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COMPETENCY MAPPING FOR MANAGERIAL CANDIDATES IN THE AGE OF ARTIFICIAL INTELLIGENCE: A THEORETICAL FRAMEWORK FROM THE PERSPECTIVES OF EDUCATIONAL SCIENCES AND BUSINESS ADMINISTRATION

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Abstract

The accelerating diffusion of artificial intelligence (AI) technologies into organizational life is fundamentally reconfiguring the competency requirements for managerial roles. This paper develops a theoretically grounded competency mapping framework for managerial candidates operating at the intersection of educational sciences and business administration. Drawing on human capital theory, transformative learning, complexity leadership theory, social cognitive theory, dynamic capabilities, and contemporary AI literacy frameworks, we synthesize a multi-domain competency architecture comprising six interdependent clusters: cognitive and analytical, digital and technological, leadership and strategic, interpersonal and social, ethical and responsible, and learning agility. We further examine how AI-mediated pedagogical tools including intelligent tutoring systems, generative AI platforms, simulation environments, and learning analytics can be leveraged to develop, assess, and continuously refine these competencies in management education contexts. The framework addresses a critical gap in the literature by offering an integrative model that acknowledges both the enduring importance of human-centered managerial capacities and the emergent demands imposed by AI augmentation. Implications for curriculum design, executive development programs, and organizational talent management are discussed, alongside an agenda for future empirical research.

Keywords: Competency mapping, artificial intelligence, management education, leadership development, AI literacy, educational sciences, human capital.

INTRODUCTION

The organizational landscape of the twenty-first century is undergoing a structural transformation of historic proportions, driven by the rapid maturation and deployment of artificial intelligence technologies. From generative large language models to autonomous decision systems, AI is permeating virtually every functional domain of management from strategic planning and human resource management to operations, marketing, and finance (Agrawal et al., 2018; Brynjolfsson & McAfee, 2014). The practical consequence of this transformation is a profound and urgent recalibration of what it means to be an effective manager.

Traditional competency frameworks developed in the industrial and early knowledge economy eras however rigorous and evidence-based, are demonstrably incomplete as guides for managerial preparation in an AI-integrated world (World Economic Forum, 2023). The competencies required to lead organizations effectively when a significant portion of cognitive labor can be delegated to, augmented by, or must be governed alongside intelligent machines, are substantively different from those required in pre-AI contexts. Yet the academic literature at the intersection of management

education and AI adoption remains fragmented, with scholars in educational sciences, business administration, human resource development, and AI ethics each contributing partial accounts that have not been systematically synthesized.

This paper addresses this gap by proposing a theoretically integrated competency mapping framework explicitly designed for managerial candidates in the AI age. The framework is constructed at the intersection of two disciplines: educational sciences, which offers well-developed theories of adult learning, competency development, and instructional design; and business administration, which provides frameworks for strategic thinking, organizational behavior, and managerial effectiveness. The integration of these disciplinary lenses is not merely additive, it is synergistic, producing a framework that is both theoretically rigorous and practically actionable.

The paper proceeds as follows. Section 2 reviews the theoretical foundations that anchor the proposed framework. Section 3 introduces and elaborates the six-domain competency architecture. Section 4 examines AI-augmented pedagogical approaches for competency development and assessment. Section 5 discusses implications for management education, executive development, and talent management. Section 6 proposes a research agenda, and Section 7 concludes.

METHOD

Theoretical Foundations

Human Capital Theory and the Changing Value of Skills

Becker's (1964) human capital theory established the foundational insight that education and training constitute investments in productive capacity, yielding returns analogous to investments in physical capital. This framework has been extensively applied to management development and executive education, with the implicit assumption that human skills retain value over relatively long time horizons. The AI revolution problematizes this assumption. As Autor (2015) documents, technological change has historically substituted for routine cognitive tasks while complementing non-routine, judgment-intensive work. Generative AI, however, extends this substitution to a broader range of cognitive activities previously considered uniquely human, including language generation, pattern recognition, and multi-step reasoning.

