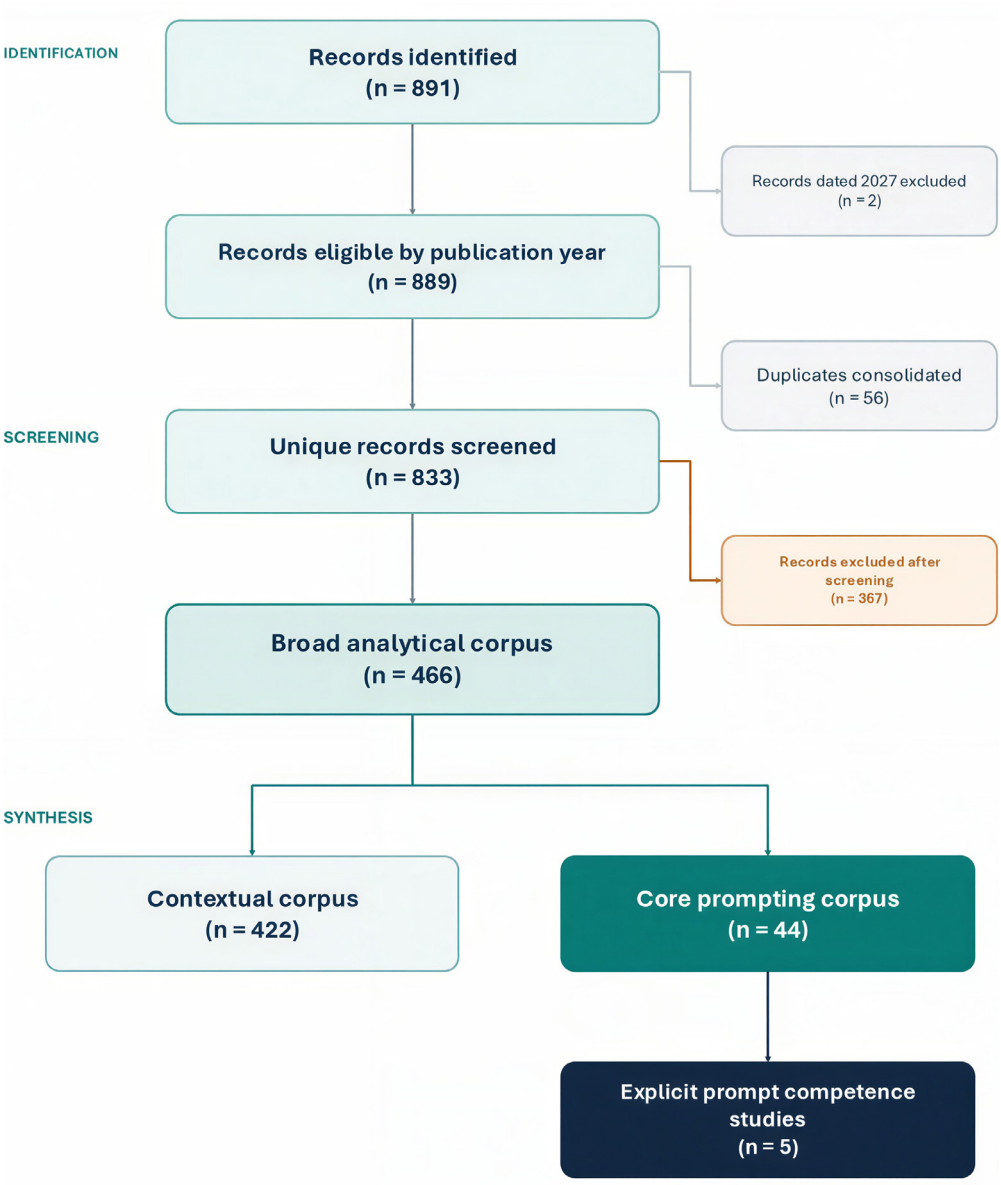


Fig. 1. Study selection and analytical corpus (original work)

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The analysis comprised two stages. First, VOSviewer keyword co-occurrence mapping was applied to the 833-record corpus using full counting, association-strength normalization, and a minimum occurrence threshold of five; 246 of 5,298 keywords met the threshold. Proximity and links were interpreted descriptively, not causally.

