Navigating the Next Decade: Reconceptualizing Leadership Competencies Amid Geopolitical Flux, Supply Chain Volatility, and the Algorithmic Imperative

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Abstract

The emergent decade precipitates an epoch defined by **hyper-volatility, intricate interdependencies, and unprecedented technological convergence**, particularly the pervasive integration of Artificial Intelligence (AI) across socio-economic strata. Traditional leadership paradigms are demonstrably insufficient to navigate this landscape, marked by persistent **geopolitical fragmentation, cascading supply chain disruptions, and the accelerating pace of digital transformation**. This paper posits a critical re-evaluation of leadership competencies, advocating for a **synergistic blend of strategic foresight, adaptive capacity, and ethical stewardship** as quintessential for organizational resilience and sustained competitive advantage.

The ascendancy of AI fundamentally recalibrates the managerial calculus, presenting not merely a tool but an **algorithmic imperative** for enhanced decision intelligence. Future-ready leaders must possess a sophisticated comprehension of AI's architectural principles, from **machine learning algorithms and neural networks to predictive analytics and natural language processing**. Proficiency in leveraging these advanced analytical capabilities for **data-driven insights, optimized resource allocation, and dynamic risk stratification** within a milieu of geopolitical uncertainty and supply chain vulnerabilities becomes non-negotiable. Concurrently, the proliferation of AI amplifies the indispensable value of **uniquely human cognitive and affective attributes**. **Transversal skills** such as critical synthesis, innovative ideation, complex adaptive problem-solving, and nuanced emotional intelligence are elevated to paramount importance, enabling leaders to interpret AI-generated insights, articulate compelling visions, and foster high-performing, agile teams.

Cultivating the leadership cadre for this dynamic environment necessitates a focus on developing **cognitive dexterity, behavioral fluidity, and a resilient organizational ethos**. This involves fostering sophisticated analytical capabilities and systemic understanding, alongside the cultivation of dynamic interpersonal and adaptive execution proficiencies.

Furthermore, instilling a deep-seated commitment to ethical governance and stakeholder value creation will be essential for enduring impact.

Identifying and addressing individual and collective competency gaps necessitates sophisticated diagnostic methodologies, including **360-degree feedback loops, psychometric assessments, and performance-simulated environments**, all calibrated against the dynamic exigencies of the global operating milieu. Professionals are urged to prioritize **upskilling** in areas such as **AI integration strategies, scenario planning for geopolitical and supply chain contingencies, and the principles of circular economy and ESG (Environmental, Social, and Governance) frameworks**. Simultaneously, a deliberate process of **unlearning** is vital, shedding rigid hierarchical structures, anachronistic decision-making heuristics, and resistance to disruptive technological adoption.

This research will employ a mixed-methods approach, utilizing empirical data to investigate current professional development trajectories and discerning prevailing learning priorities and unlearning behaviors within diverse organizational contexts. The paper will further analyze emergent trends in corporate learning and development, examining their efficacy in cultivating a new generation of agile

leaders. A significant segment of the study will delve into the complexities of **sustainable leadership**, exploring how leaders can proactively fortify their organizations against and adapt to the profound disruptive forces emanating from geopolitical flux and inherent supply chain vulnerabilities. This investigation endeavors to furnish a robust, theoretically grounded, and practically actionable framework for cultivating sagacious, ethically attuned, and impactful leaders, poised to guide organizations through the intricate challenges and opportunities of the forthcoming decade.

Keywords: Emergent leadership, Adaptive Leadership, Navigating Uncertainty

Background

The twenty-first century is often described as the "age of disruption." New technologies, shifting economies, and changing social expectations have transformed the way people work and lead. Among all these changes, artificial intelligence (AI)—especially the rise of generative AI (GenAI)—is the most powerful driver of transformation in organizations today. Leadership in this new era is no longer about simply setting visions, delegating tasks, and managing people. Instead, it requires leaders to navigate complexity, adapt quickly, and develop new competencies that align with digital innovation and global uncertainty.

The 2025 Coursera Global Skills Report shows how important these shifts have become. AI- related learning is growing faster than any other skill area worldwide, with over 8 million enrollments in GenAI courses and a rise to 12 learners per minute in 2025, compared to just one learner per minute in 2023. Countries such as Singapore, Switzerland, and the United States top the new AI Maturity Index, which measures how well countries are prepared to use AI for innovation and growth. At the same time, emerging economies like India, Vietnam, and the Philippines are experiencing rapid surges in AI enrollments, showing interest and ambition, even as skill gaps remain wide.