The implication for competency mapping is significant: the relative value of different competencies is shifting at an accelerating rate, and any framework must build in mechanisms for continuous recalibration rather than treating competency profiles as static inventories (McKinsey Global Institute, 2023). Human capital theory must therefore be supplemented by theories that explain not only what competencies are valuable, but how individuals and organizations can continuously adapt their competency portfolios in response to environmental turbulence.

Transformative Learning Theory

Mezirow's (1991) transformative learning theory holds that deep, enduring learning involves the critical examination and revision of one's meaning perspectives the interpretive frameworks through which individuals make sense of experience. Transformative learning is particularly relevant for management education in the AI era because the introduction of AI into organizational practice does not merely add new skills to be mastered; it challenges fundamental assumptions about the nature of managerial work, the sources of organizational intelligence, and the ethical responsibilities of managers.

Mezirow identifies disorienting dilemmas as the catalysts of transformative learning experiences that disrupt existing frameworks sufficiently to motivate critical reflection. The widespread deployment of AI in organizations creates precisely such dilemmas for managers, who must confront questions about their own role, authority, and value-added when AI systems can perform functions they were trained to perform (Seldon & Abidoye, 2018). A competency development approach grounded in

transformative learning would therefore prioritize pedagogical experiences that trigger and support this critical reflective process.

Dynamic Capabilities and Individual Adaptive Capacity

Teece, Pisano, and Shuen's (1997) dynamic capabilities framework was developed to explain how firms sustain competitive advantage in rapidly changing environments through the capacity to sense market changes, seize opportunities, and reconfigure organizational assets. While the framework was developed at the organizational level, its logic translates directly to individual managerial competency. Managers who will thrive in AI-augmented environments must themselves possess dynamic capabilities the ability to sense emerging AI-related opportunities and threats, seize them through rapid learning and adaptation, and reconfigure their personal competency portfolios accordingly.

This individual-level dynamic capabilities perspective suggests that learning agility the metacognitive capacity to acquire new competencies rapidly and to unlearn obsolete ones should be positioned as a foundational competency rather than a supplement to domain-specific skills. It also implies that static, point-in-time competency assessments are insufficient and must be replaced or supplemented by longitudinal competency trajectory monitoring.

Complexity Leadership Theory

Uhl-Bien, Marion, and McKelvey's (2007) complexity leadership theory reconceptualizes leadership as an adaptive, emergent process within complex adaptive systems rather than as a set of behaviors enacted by heroic individuals. AI-integrated organizations are quintessential complex adaptive systems: they incorporate human and non-human agents whose interactions produce emergent organizational behaviors that cannot be predicted or controlled through traditional hierarchical means.

Complexity leadership theory therefore suggests that effective management in AI-augmented organizations requires competencies oriented toward enabling and navigating emergence fostering conditions for creative problem-solving, managing the adaptive tension between stability and change, and facilitating organizational learning across human-AI boundaries. These competencies are qualitatively different from those emphasized in traditional leadership development programs, which tend to focus on individual leader effectiveness rather than system-level facilitation.

Social Cognitive Theory and AI as Modeling Agent

Bandura's (1986) social cognitive theory emphasizes the role of observational learning, self-efficacy, and reciprocal determinism in shaping behavior and learning. In the context of AI-augmented management education, AI systems function as novel modeling agents: they demonstrate cognitive and behavioral patterns that learners can observe, imitate, and critically evaluate. The quality of these AI models, their epistemic soundness, ethical consistency, and contextual appropriateness therefore have direct implications for the competencies developed by managerial candidates who interact with them intensively.

Self-efficacy beliefs are particularly relevant. Research consistently shows that individuals with strong self-efficacy beliefs in a domain are more likely to persist in the face of challenges, set higher goals, and ultimately achieve stronger performance outcomes. A critical objective of AI-era management education is therefore to build AI self-efficacy learners' confidence in their ability to understand, critically evaluate, and work effectively alongside AI systems alongside the technical knowledge and skills required to operationalize this confidence (Van Laar et al., 2020).