Second, all 833 records were screened against predefined criteria and assigned to non-exclusive categories aligned with the research questions. A rule-based dictionary distinguished technical from unrelated uses of "prompt" and "prompting," and classifications were verified against titles and abstracts. The 44 prompting records, including five explicit competence studies, were synthesized with contextual literature to define the construct, dimensions, and propositions. Frequencies indicate thematic occurrence, not effects.

An explainable rule-based script and ChatGPT (OpenAI) supported screening, preliminary classification, and technical diagram preparation. The authors verified the outputs and retained responsibility for all inclusion, classification, interpretation, and reporting decisions.

4. RESULTS

The updated co-occurrence map shows a dense, multi-cluster field centered on artificial intelligence and generative artificial intelligence (fig. 2). Management, decision-making, performance, and strategy form a prominent organizational stream, while ChatGPT, knowledge management, ethics, and human – AI collaboration connect managerial and technological research. Further areas concern decision-support systems and risk assessment; large language models, natural-language processing, and interpretability; education and training; and machine learning, digital transformation, sustainability, supply chains, and optimization. Prompt engineering is connected to the center but remains a smaller node than the broad AI and management terms, suggesting an emerging rather than dominant standalone stream. Cluster membership indicates thematic proximity only.

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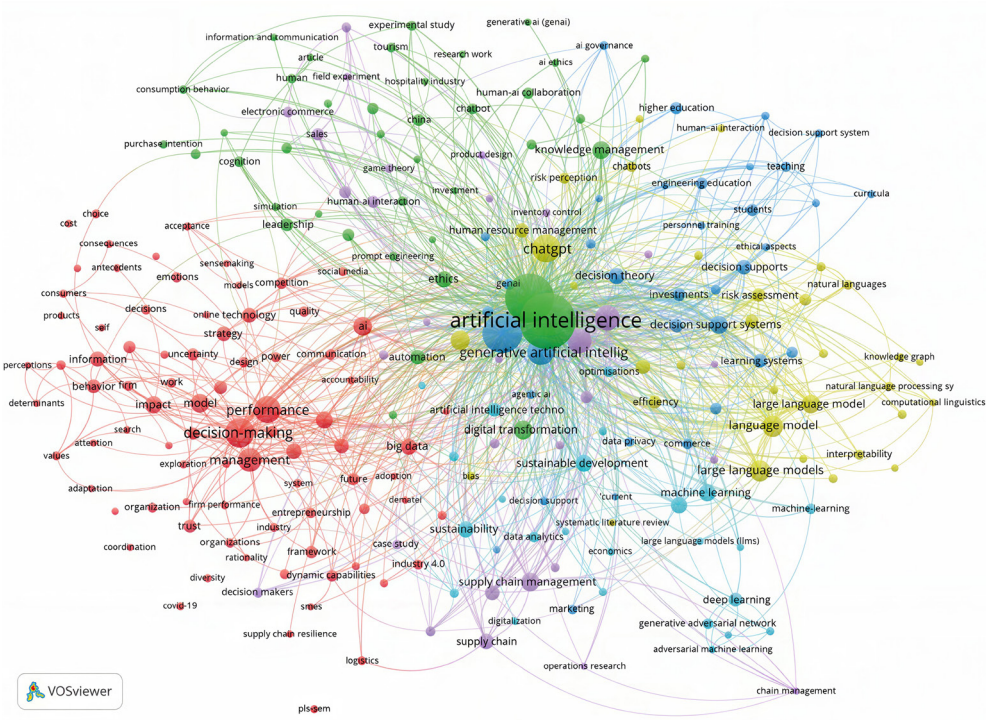


Fig. 2. Keyword co-occurrence network for the 833 unique screened records (original work)

The non-exclusive coding showed that 445 of 466 publications addressed AI/GenAI, 401 management and organizations, 291 decision-making, 177 competencies and skills, 162 ethics, risk, or governance, and 151 innovation. Digital transformation appeared in 64 records, organizational effectiveness in 62, human – AI interaction in 56, prompting or prompt engineering in 44, AI literacy in 11, and explicit prompt competence or skills in five (tab. 1).