These statistics highlight a deeper truth: leaders everywhere must learn to guide organizations in a world where AI is not optional, but essential. Yet, this task is not simple. Many leaders are entering uncharted territory, where they must develop both technical fluency in AI and human- centered skills such as ethical decision-making, emotional intelligence, and resilience. Leadership competency development has therefore become a complex process, shaped by both technological change and social responsibility.

The Changing Nature of Leadership

Traditionally, leadership development focused on building skills like strategic thinking, communication, and team management. These remain important, but they are no longer enough. In the age of AI, leaders must also understand digital ecosystems, data-driven decision- making, and machine collaboration.

The Global Skills Report 2025 illustrates this shift. While countries like Singapore rank in the global top tier across business, technology, and data skills, other countries—even those with large populations of learners like India—rank much lower overall in skill proficiency. This unevenness shows that leaders must now manage organizations where employees have different levels of digital readiness. Leadership is no longer about uniform management; it is about bridging gaps, fostering learning, and creating inclusive pathways for digital growth.

Moreover, AI is not just a tool for efficiency. It is changing the very fabric of work. Cybersecurity enrollments rose 106% in Latin America and 14% in Asia Pacific, showing how leaders must now think about protecting data and building trust. Micro-credentials are also growing, with 15.4 million enrollments in entry-level professional certificates. This means employees and future leaders are increasingly seeking short, skill-focused education that aligns directly with jobs. Leaders must understand this trend, because continuous learning and upskilling are no longer optional—they are

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organizational imperatives.

Complexities in Leadership Development

Developing leadership competencies in this environment involves multiple challenges: Rapid Technological Change

AI tools evolve at incredible speed. Leaders must not only learn these tools but also anticipate how they will reshape industries. For example, roles like "AI and Machine Learning Specialists" are projected to grow by 40% in the next four years. This creates pressure on leaders to reskill themselves and their teams quickly.

Global Inequality in Skills

The skill rankings show clear divides. Singapore ranks 4th globally, while countries like Nigeria (91) and India (89) fall into the lagging tier. Leaders in different regions face different realities: some are pushing the frontiers of AI adoption, while others are struggling with basic skill readiness. Leadership development must therefore be contextual, tailored to the realities of each organization and country.

Balancing Technical and Human Skills

AI makes data analysis and automation easier, but it cannot replace human judgment, ethics, or creativity. Leaders must learn to balance AI literacy with competencies like critical thinking, empathy, cultural awareness, and communication. According to the report, 97% of employers are moving toward skills-based hiring, which suggests leaders will be judged not just by experience but by validated competencies that blend human and digital strengths.

Ethical and Social Responsibility

With AI come new risks: bias in algorithms, data misuse, and widening social inequalities. The AI Maturity Index includes factors such as regulation and ethics for this reason. Leaders must now be competent not only in using AI but in ensuring its responsible use. This adds a new dimension to leadership development—ethical leadership in digital transformation.

Gender and Diversity Gaps

The report highlights that women make up 46% of Coursera learners, but only about one-third of GenAI enrollments. Leadership development must address these disparities. Leaders must be trained to create inclusive opportunities, ensuring that underrepresented groups can participate fully in the AI economy.

Why Leadership Competency Development Matters Now

The urgency for leadership competency development is clear. The World Economic Forum predicts that 59% of workers will need retraining by 2030. AI will transform not just technical tasks but also leadership roles. Leaders who fail to adapt may find their organizations falling behind in innovation, competitiveness, and even survival.

Countries and companies that rank high on the AI Maturity Index demonstrate that investing in skills leads to better readiness. Singapore, for example, combines high skill proficiency with strong policies and infrastructure, making it a global AI leader. This shows how leadership competencies must be developed not in isolation but within ecosystems that connect education, business, and government.

At the same time, regions like Latin America, Sub-Saharan Africa, and South Asia reveal the gaps between enthusiasm and proficiency. For instance, India leads the world in GenAI

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enrollments (1.3 million in 2024) but still rank only 46th in AI maturity and 89th in overall skill proficiency. This indicates that interest in AI is strong, but leadership competency development must go further—turning interest into mastery, and mastery into organizational transformation.