A Multi-Domain Competency Architecture for AI-Era Managers

Framework Overview

Building on the theoretical foundations outlined in the preceding section, this paper proposes a six-domain competency architecture for managerial candidates in the AI age. The framework is organized

around six interdependent competency clusters, each of which captures a distinct but interconnected dimension of effective management in AI-integrated organizational contexts. These six domains are: (1) cognitive and analytical, (2) digital and technological, (3) leadership and strategic, (4) interpersonal and social, (5) ethical and responsible, and (6) learning agility.

Table 1. Multi-Domain AI-Era Managerial Competency Framework

Competency Domain	Core Sub-Competencies	AI-Augmented Indicators	Theoretical Anchors
Cognitive & Analytical	Critical thinking, systems thinking, data literacy	AI-assisted scenario modeling, algorithmic interpretation	Bloom (1956); Mayer (2009)
Digital & Technological	AI tool proficiency, cybersecurity awareness, digital ethics	Prompt engineering, LLM governance, bias detection	Prensky (2001); OECD (2019)
Leadership & Strategic	Vision setting, organizational change management, resilience	Human-AI teaming, adaptive leadership under uncertainty	Bass & Avolio (1994); Day (2001)
Interpersonal & Social	Empathy, communication, cross-cultural collaboration	Virtual team facilitation, AI-mediated conflict resolution	Goleman (1995); Gardner (1983)
Ethical & Responsible	Value-based decision making, accountability, transparency	AI ethics auditing, fairness in automated decisions	Rest (1986); Treviño et al. (2006)
Learning Agility	Metacognition, lifelong learning, knowledge transfer	Personalized AI learning paths, adaptive skill tracking	Kolb (1984); Dweck (2006)

Table 1. Competency domains, sub-competencies, AI-augmented indicators, and theoretical anchors for AI-era managerial candidates. Sources: synthesized from Bloom (1956), Bandura (1986), Goleman (1995), Teece et al. (1997), Uhl-Bien et al. (2007), OECD (2019), and World Economic Forum (2023).

Domain 1: Cognitive and Analytical Competencies

At the core of effective management is the capacity to reason carefully about complex problems to identify relevant information, evaluate competing claims, recognize cognitive biases, and develop well-reasoned judgments. In the AI age, these foundational cognitive capacities must be extended and reconfigured in important ways. As AI systems become increasingly capable of generating plausible-sounding analyses, recommendations, and narratives, the critical evaluation of AI outputs becomes a central managerial competency (Huang & Rust, 2021).

Data literacy the ability to read, work with, analyze, and communicate with data emerges as a particularly critical cognitive competency. Managers need not be data scientists, but they must possess sufficient statistical and methodological literacy to evaluate the quality and limitations of AI-generated analyses, identify potential biases or errors, and communicate meaningfully with technical specialists. Systems think the ability to understand feedback loops, non-linear dynamics, and emergent properties in complex systems is equally critical as AI systems become increasingly embedded in organizational processes and value chains (Makridakis, 2017).

Domain 2: Digital and Technological Competencies

Digital and technological competencies encompass the knowledge, skills, and attitudes required to function effectively in digitally mediated work environments. For managerial candidates in the AI age, these competencies extend well beyond basic digital literacy to include: an understanding of AI system architectures and capabilities sufficient to make informed procurement, deployment, and governance decisions; the ability to evaluate AI outputs critically and identify failure modes; an understanding of cybersecurity risks and organizational responsibilities in protecting data assets; and a working knowledge of digital ethics principles as they apply to AI deployment (European Commission, 2022).

Prompt engineering the skill of formulating effective inputs to large language models and other generative AI systems has emerged as a practical competency of growing importance, as the quality of AI-assisted work is heavily dependent on the ability to communicate effectively with AI systems. While prompt engineering is currently a relatively low-level technical skill, its broader significance lies in the cognitive habits it cultivates precision of communication, awareness of context and framing, and iterative experimentation with AI capabilities.

Domain 3: Leadership and Strategic Competencies

Leadership and strategic competencies have traditionally been defined around the capacity to set organizational direction, inspire and motivate followers, manage change, and make decisions under uncertainty. In AI-integrated organizations, these competencies must be substantially extended to encompass the challenges and opportunities posed by human-AI collaboration. Effective managers must understand how to leverage AI capabilities strategically identifying use cases where AI creates genuine organizational value, avoiding automation for its own sake, and managing the human consequences of AI adoption with fairness and transparency (Hjorth & Pedersen, 2022).

