

## **Bridging the Talent Gap: A Competency-Based Framework for Managerial Readiness in an AI-Driven Economy**

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### **Abstract**

Artificial Intelligence (AI) is reshaping industries across all sectors. AI is automating organizational functions, complex cognitive tasks and decision-making across departments in addition to routine tasks. This has led to a shift in managerial roles and skills required for effective performance. Reviews of existing frameworks suggest that the prevailing frameworks are fragmented and focus on technical or digital competencies (Hamzah *et al.* 2025, Pan & Froese, 2024). They do not offer an integrated model that supports managerial practices, ethical operationalization, curriculum design and competency assessment for emerging human-AI collaborative environment. This highlights the need for a management specific competency framework for employers, educators, postgraduate management graduates and policymakers in the evolving AI landscape. This study proposes a comprehensive competency framework based on latest global industry reports and literature review. NVivo was used for systematic coding, cross-case comparison for identifying the thematic patterns. The competencies identified and analysed based on relevance and frequency are AI literacy, digital and data fluency, cybersecurity, human-AI collaboration, ethical AI use and social-emotional skills. These were incorporated in the model. The model (Figure. 1) was found to be reliable and valid.

**Keywords** -Artificial Intelligence (AI), competency framework, Human centric AI capability, managerial role, responsible digital Intelligence

### **1.0 Introduction**

AI is one of the major emerging technologies of the twenty-first century and it is changing how businesses operate and create value. Organizations use AI to automate tasks such as content generation, document summarization, marketing content creation and insight generation. This has led to a shift in managerial roles from performing tasks to enhancing the output generated (Babashahi *et al.*, 2024). AI also supports managerial and executive decision-making through real-time insight generation and predictive analysis to improve decision outcomes. Customer experience is being redefined through AI enabled onboarding systems, hyper-personalized services and intelligent chat bots. These advances are disrupting traditional approaches through automated consulting, AI-generated workflows and productization of services. According to McKinsey, 2024 report AI could contribute 15-20 trillion USD to the economy by 2030 through automation, intelligent decision-making and improved productivity. The report also warns that there may be a loss of 7 trillion USD unless industries bridge the widening skill gap. With the increasing use of AI in core business functions there is a need for managers who can effectively work in AI-driven environment. There is a shift in skills and competencies expected of managers as compared to the past. Employers expect postgraduate management graduates to possess diverse and future-ready skill sets. However, many of the postgraduate programs still focus on traditional skills. This could widen the skill gaps and hinder employability of the graduates. There is a dearth of studies examining the critical skills required in the evolving job landscape. This study addresses this gap by proposing a competency framework for managers in an AI-driven economy. This model can guide educators, policymakers and industry leaders in designing curriculum, training programs and talent development strategies.

### **1.1 Development of AI Managerial Competency Model from the Literature Review**

An extensive literature review was conducted to determine factors contributing to the managerial AI competency framework. For this a thorough and methodical review of prior research on artificial intelligence, digital competence, managerial competence and responsible technology adoption was done. Managerial competence in

AI is not limited to technical skills but also includes social capabilities and ethical application. This served as the foundation for selecting the determinants for AI Managerial Competency Framework.

Several studies have stressed that managers need to have the fundamental understanding of AI concepts, capabilities and limitations (Zhai *et al.* 2022, Carolus *et al.* 2023, Han *et al.* 2023). AI literacy contains interrelated components which include comprehending AI concepts, using AI tools and critically evaluating the outputs. AI literacy refers to the knowledge and capabilities required to use, interpret and evaluate AI systems effectively in diverse contexts (Lintner, 2004). Managers with AI literacy can assess AI use cases, analyse AI-generated results and interact with technical teams. If they lack AI literacy managers stand the risk of misinterpreting AI outputs or overestimating AI capabilities (Carolus *et al.* 2023). As AI-literate managers are effectively able to use and interpret results from AI- tools this could result in better strategic decision-making (Kang *et al.* 2024). As per research in finance sector leaders with AI literacy show higher innovation outcomes and adaptive capacity suggesting that managers can be more effective in complex environment by using AI-tools (Han *et al.* 2025). Studies strongly state that AI literacy is necessary for professionals in AI-driven workplace. It makes it possible for managers to interact with AI technologies and make informed decisions (Nag *et al.* 2021).

Digital and data fluency are essential to artificial intelligence because AI systems rely heavily on data and technology. In data-driven decision-making environment where AI systems produce predictive and prescriptive insights the relationship between data fluency and AI is significant (Benlian, 2025). To effectively use AI tools managers need to be digitally fluent to work with AI platforms and technologies. The accuracy and dependability of AI-generated output are impacted by the availability, quality and interpretation of data as AI systems are data-dependent (Górka *et al.* 2025). Data-driven decision-making is becoming a key managerial skill in AI-enabled organizations according to leadership and management research. This change is further supported by increasing reliance on big, complex datasets and predictive analytics where AI systems provide recommendations. However, effective use of AI depends on managers' capacity to interpret analytical outputs, evaluate underlying assumptions and make well-informed decisions in the organizational contexts (Chiusano *et al.* 2022). Research suggests a dual competency requirement where managers need to have data fluency to evaluate data source quality, limitation and governance as well as digital fluency to comprehend and interact with AI technologies and platforms. With these competencies managers can translate AI-driven insights to strategic and operational actions.