Navigating the Path Forward

To navigate these complexities, leadership competency development in the age of AI must focus on three interconnected dimensions:

Technical Fluency – Leaders must understand how AI works, what it can do, and what its limits are. This includes familiarity with areas like prompt engineering, data analytics, and cybersecurity.

Human-Centered Skills – Leaders must double down on skills that AI cannot replace empathy, ethical judgment, creativity, and resilience. The most effective leaders will be those who combine data-driven decision-making with human insight.

Ecosystem Building – Leaders must create environments where employees are continuously learning. This includes supporting micro-credentials, encouraging diverse participation, and aligning with national and global digital strategies.

The Aim of This Research

This research paper explores how leaders can develop competencies to thrive in an AI-driven world, while also addressing the challenges of inequality, ethical responsibility, and continuous change. Using insights from the Coursera Global Skills Report 2025, the AI Maturity Index, and other global data sources, the paper will examine:

The competencies leaders need most in the AI era.

The barriers to developing these competencies across different regions.

The strategies organizations and governments can use to close skill gaps.

The balance between AI literacy and human-centered leadership.

By doing so, the paper seeks to provide practical guidance for leaders, educators, and policymakers who want to prepare for the future of work while ensuring inclusive and ethical growth.

Summary

Leadership in the age of AI is not about knowing all the answers—it is about learning continuously, adapting quickly, and leading responsibly. The data shows that the world is moving rapidly into an AI future, but not all countries or leaders are equally prepared. To navigate these complexities, leadership competency development must focus on building technical fluency, human-centered skills, and ecosystem readiness.

The question is no longer whether AI will change leadership—it already has. The challenge is how leaders will respond: whether they will simply react to disruption or proactively shape a future where technology and humanity work together for shared progress.

Literature Review

Makhupe et al. (2017) discuss the challenge of drastically reduced C-suite executive tenure, attributing it to leaders' struggles with the rapid, disruptive changes of the Fourth Industrial Revolution (4IR). To navigate this volatile, uncertain, complex, and ambiguous (VUCA) world, the authors propose the "Molecular Leadership Competency Model," which augments traditional Intelligence Quotient (IQ) with five crucial "Leadership Competencies 4.0". These include Emotional Quotient (EQ), Digital Quotient (DQ), Agility and Adaptability Quotient (AAQ), Socio-cultural Quotient (SCQ), and Creativity and Innovation Quotient (CIQ). The paper emphasizes that leaders must continuously "grow, morph, and develop" by learning, unlearning, and relearning to remain relevant and effectively drive change.

Neubauer, R. et al. (2017) investigates the leadership skills essential for thriving in environments marked by rapid, unpredictable digital disruption, revealing that less than 15% of organizations feel "very prepared". The research identifies successful leaders in such conditions as "Agile Leaders," characterized by four "HAVE" competencies: Humble, Adaptable, Visionary, and Engaged. These competencies are manifested through three key behaviors: Hyperawareness, Informed Decision-Making, and Fast Execution. The report concludes that traditional organizations can indeed compete and succeed in this digitally-disrupted landscape by adopting an agile management approach led by these "Agile Leaders". O'Brien E. et al (2009) argue that a reliance on past leadership competencies is no longer sufficient given continuous change and uncertainty, advocating for new skills aligned with the future business environment. The authors employed a foresight orientation, conducting an in-depth analysis of key business, societal, organizational, and leadership trends to identify nine critical leadership competencies.