The complexity leadership perspective adds an important qualification: effective AI-era managers must be capable of facilitating emergent processes in human-AI systems rather than directing them through traditional hierarchical control. This requires a fundamental shift in leadership orientation from command-and-control to sense-and-respond and in the associated competency profile, which must include tolerance for ambiguity, adaptive capacity, and skill in facilitating distributed problem-solving across human and AI agents.

Domain 4: Interpersonal and Social Competencies

One of the most important insights from the organizational AI literature is that the competencies most difficult to automate and therefore most valuable in an AI-augmented workforce are precisely those that depend on deep human social and emotional intelligence: empathy, nuanced communication, trust-building, ethical judgment in ambiguous situations, and the capacity to understand and respond to the motivational states of others (Goleman, 1995; Gardner, 1983). These interpersonal and social competencies are not merely AI-resistant; they are the distinctively human value-added that managers bring to organizations that have delegated significant cognitive work to AI systems.

Critically, interpersonal competencies in the AI age must be exercised in increasingly complex social contexts that include virtual and hybrid team configurations, cross-cultural collaborations mediated by AI translation and communication tools, and the management of employees who are themselves working alongside AI systems and navigating their own anxieties and identity questions about technological displacement. Managers must be equipped to facilitate these complex social dynamics with empathy, cultural sensitivity, and sophisticated communication skills.

Domain 5: Ethical and Responsible Competencies

The deployment of AI in organizational contexts generates a distinctive set of ethical challenges that managerial candidates must be equipped to navigate. These include: algorithmic bias and fairness, where AI systems trained on historical data can perpetuate or amplify existing patterns of

discrimination; privacy and surveillance, where AI-enabled monitoring creates new risks to employee and customer autonomy; accountability gaps, where the distributed and opaque nature of AI decision-making can obscure responsibility for harmful outcomes; and the broader societal consequences of organizational AI adoption, including employment displacement and the concentration of AI capabilities among a small number of organizations (Zuboff, 2019; Treviño et al., 2006).

Rest's (1986) four-component models of ethical behavior moral sensitivity, moral judgment, moral motivation, and moral implementation provides a useful framework for operationalizing ethical competency in AI contexts. Managers must be morally sensitive to the ways in which AI deployment creates ethical stakes; they must be equipped with the judgment to reason carefully about competing ethical considerations; they must be motivated to prioritize ethical considerations in organizational decision-making; and they must possess implementation skills to translate ethical commitments into concrete organizational practices.

Domain 6: Learning Agility as Integrative Meta-Competency

The preceding five competency domains are grounded in established theoretical frameworks and represent substantive skill clusters with well-documented behavioral indicators. The sixth domain learning agility is distinctive in functioning as an integrative meta-competency that enables the continuous development and recalibration of competencies across all other domains. Dweck's (2006) growth mindset research establishes the dispositional foundations of learning agility: individuals who believe their abilities can be developed through effort and learning are more likely to embrace challenges, persist in the face of setbacks, and engage in the deliberate practice required to develop new competencies.

In the context of AI-era management education, learning agility encompasses: metacognitive awareness of one's own competency strengths and developmental edges; the capacity to learn rapidly from novel experiences and transfer learning across contexts; openness to feedback, including feedback from AI systems; and the ability to unlearn established patterns of behavior and thinking that have become obsolete in the face of technological change. Kolb's (1984) experiential learning cycle concrete experience, reflective observation, abstract conceptualization, and active experimentation provides a practical process model for learning agility development.

AI-Augmented Pedagogical Approaches for Competency Development

Theoretical Underpinnings of AI-Supported Learning

The pedagogical translation of the six-domain competency framework requires learning experiences that are both theoretically grounded and responsive to the actual capabilities and limitations of available AI technologies. Mayer's (2009) cognitive theory of multimedia learning provides foundational principles for the design of AI-augmented learning experiences, emphasizing the importance of managing cognitive load, fostering active processing, and integrating verbal and visual representations. Lave and Wenger's (1991) situated learning theory adds the critical insight that competencies are most effectively developed through participation in authentic communities of practice rather than through decontextualized instruction.