Within the 44 prompting records, 35 linked prompting with management, 26 with decision-making, ten with innovation, three with organizational effectiveness, and three with antecedents of prompt competence. Because the categories were non-exclusive and derived from titles, abstracts, and keywords, these counts indicate thematic occurrence rather than effects or causal relationships.

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Table 1. Selected non-exclusive thematic categories in the analytical corpus

Category	Records (n)
AI/GenAI	445
Management and organizations	401
Managerial decision-making	291
Competencies and skills	177
Ethics, risk and governance	162
Innovation	151
Optimization and model refinement	118
Digital transformation	64
Organizational effectiveness	62
Human – AI interaction	56
Prompting/prompt engineering	44
Explicit prompt competence/skills	5

Source: original work based on literature analysis.

Integrating the bibliometric and thematic evidence yielded a model in which individual antecedents – digital competence, AI and data literacy, domain knowledge, and analytical reasoning – and organizational enablers – access, purposeful GenAI use, training, and feedback – support prompt competence. Prompt competence comprises problem formulation, clarity, contextualization, iterative refinement, output verification, and ethical awareness and is expected to enhance AI-supported decision-process quality. Innovation and organizational effectiveness are distal outcomes, whereas digital maturity, data quality, organizational learning, and AI governance are contextual conditions rather than direct results of prompt competence.

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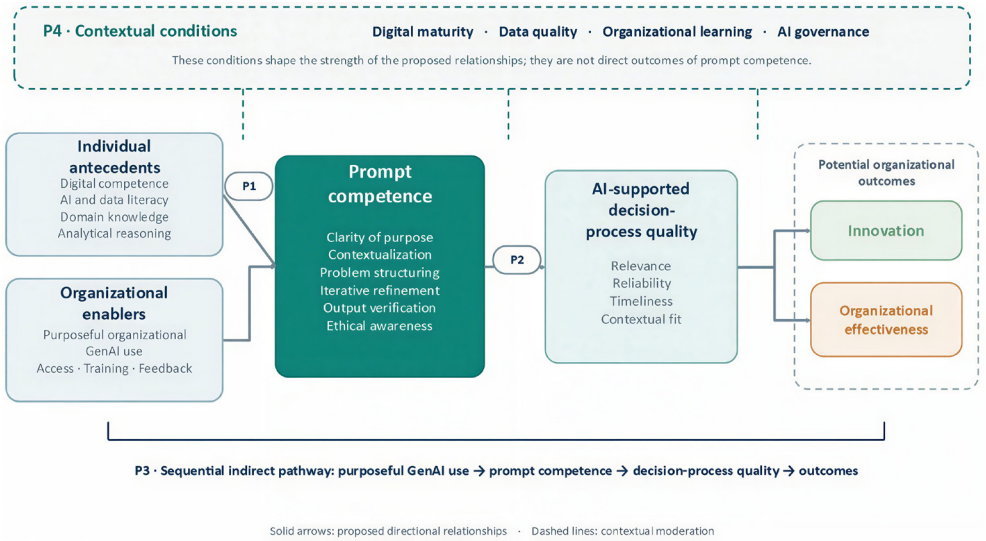


Fig. 3. Proposed model of prompt competence, AI-supported decision-process quality, and organizational outcomes (original work based on literature analysis)

Based on the literature synthesis, four research propositions were formulated:

P1: Managers' digital competence, AI and data literacy, domain knowledge, and analytical reasoning are positively associated with the development of prompt competence.

This proposition addresses RQ1 by identifying digital, analytical, and domain-related capabilities as antecedents of prompt competence. Prompting is therefore treated as an emerging managerial digital capability rather than an isolated technical skill (Korzyński et al., 2023).