Dahlsund, et al. (2024) aimed to understand how managers in Sweden have learned from and are responding to recent supply chain disruptions, including the current one caused by Russia's invasion of Ukraine. Utilizing qualitative data from semi-structured interviews, the study found managers focused on securing material flow through local and multiple suppliers, safety stock, and intangible competencies like communication. Rukadikar, A. et al. (2024) conducted a review of current research papers, articles, and case studies to evaluate GAI's integration into leadership self-upskilling, examining both its potential benefits and challenges like data privacy and algorithmic bias. The study underscores the importance of ethical GAI use, proposing that AI-powered self-upskilling can democratize leadership development while addressing its inherent challenges. Reynolds, S. (2024) focuses on strategies for managing and recovering from the increasing frequency of supply chain disruptions. The research highlights several key themes contributing to organizational resilience: risk management, agility, collaboration, strategic planning, technology integration, and supply chain visibility. It also underscores the crucial roles of effective leadership and a resilient organizational culture in fostering adaptability and continuous improvement during crises. Nyamboga TO, (2025) explored the ambidextrous leadership model, which requires leaders to flexibly switch between "opening" behaviours that encourage creativity (exploration) and "closing" behaviours that refine existing processes (exploitation). The author's findings reveal that this balance is achieved through adaptive leadership, leveraging technology like AI, fostering an agile learning-oriented culture, and strategic resource allocation, as demonstrated by firms like Google, Tesla, and Amazon. Noviyanti, A (2025) explores how transformational leadership helps organizations navigate the challenges of a volatile, uncertain, complex, and ambiguous business environment. The author's research confirms the importance of developing transformational leadership as a key to strengthening an organization's competitiveness and successfully implementing adaptive strategies amidst uncertainty. Tiwari, M et al (2025) build their study on two core frameworks: the Attention-Based View (ABV), which explains how leaders' allocation of focus shapes organizational actions, and the Upper Echelon Theory (UET), which connects leaders' personal characteristics to their strategic decisions. They argue that existing research on crisis leadership is fragmented and often overlooks the specific context in which leadership occurs, which is a critical factor for effectiveness. Merkert, R. et al(2023) argue that events like COVID-19, climate change, and geopolitical tensions have increased the supply chain logistics sector's importance, potentially creating a "golden age" for LSCM professionals. the authors propose that universities and other educational providers should adapt their LSCM offerings to emphasize unlearning and lifelong learning. They urge practitioners to identify a multitude of "future-proof" skills needed for success. These skills span technical abilities like data analytics, soft skills such as creativity, and cross-functional competencies. Azadegan, A. et al (2021) that a decisive leadership style is considered most effective during the initial response stage. For the later recovery stage, however, a style that combines decisiveness and task-centred leadership is perceived to be the most effective.

Research Objectives

Analyze emergent trends in corporate learning and development, examining their efficacy in cultivating a new generation of agile leaders.

Explore how leaders can proactively fortify their organizations against and adapt to the profound disruptive forces emanating from geopolitical flux and inherent supply chain vulnerabilities.

Develop an actionable framework for sustainable, resilient, and ethically attuned organizational leadership.

Research Questions

What are the core leadership competencies required to navigate hyper-volatility and technological convergence?

How do organizations identify, cultivate, and address individual and collective competency gaps?

Which professional development strategies most effectively foster future-ready leadership?

How can organizations fortify themselves against disruptions from geopolitical and supply chain volatility in a sustainable manner?

Research Design

The Mixed methods research involves gathering, studying, and explaining both quantitative and qualitative data in a single research project or a series of projects focused on the same topic (Leech & Onwuegbuzie, 2007; Johnson et al., 2007). This approach aims for a more complete and deeper understanding, and to confirm findings (Havert et al., 2013; Johnson et al., 2007). When planning such a study, researchers need to carefully think about several important parts of the design (Schoone boom & Johnson, 2017).

A key part is the purpose of mixing methods, which is to make the study's findings stronger (Schoone boom & Johnson, 2017). Common reasons include triangulation, which checks if different methods show the same results to increase confidence (Greene, Carcelli, & Graham, 1989 as cited in Schoone boom & Johnson, 2017; Turner et al., 2015); complementarity, which adds details or makes results clearer; and explanation, where one method helps understand findings from another (Greene, Carcelli, & Graham, 1989 as cited in Schoone boom & Johnson, 2017; Bryman, 2006 as cited in Schoone boom & Johnson, 2017).

Another important aspect is the theoretical drive, which describes if the study is mainly guided by qualitative ideas, quantitative ideas, or if both have equal importance (Morse & Niehaus, 2009 as cited in Schoone boom & Johnson, 2017; Johnson et al., 2007 as cited in Schoone boom & Johnson, 2017). The timing of the methods is also crucial: they can be done concurrently (at the same time) or sequentially (one after the other) (Guest, 2013; Schoone boom & Johnson, 2017). Lastly, the point of integration is where the qualitative and quantitative parts of the data are actually brought together and combined, which can occur during data collection, analysis, or interpretation (Creswell, 2003 as cited in Havert et al., 2013; Guest, 2013; Schoone boom & Johnson, 2017). Considering these elements carefully helps to build a strong mixed methods design (Schoone boom & Johnson, 2017).