Together, these frameworks suggest that AI-augmented management education should: create authentic contexts in which competencies are practiced and evaluated, rather than merely taught didactically; leverage AI capabilities to provide adaptive, personalized learning experiences that respond to individual competency profiles; and use AI tools to create realistic simulations of organizational challenges that allow learners to practice and receive feedback in low-stakes environments before encountering analogous situations in real organizational contexts (Zawacki-Richter et al., 2019).

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Table 2. Frameworks Underpinning the AI-Era Competency Model

Framework	Core Proposition	Discipline	AI-Era Relevance
Human Capital Theory (Becker, 1964)	Investment in education yields economic productivity	Economics / Management	AI redefines skill value and depreciation rates
Transformative Learning (Mezirow, 1991)	Critical reflection enables perspective transformation	Education	Essential for leaders navigating AI-induced disruptions
Dynamic Capabilities (Teece et al., 1997)	Firms sense, seize, and reconfigure resources in changing environments	Strategic Management	Individuals require analogous adaptive capacities
Situated Learning (Lave & Wenger, 1991)	Learning occurs through social participation in communities of practice	Education / Sociology	AI-augmented communities of practice
Complexity Leadership (Uhl-Bien et al., 2007)	Leadership as adaptive process in complex systems	Organization Theory	AI systems increase organizational complexity
Social Cognitive Theory (Bandura, 1986)	Behavior shaped by observation, self-efficacy, and environment	Psychology	AI as a new modeling agent in learning environments

Table 2. Theoretical frameworks, core propositions, disciplinary origins, and relevance to AI-era competency development. Sources: Becker (1964), Mezirow (1991), Teece et al. (1997), Lave & Wenger (1991), Uhl-Bien et al. (2007), Bandura (1986).

AI Tools and Educational Applications

A rapidly expanding ecosystem of AI-powered educational technologies offers concrete tools for the development and assessment of AI-era managerial competencies. These tools vary substantially in their pedagogical approach, technical sophistication, and alignment with specific competency domains. Table 3 provides a systematic overview of major AI tool categories and their applications in management education contexts.

Table 3. AI Tools and Their Educational Applications in Management Competency Development

AI Tool Category	Example Platforms	Educational Application	Competency Developed
Generative AI (Text)	GPT-4, Claude, Gemini	Case study generation, reflective writing prompts	Critical thinking, communication
Intelligent Tutoring Systems	Khanmigo, Carnegie Learning	Adaptive problem-solving exercises	Cognitive skills, learning agility
AI Simulation & Gaming	Mursion, PwC VR, Talespin	Leadership scenario simulations	Interpersonal, strategic leadership
Learning Analytics Platforms	Brightspace, Civitas Learning	Personalized feedback, performance tracking	Self-regulation, metacognition
AI Ethics Tools	IBM AI Fairness 360, What-If Tool	Bias auditing exercises, ethical case analysis	Ethical & responsible competence
Natural Language Processing	Grammarly, Turnitin AI, Quillbot	Writing quality feedback, originality analysis	Communication, digital literacy

Table 3. Categories of AI educational tools, for example platforms, pedagogical applications, and competency development targets. Sources: IBM Institute for Business Value (2023); Viberg et al. (2018); Zawacki-Richter et al. (2019).

Intelligent Tutoring Systems and Adaptive Learning

Intelligent tutoring systems (ITS) represent one of the most theoretically sophisticated applications of AI in education. ITS platforms construct dynamic models of individual learner knowledge states, identify specific misconceptions and knowledge gaps, and adapt instructional sequences accordingly. In management education contexts, ITS applications are particularly valuable for developing the cognitive and analytical competencies that form the foundation of the overall framework logical reasoning, quantitative analysis, decision theory, and financial literacy where structured problem sequences can be systematically adapted to individual learning trajectories (Viberg et al., 2018).

The learning analytics capabilities of contemporary ITS platforms also have important assessment applications. By tracking learner behavior at high temporal resolution including response times, error patterns, help-seeking behaviors, and persistence in the face of challenge these systems can provide rich, multi-dimensional competency profiles that complement and extend the information available from traditional assessment methods.