P2: Prompt competence is positively associated with the effectiveness of AI-supported managerial decision-making.

This proposition addresses RQ2. Prompt competence may support decision-making by improving problem formulation, contextualization, the generation of alternatives, and output verification. Its role may differ between strategic decisions, where AI is primarily used for exploration and scenario development, and operational decisions, where it may support efficiency and standardization. Prompt protocols can structure human–AI interaction without replacing managerial judgement (Robertson et al., 2024).

P3: Prompt competence and AI-supported decision-process quality form a sequential indirect pathway between purposeful organizational GenAI use and innovation and organizational effectiveness.

This proposition addresses RQ3 by linking decision processes with innovation outcomes. More effective use of information and decision alternatives may facilitate

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process, product, organizational, and marketing innovations, subject to organizational learning and complementary resources (Haefner et al., 2021).

P4: The strength of these relationships depends on digital maturity, data quality, organizational learning, and AI governance.

This proposition identifies contextual conditions that shape the proposed relationships and therefore informs RQ4. Digital competencies are not assumed to generate innovation automatically; their value depends on managers' effective GenAI use and integration of outputs into organizational decisions. However, these relationships require empirical verification.

Prompt competence was conceptualized through six proposed dimensions: clarity of purpose, contextualization, problem structuring, output quality control, iterative refinement, and ethical awareness (tab. 2). These dimensions reflect the ability to formulate instructions, incorporate organizational context, decompose problems, verify outputs, refine prompts iteratively, and consider the consequences of AI-assisted decisions. The illustrative indicators provide a basis for future scale development but require empirical validation.

Table 2. Conceptual dimensions and illustrative indicators of prompt competence

Dimension	Sample indicator	Source
Clarity of purpose	Precise specification of the objective and the expected response format	Korzyński et al. (2023); Noy, Zhang (2023)
Contextualization	Incorporation of organizational and industry-specific context	Nazary et al. (2024); Bai et al. (2024)
Problem structuring	Decomposition of complex tasks into sequential steps	Nazary et al. (2024); Tang et al. (2022); Bai et al. (2024)
Quality control	Verification of assumptions and consideration of alternative scenarios	Sclar et al. (2024); Cruz (2024)
Iterative refinement	Refinement of prompts based on generated outputs	Tang et al. (2022); Knoth et al. (2024)
Ethics	Consideration of neutrality and responsibility	Rana et al. (2024)

Source: original work based on literature analysis.

Digital competence resources are represented by technological knowledge, Big Data knowledge, and knowledge of modeling and optimization. Managerial decision effectiveness concerns the quality, relevance, and timeliness of decisions rather than decision speed alone. Innovation effectiveness refers to the organization's ability to implement product, process, organizational, or marketing innovations. These indicators provide an initial basis for developing measurement scales, but their reliability and validity must be established in future empirical research.

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5. DISCUSSION

The review indicates that effective managerial GenAI use requires task formulation, contextualization, iterative refinement, output verification, and integration with domain knowledge; however, prompt competence remains rarely measured independently (Reicho et al., 2026). The proposed relationships are therefore theoretical rather than causal.

Prompt competence is related to but distinct from digital competence, AI literacy, data literacy, algorithmic thinking, and decision intelligence. Cross-national evidence from 27 EU countries indicates that stronger digital competencies are associated with more favorable perceptions of workplace AI, whereas prior digital experience plays a weaker and conditional role (Piotrowski, Revtiuk, 2026). Prompt competence builds on this broader foundation but specifically concerns formulating, contextualizing, refining, and critically evaluating GenAI interactions, extending prompting from a technical practice to a managerial digital capability (Korzyński et al., 2023; Knoth et al., 2024).

It may improve problem definition, criteria specification, alternative generation, and output verification. However, value depends on combining human and technological capabilities (Shrestha et al., 2019); prompt protocols cannot replace domain knowledge, contextual judgement, or accountability (Robertson et al., 2024; Pompei et al., 2026). Prompt complexity or frequent AI use alone does not demonstrate better decisions.