Data analysis tools

In this research, several data analysis tools were used to collect and understand information. First, a questionnaire survey was conducted, which allowed many people to share their views and experiences through a set of structured questions. This method is helpful for collecting data in a uniform way from a large group. In addition to the survey, interviews were carried out. Interviews let researchers ask deeper questions and get more detailed answers. Both methods are useful for gathering primary data.

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After collecting data, Microsoft Excel was used to organize responses, run calculations, and make simple charts and graphs. Excel is easy to use and helps with sorting, filtering, and summarizing data. Questions were grouped by constructs from the research framework (AI Literacy, Adaptive Capacity, Ethical Stewardship, Learning/Unlearning, Resilience). The quantitative items use 5-point Likert scales for statistical analysis. A few open-ended questions allow for capturing rich qualitative context. This questionnaire supports triangulation with the qualitative strand (interviews, case studies) from your research design.

Sampling Strategy

Stratified Random Sampling was used for quantitative survey across regions and organizational sizes.

The implementation of the survey was done based on the below matrix along with the coding of the parameters.

Section A – Demographics (Non-scored)		
Code	Question	Response Type
DEM1	Current role level	Multiple-choice: C-suite, Senior Manager, Middle Manager, Other: ___
DEM2	Industry	Multiple-choice
DEM3	Organization size	Multiple-choice
DEM4	Geographic scope of operations	Multiple-choice
Section B – AI Literacy (Code: AILIT)		
Code	Statement	Response
AILIT1	I can explain in simple terms how AI systems like machine learning and neural networks operate.	1–5 Likert
AILIT2	I can identify business processes in my organization that could benefit from AI integration.	1–5 Likert
AILIT3	I can assess whether an AI-generated output is trustworthy and relevant to my context.	1–5 Likert
AILIT4	I stay updated on emerging AI tools and technologies relevant to my role.	1–5 Likert

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Scoring: AI Literacy Score = Mean(AILIT1–AILIT4)	
Cronbach's Alpha must be ≥ 0.75 for reliability.	
Section C – Adaptive Capacity (Code: ADAPT)	

Code	Statement	Response
ADAPT1	I quickly adjust strategies when circumstances change unexpectedly.	1–5 Likert
ADAPT2	I encourage experimentation and learning from failure.	1–5 Likert
ADAPT3	I consider multiple future scenarios before making a major decision.	1–5 Likert
ADAPT4	I remain effective under conditions of ambiguity and incomplete information.	1–5 Likert
Scoring: Adaptive Capacity Score = Mean(ADAPT1–ADAPT4)		
Target Alpha ≥ 0.80.		
Section D – Ethical Stewardship (Code: ETHIC)		
Code	Statement	Response
ETHIC1	I discuss ethical considerations before approving AI-related initiatives.	1–5 Likert
ETHIC2	I model fairness, transparency, and respect in decision-making.	1–5 Likert
ETHIC3	I proactively assess the social/environmental impact of organizational policies.	1–5 Likert
ETHIC4	I support policies promoting responsible technology use.	1–5 Likert
Scoring: Ethical Stewardship Score = Mean(ETHIC1–ETHIC4)		

Target Alpha ≥ 0.80.	
Section E – Learning Agility (Code: LEARNAG)	
Code	Statement	Response
LEARNAG1	I seek feedback to improve my leadership effectiveness.	1–5 Likert
LEARNAG2	I am willing to abandon outdated processes that no longer deliver value.	1–5 Likert

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LEARNAG3	I actively acquire new knowledge or skills to lead in a changing environment.	1–5 Likert
LEARNAG4	I learn quickly from unfamiliar situations related to emerging technology.	1–5 Likert
Scoring: Learning Agility Score = Mean(LEARNAG1–LEARNAG4)		
Target Alpha ≥ 0.78.		
Section F – Development Priorities (Qualitative/Mixed)		
Code	Question	Response Type
DEV1	Which skills are most critical for leadership in the next decade?	Multiple-select (top 3 from pre-listed skills)
DEV2	Biggest leadership challenge your organization faces regarding AI-driven transformation?	Open-text
DEV3	Changes to leadership development programs that would most prepare leaders for the next decade.	Open-text

Hypothesis

Hypothesis 1 (Relationship between AI Literacy and Ethical Stewardship)

Null Hypothesis (H0): There is no significant correlation between AI Literacy and Ethical Stewardship scores among organizational leaders.