Simulation and Experiential AI Learning

Simulation-based learning environments including business games, role-play simulations, and virtual reality scenarios have a long history in management education, and AI is dramatically expanding their scope and fidelity. AI-powered simulation platforms can now create realistic, dynamically responsive organizational scenarios in which learners must navigate complex interpersonal dynamics, strategic dilemmas, and ethical challenges under time pressure and with incomplete information. These environments are particularly well-suited to developing leadership, interpersonal, and ethical competencies that are difficult to practice safely in real organizational contexts (IBM Institute for Business Value, 2023).

Generative AI further expands simulation possibilities by enabling learners to engage in open-ended dialogue with AI-generated organizational characters, generate and test strategic hypotheses against AI-modeled market and competitive environments, and receive nuanced, contextually grounded feedback on complex behavioral performances. The authenticity and responsiveness of these AI-generated simulation environments create conditions for the kind of immersive, consequential practice that cognitive science research identifies as essential for the development of expert performance.

Assessment of AI-Era Competencies

The assessment of AI-era managerial competencies presents distinctive methodological challenges. Many of the most important competencies in the proposed framework learning agility, ethical reasoning, adaptive leadership are complex, multi-dimensional constructs that resist reduction to simple behavioral indicators or psychometric scales. Moreover, the dynamic nature of the AI environment means that competency profiles are continuously evolving, requiring assessment approaches that can track developmental trajectories rather than merely capturing point-in-time snapshots.

Table 4. Assessment Methods for AI-Era Managerial Competencies

Assessment Method	Description	AI Enhancement	Competency Domain
360-Degree Feedback	Multi-rater evaluation from peers, supervisors, subordinates	NLP-based sentiment analysis of feedback quality	Leadership, Interpersonal
Portfolio Assessment	Curated evidence of competent development	AI-driven portfolio gap analysis and recommendations	Learning Agility, Cognitive
Behavioral Simulation	Role plays and business games in controlled settings	AI actors and real-time behavioral scoring	Leadership, Interpersonal, Ethical
Competency-Based Interviews	Structured interviews tied to specific behavioral anchors	AI interview coaching and response analysis	All domains

Psychometric Testing	Personality, cognitive ability, and values assessments	Adaptive testing powered by IRT and ML models	Cognitive, Ethical
Work Sample Tests	Authentic tasks mirroring real job demands	AI-graded complex problem-solving simulations	Cognitive, Digital, Strategic

Table 4. Assessment methods, descriptions, AI enhancements, and competency domain coverage. Sources: Day (2001); Van Laar et al. (2020); World Economic Forum (2023).

Implications for Management Education and Talent Development

Curriculum Design in Business Schools

The competency framework proposed in this paper has far-reaching implications for the design of management education curricula at business schools and university programs. Most existing MBA and management degree curricula were designed around a conception of managerial work rooted in the industrial and early knowledge economy periods, and their core content accounting, finance, operations, marketing, and organizational behavior was calibrated accordingly. While this foundational knowledge remains relevant, it requires substantial extension and reintegration around the six competency domains outlined in this paper.

Practically, this suggests the need for: dedicated AI literacy modules that develop both technical understanding and critical evaluation capacities; integration of ethical reasoning throughout the curriculum rather than confining it to a single ethics elective; experiential learning opportunities that create authentic contexts for leadership, interpersonal, and ethical competency development; and capstone experiences that require learners to integrate competencies across all six domains in response to complex, AI-relevant organizational challenges (OECD, 2021; UNESCO, 2021).

Executive Development Programs

Practicing managers face a particular version of the competency challenge: they must develop new AI-era competencies while continuing to perform their existing roles effectively, often without the protected learning time available to full-time students. Executive development programs must therefore be designed with particular attention to transfer of learning the challenge of ensuring that competencies developed in program contexts are applied in workplace settings.