Likewise, idea generation does not automatically produce innovation or organizational effectiveness. Outcomes depend on implementation, learning, complementary resources, data quality, digital maturity, governance, and collective verification (Haefner et al., 2021). The study therefore positions prompt competence as an enabling managerial capability. Organizations should combine prompt training with output verification, bias recognition, data protection, and accountability. Research should develop validated measures and test the model experimentally, longitudinally, and across organizational levels.

6. CONCLUSIONS

This study conceptualizes prompt competence as a distinct managerial capability involving the formulation, contextualization, iterative refinement, and critical evaluation of GenAI interactions. Drawing on digital competence, AI literacy, data literacy, and decision intelligence, it specifically concerns the purposeful use of GenAI in managerial tasks and decisions.

The proposed framework suggests that prompt competence may support decision-making by improving problem formulation, broadening the generation of alternatives, and enabling verification of AI outputs. However, its potential influence on

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innovation and organizational effectiveness is indirect and depends on factors such as domain knowledge, data quality, digital maturity, organizational learning, and AI governance. The model should therefore be treated as a theoretical foundation for further research rather than as confirmation of causal relationships.

From a managerial perspective, organizations should develop prompt competence as part of broader AI capability-building initiatives. Training should extend beyond prompt templates and include critical evaluation, bias recognition, data protection, and accountability for AI-assisted decisions.

The study is limited by the emerging and predominantly conceptual literature. Future research should develop a validated scale and test the proposed relationships using experimental, longitudinal, and multilevel designs to establish when prompt competence contributes to decision quality, innovation, and organizational effectiveness.

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KOMPETENCJE PROMPTOWE W ZARZĄDZANIU OPARTYM NA SZTUCZNEJ INTELIGENCJI: PRZEGLĄD LITERATURY I MODEL TEORETYCZNY DLA TRANSFORMACJI CYFROWEJ

Streszczenie

Celem badania jest analiza kompetencji promptowania jako wyłaniającej się kompetencji menedżerskiej wspierającej celową i krytyczną interakcję z generatywną sztuczną inteligencją. W artykule odróżniono kompetencję promptowania od inżynierii promptów, kompetencji cyfrowych i kompetencji w zakresie AI oraz zaproponowano model teoretyczny łączący jej uwarunkowania z podejmowaniem decyzji menedżerskich wspieranym przez AI i efektami organizacyjnymi.

Systematyczny przegląd literatury w bazach Scopus i Web of Science zaktualizowano 1 września 2026 r. Uzyskano 891 rekordów. Po wykluczeniu dwóch publikacji przypisanych do 2027 r. i usunięciu 56 duplikatów analizie poddano 833 unikatowe tytuły i abstrakty, z których 466 włączono do szerokiego korpusu analitycznego. Mapowanie bibliometryczne połączono z ustrukturyzowanym, niewykluczającym kodowaniem tematycznym, ze szczególnym uwzględnieniem 44 publikacji dotyczących promptowania, w tym 5 odnoszących się bezpośrednio do kompetencji promptowania.

Badania nad zarządzaniem wspieranym przez AI są rozwinięte, natomiast literatura bezpośrednio konceptualizująca kompetencję promptowania pozostaje ograniczona i rozproszona. Synteza wskazuje, że może ona wspierać formułowanie problemów, kontekstualizację, generowanie alternatyw i weryfikację wyników. Jej wpływ na innowacyjność i efektywność organizacyjną ma prawdopodobnie charakter pośredni i zależny od wiedzy dziedzinowej, jakości danych, dojrzałości cyfrowej, uczenia się organizacyjnego i ładu AI.

Badanie ujmuje kompetencję promptowania jako odrębną, wielowymiarową kompetencję menedżerską i proponuje ramy jej przyszłego pomiaru oraz empirycznej weryfikacji.

Słowa kluczowe: zarządzanie, innowacje, sztuczna inteligencja, transformacja cyfrowa, kompetencje promptowania, inżynieria promptu

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