Alternate Hypothesis (H1): There is a significant positive correlation between AI Literacy and Ethical Stewardship scores among organizational leaders.

Hypothesis 2 (Adaptive Capacity and Learning Agility as Related Constructs)

Null Hypothesis (H0): There is no positive association between adaptive capacity and learning agility among leaders.

Alternate Hypothesis (H1): Adaptive capacity has a positive effect on learning agility among leaders, meaning as adaptive capacity increases, learning agility also increases.

Hypothesis 3 (Distinctness of L&D Process as a Leadership Dimension)

Null Hypothesis (H0): The organizational learning and development (L&D) process does not represent a distinct leadership capability separate from AI literacy, ethical stewardship, adaptive capacity, and learning agility.

Alternate Hypothesis (H1): Organizational learning and development (L&D) reflects a distinct leadership capability that is less overlapping with AI literacy, ethical stewardship, adaptive capacity, and learning agility.

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Findings

The Cronbach Alpha score for the survey was robust and assessed whether the items of a scale produce consistent results, indicating there is little random error and the scale is measuring a coherent construct. A score above 0.7 is generally considered acceptable for research purposes, with higher scores representing stronger internal consistency.

AILIT1	AILIT2	AILIT3	AILIT4	AILIT5	ETHIC1	ETHIC2	ETHIC3	ETHIC4	ADAPT1	ADAPT2	ADAPT3	ADAPT4	ADAPT5	LEARNAG1	LEARNAG2	DEV1	DEV2
0.9409	0.9489	0.9555	0.9592	0.9476	0.8186	0.8866	0.9123	0.8709	0.7701	0.8794	0.8984	0.9260	0.9365	0.8560	0.7416	0.7269	0.7183

Correlation analysis

	AI Literacy Score	Ethical Stewardship Score	Adaptive Capacity Score	Learning Agility Score	L&D Process Score
AI Literacy Score	1.0000	0.598	0.588	0.446	0.248
Ethical Stewardship Score	0.598	1.0000	0.607	0.472	0.467
Adaptive Capacity Score	0.588	0.607	1.0000	0.595	0.393
Learning Agility Score	0.446	0.472	0.595	1.0000	0.363
L&D Process Score	0.248	0.467	0.393	0.363	1.0000

Inferences from above - Moderate to strong correlations (0.4 to 0.6 level) among AI Literacy, Ethical Stewardship, Adaptive Capacity, and Learning Agility scores suggest these leadership dimensions are related but distinct. L&D Process Score shows lower correlations (0.25 to 0.47) with other scores, indicating it may measure a somewhat different aspect of organizational leadership or capability. The highest correlation is between Ethical Stewardship and Adaptive Capacity (0.61), hinting that ethical considerations and adaptability in leadership tend to co-

occur in this population. Scores tend to group conceptually but retain some independence, which supports the multidimensionality of your leadership competency framework.

	AILIT1	AILIT2	AILIT3	AILIT4	AILIT5	ETHIC1	ETHIC2	ETHIC3	ETHIC4	ADAPT1	ADAPT2	ADAPT3	ADAPT4	ADAPT5	LEARNAG1	LEARNAG2	DEV1	DEV2
Mean	3.03	3.17	3.03	3.42	3.26	3.60	3.18	3.51	2.55	2.52	4.00	3.72	4.05	4.12	3.92	4.52	3.91	3.71
Stddev	1.13	1.07	1.02	0.98	1.08	1.27	1.03	0.92	1.09	1.19	0.88	0.82	0.72	0.67	0.96	0.69	1.03	1.04
Skewness	0.34	-0.43	-0.16	-0.93	-0.39	-0.70	-0.47	-0.58	0.38	0.61	-1.54	-0.67	-1.38	-0.47	-0.73	-1.73	-1.15	-0.32
Kurtosis	-0.57	-0.30	-0.32	0.42	-0.31	-0.54	-0.28	-0.19	-0.20	-0.32	3.32	1.05	4.82	0.50	0.23	3.80	0.93	-0.69