Research on transfer of learning suggests several design principles particularly relevant for AI-era executive development: maximum similarity between learning and transfer contexts, which argues for simulation-based learning using organizational scenarios closely analogous to participants' actual work challenges; opportunities for peer learning among managers facing analogous AI adoption challenges, which leverages the community of practice dynamics emphasized by Lave and Wenger (1991); and coaching and mentoring support during the application phase, which helps managers navigate the specific obstacles to competency application they encounter in their particular organizational contexts.

Organizational Talent Management

The implications of the proposed framework extend beyond formal education to organizational talent management practices. Organizations investing in AI adoption face a parallel challenge: ensuring that their managerial workforce possesses the competencies required to lead effectively in AI-augmented environments. This requires substantial evolution of talent management practices from competency identification and selection, through development and deployment, to performance management and succession planning.

Selection practices must be updated to assess AI-relevant competencies in addition to traditional leadership and management capabilities. Development investments must be reallocated from purely technical training toward the broader competency portfolio outlined in this framework. Performance management systems must be redesigned to recognize and reward distinctively human competencies

that create value in AI-augmented organizations ethical judgment, adaptive learning, collaborative facilitation rather than focusing exclusively on task-level performance metrics that AI systems may increasingly be able to perform autonomously (Chui et al., 2023; World Economic Forum, 2020).

Research Agenda

Empirical Validation of the Framework

The competency framework proposed in this paper is grounded in established theoretical traditions but has not yet been subjected to systematic empirical validation. A critical priority for future research is to develop and validate psychometrically sound measurement instruments for each of the six competency domains, using rigorous construct validation methodologies that establish content, construct, criterion, and discriminant validity. This validation work should be conducted across diverse managerial populations, organizational contexts, and national cultures to assess the generalizability of the framework and identify boundary conditions.

Longitudinal Studies of Competency Development

The dynamic capabilities perspective underlying the framework implies that competency profiles are continuously evolving and that the trajectories of competency development matter as much as competency levels at any given point in time. Longitudinal research designs — tracking managerial candidates through education programs and into early organizational careers — are therefore essential for understanding how AI-era competencies develop, which pedagogical approaches are most effective for different learner profiles, and how competency profiles relate to managerial effectiveness outcomes over time.

Cross-Cultural and Cross-Sector Research

The global diffusion of AI technologies means that the competency challenges described in this paper are not confined to any single national or organizational context. However, the specific manifestations of these challenges and the most effective pedagogical responses are likely to vary substantially across cultural, institutional, and sectoral contexts. Comparative research examining how AI-era competency frameworks must be adapted for different cultural contexts, organizational types, and sectoral environments would substantially enrich the theoretical and practical value of the overall framework.

DISCUSSION, CONCLUSION, and SUGGESTIONS

This paper has developed a theoretically grounded competency mapping framework for managerial candidates in the age of artificial intelligence, drawing on insights from human capital theory, transformative learning, dynamic capabilities, complexity leadership theory, and social cognitive theory. The proposed framework organizes AI-era managerial competencies into six interdependent domains cognitive and analytical, digital and technological, leadership and strategic, interpersonal and social, ethical and responsible, and learning agility and examines how AI-augmented pedagogical approaches can be leveraged to develop and assess these competencies in management education contexts.

The framework makes several theoretical contributions. It integrates disciplinary perspectives from educational sciences and business administration that have been developed largely in isolation, producing a synergistic synthesis that is more robust than either disciplinary tradition alone. It positions learning agility as an integrative meta-competency rather than simply one competency domain among others, recognizing that the capacity for continuous competency development is the foundational requirement of effective management in an environment of accelerating technological change. And it incorporates the emergent insights from complex leadership theory and social cognitive theory to account for the distinctive challenges and opportunities created by AI as a new category of organizational actors.

Perhaps most importantly, the framework affirms the enduring centrality of distinctively human competencies empathy, ethical judgment, adaptive leadership, and metacognitive awareness in an era of rapid AI capability expansion. The case for investing heavily in the development of these competencies is not merely that they are difficult to automate, though they are it is that they represent the foundational capacities through which organizations remain responsive, responsible, and genuinely human in their pursuit of purpose and value. As AI capabilities continue to expand, the organizations that will thrive are precisely those whose managers have been equipped with the full spectrum of competencies outlined in this framework.

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