AILIT1 to AILIT5 (AI Literacy items): Cluster around a mean of 3.0 to 3.4, indicating moderate recognition or agreement with AI literacy competencies. ETHIC1 to ETHIC4 (Ethical Stewardship): Means range from 2.55 to 3.60, showing moderate to somewhat positive agreement, with ETHIC4 slightly lower, possibly indicating a less strong consensus. ADAPT1 to ADAPT5 (Adaptive Capacity): Means vary from 2.52 to 4.12, showing some adaptive skills are rated highly (ADAPT4 and ADAPT5 with means above 4), while others less so (ADAPT1 and ADAPT2 closer to 2.5). LEARNAG1 and LEARNAG2 (Learning Agility): Means about

3.9 to 4.5 indicate strong learning agility perception. DEV1 and DEV2 (Learning & Development process): High values—3.9 and 3.7—reflect positive views on organizational development processes. Most items fall in the moderate to high agreement range (mean ~3 to 4.5). Items reflect varying levels of perceived competency or importance among respondents. Lower means (around 2.5) suggest areas where respondents are less confident or see more room for development.

Hypothesis 1 (Relationship between AI Literacy and Ethical Stewardship)

Null Hypothesis (H0): There is no significant correlation between AI Literacy and Ethical Stewardship scores among organizational leaders.

Alternate Hypothesis (H1): There is a significant positive correlation between AI Literacy and Ethical Stewardship scores among organizational leaders. – ACCEPTED (based on the results of Correlation)

Hypothesis 2 (Adaptive Capacity and Learning Agility as Related Constructs)

Null Hypothesis (H0): There is no positive association between adaptive capacity and learning agility among leaders.

Alternate Hypothesis (H1): Adaptive capacity has a positive effect on learning agility among leaders, meaning as adaptive capacity increases, learning agility also increases. – ACCEPTED (based on the result of Correlation)

Hypothesis 3 (Distinctness of L&D Process as a Leadership Dimension)

Null Hypothesis (H0): The organizational learning and development (L&D) process does not represent a distinct leadership capability separate from AI literacy, ethical stewardship, adaptive capacity, and learning agility.

Alternate Hypothesis (H1): Organizational learning and development (L&D) reflects a distinct leadership capability that is less overlapping with AI literacy, ethical stewardship, adaptive capacity, and learning agility. – ACCEPTED (based on the below regression analysis)

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OVERALL FIT	
Multiple R	0.615116
R Square	0.378368
Adjusted R Square	0.347795
Standard Error	0.534319

ANOVA				Alpha	0.05	
	df	SS	MS	F	p-value	sig
Regression	3	10.60011	3.533371	12.37624	2.01E-06	yes
Residual	61	17.41527	0.285496			
Total	64	28.01538				

	coeff	std err	t stat	p-value	lower	upper	vif
Intercept	1.649826	0.435404	3.789183	0.000348	0.779181	2.52047	
AI_Literacy_Score	0.075415	0.106579	0.707596	0.481891	-0.1377	0.288534	1.77841
Ethical_Stewardship_Score	0.127055	0.125509	1.012318	0.315385	-0.12392	0.378025	1.843082
Adaptive_Capacity_Score	0.522735	0.156167	3.347274	0.001402	0.210459	0.835011	1.810255

Learning Agility Score does not depict a different direction from the AI literacy score, Ethical stewardship score and Adaptive capacity score.

The model used three predictor variables to explain variation in the dependent variable.

The regression model explains about 37.8% of the total variance in the outcome (R Square = 0.378).

The adjusted R Square of 0.348 indicates that after accounting for the number of predictors, the model still explains a substantial portion of variance.

The F-statistic value (12.38) is large, meaning the overall regression model fits the data significantly better than a model without predictors.

The p-value for the F-test (2.01E-06) is much smaller than the alpha level (0.05), so the model is statistically significant.

This significance means that at least one of the predictors has a statistically significant relationship with the dependent variable.

The residual mean square is small (0.29), indicating the model's predictions are fairly close to actual observations.

The large regression sum of squares (10.6) compared to residual (17.4) shows the predictors contribute notably to explaining the dependent variable.

The sample size of 65 observations is moderate and sufficient for this regression model. Overall, this regression analysis shows a strong, statistically significant model that can be used to understand and predict the dependent variable based on the chosen predictors.

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Leadership for Complexity, Sustainability, and Human-Centric Innovation – September 19, 2025

L & D Process Score does not depict a different direction from the AI literacy score, Ethical stewardship score and Adaptive capacity score.

OVERALL FIT	
Multiple R	0.495401
R Square	0.245422
Adjusted R Square	0.208311
Standard Error	0.856808

ANOVA				Alpha	0.05	
	df	SS	MS	F	p-value	sig
Regression	3	14.56484	4.854945	6.613286	0.000609	yes
Residual	61	44.78132	0.73412			
Total	64	59.34615				

	coeff	std err	t stat	p-value	lower	upper	vif
Intercept	1.170754	0.698193	1.676833	0.098693	-0.22537	2.566878	
AI_Literacy_Score	-0.14366	0.170906	-0.84059	0.403861	-0.48541	0.198085	1.77841
Ethical_Stewardship_Score	0.544398	0.20126	2.70495	0.008843	0.141954	0.946843	1.843082
Adaptive_Capacity_Score	0.365359	0.250423	1.45897	0.149704	-0.13539	0.86611	1.810255

The regression model includes three predictors: AI Literacy, Ethical Stewardship, and Adaptive **Capacity.**

About 24.5% of the outcome's variation is explained by these predictors together, which is a modest but meaningful amount.

After adjusting for predictors and sample size, about 20.8% variance explanation remains, indicating a reasonably good fit.

The model overall is statistically significant, meaning the predictors together have a real association with the outcome.

Ethical Stewardship is the strongest and only significant positive predictor of the outcome.

AI Literacy shows a small negative effect, but it is not statistically significant, so it may not influence the outcome reliably here.

Adaptive Capacity has a positive coefficient but did not reach statistical significance in this model.

The intercept suggests that if all predictors were zero, the baseline outcome value would be about 1.17.

The moderate R value (0.495) suggests reasonable prediction accuracy but also room for improvement with additional factors or refinement.

Overall, Ethical Stewardship appears important for influencing the outcome, while AI Literacy and Adaptive Capacity need further exploration or larger samples to confirm effects.

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Limitations of the study

The study was limited to online survey conducted with individuals from industries, especially in IT services, Fintech and Banking. The interviews were conducted with individuals in higher management positions. There is scope to conduct the study further across a wide range of working professionals from industry as well as academia.

Conclusion

This research has thoroughly explored key leadership competencies including AI Literacy, Ethical Stewardship, Adaptive Capacity, Learning Agility, and Learning & Development (L&D) processes through a mixed-methods approach using questionnaires and interviews. Our statistical analyses, comprising factor analysis, correlation matrices, and regression modeling, reveal important insights for organizations committed to developing strong leadership pipelines. The findings highlight that these competencies, while interrelated, exhibit unique qualities and influences on leadership effectiveness. For example, Ethical Stewardship emerged as a significant predictor of leadership outcomes, underscoring the critical role of ethical awareness and responsible decision-making in today's complex organizational environments.

Adaptive Capacity and Learning Agility also show meaningful positive relationships, emphasizing the importance of leaders who can respond dynamically to change and continuously learn.

Importantly, the L&D Process was found to represent a distinct dimension, reinforcing that structured learning frameworks within organizations are vital to support and sustain leadership growth. The moderate but meaningful explained variance in regression models suggests that while these competencies are strong contributors, leadership development must also consider broader contextual and organizational factors.

For Learning & Development departments, these insights point to several actionable takeaways. First, L&D initiatives should prioritize not only traditional skill building but also embed strong ethical frameworks as part of core leadership curricula. Programs that foster adaptability and agility will prepare leaders to better navigate uncertainty and disruption. Secondly, the distinctiveness of L&D process competency calls for well-designed, ongoing training interventions that integrate classroom learning with experiential and on-the-job opportunities, supporting the recommended 70:20:10 learning model.

Moreover, the significant yet varied relationships among competencies mean L&D should adopt a holistic yet tailored developmental approach, addressing specific leadership needs within organizational contexts rather than relying solely on one-size-fits-all solutions. Continuous evaluation and refinement of leadership programs using reliable data and robust analytics, like those applied in this research, will ensure ongoing relevance and impact.

In summary, this research confirms the multidimensional nature of leadership competencies and highlights the indispensable role of ethical stewardship and adaptive learning in cultivating effective leaders. By strategically leveraging these findings, L&D departments can design comprehensive leadership development initiatives that not only build competence but also enhance organizational resilience and sustainability in the face of evolving challenges. Investing in these competencies with data-driven approaches and integrated learning strategies is essential for organizations aiming to thrive in the future.

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