Artificial intelligence and cybersecurity are closely related because AI systems rely on secure data environment and automate incident response (Wetzel, 2025). Without proper cybersecurity AI systems could be vulnerable to data breaches or manipulation producing biased or unreliable results. AI also presents new cybersecurity risks of automated cyberattacks like deepfakes, advanced phishing or adversarial attacks that target AI models (ISC2, 2025). However, on the other hand AI strengthens cybersecurity by real-time threat detection, automated incident response and predictive risk analysis. (Matei *et al.* 2023). From a managerial perspective cybersecurity is necessary for ensuring regulatory compliance, trust and accountability because AI systems handle sensitive data. Therefore cybersecurity awareness and risk literacy are needed for managers to effectively adopt AI (Ghanbari, 2026). Because cybersecurity and AI complement each other cybersecurity is an essential component of AI competency especially for managers operating in AI environment (Samuel, 2025).

Human-AI collaboration is a key theme in managerial research because it has a significant impact on how managers use AI capabilities to achieve crucial outcomes. Knowing which tasks are best performed by humans and which can be done by AI is an important aspect in Human-AI collaboration. Making this distinction ensures that AI is used where it adds the most value, and decision-making involving judgment or uncertainty is left to humans (Bieńkowska *et al.* 2025). How managers interpret AI-generated outputs is an additional element of human-AI collaboration. AI can generate forecasts, classifications, and recommendations, but these outcomes are rarely self-explanatory. In order to determine their applicability managers must critically question them (Holstein & Satzger, 2025). Managers can integrate AI results and their knowledge. Effective coordination and communication are crucial for human-AI collaboration in cases where humans and AI systems contribute to work processes. Effective communication reduces confusion and minimizes over-reliance on AI (Hemmer, 2023). All these features establish human-AI cooperation as a fundamental managerial skill for ethical and successful AI-driven decision-making.

Emotional intelligence (EI) and social skills are crucial for effective leadership and has a positive impact on building cohesive, motivated and effective teams (Joanna *et al.* 2025). Empathetic and socially adept managers are better at fostering trust, motivating staff members and managing conflicts. These abilities are also critical as companies deal with advanced technology and uncertain situations (Isabel *et al.* 2013). Since AI is automating a lot of repetitive tasks incorporating emotional intelligence into AI-driven leadership models improves the ability of managers to lead others. While AI can assist with analysis managers' social-emotional skills are crucial for successful management communication, employee engagement, and relationship building (Jog, 2025). Managers must interpret AI outputs, clearly explain decisions, and sensitively address employee concerns highlighting the continued importance of human judgment in AI workplaces. Emotionally intelligent managers play a key role by promoting open communication and accepting different points of view in human-led decisions supported by AI recommendations (Woods, 2025). For managers to effectively lead in AI-enabled organizational contexts, social-emotional skills become a crucial component of AI competency.

Studies on AI competency identify responsible application and ethical AI governance as an essential managerial competency (Batool *et al.* 2025). AI governance emphasizes on managers' ability to ensure fairness, reduce algorithmic bias and protect data privacy for successful AI adoption (Štrukelj & Dankova, 2025). Further transparency and accountability must be included in organizational governance structures. AI competency extends beyond technical understanding to include institutional norms, policies and practices that promote ethical AI use (Simone, 2026). Ethical AI use is also related to managerial risk management. AI systems can introduce significant risks related to data misuse, discrimination and regulatory noncompliance (Baldwin *et al.* 2025). Good knowledge of ethical AI principles equips managers to foresee these risks and implement appropriate safeguards.

Grounded in sociotechnical systems theory, technology acceptance models, and ethical leadership perspectives, this study conceptualizes AI competence as a multidimensional managerial capability. The constructs were identified based on a literature review and report by KPMG, McKinsey & Company and EY on contemporary managerial skills in an AI-driven environment. The selected factors AI literacy, cybersecurity, digital and data fluency, AI ethical use, human-AI collaboration and social-emotional skills collectively capture the essential dimensions required for managers to function in an AI-augmented environment. These represent the competencies required for managers to effectively govern, interpret, and integrate AI in organizational decision-making contexts.

## 1.2 Research Gap

Studies highlight that existing frameworks are fragmented addressing isolated dimensions such as technical or digital skills overlooking the integrations of cognitive, interpersonal, strategic, and ethical capabilities (Santana & Díaz-Fernández, 2023; Babashahi *et al.* 2024). Managers are lagging in competencies necessary to operate effectively in AI-enabled work environments and there is a need for more integrated theoretical frameworks to guide managerial development. (Marocco *et al.* 2024, Babashahi *et al.* 2024). Most models focus on software proficiency while underrepresenting managerial judgment, leadership, human-AI collaboration and socio-economic competencies. (Cox, 2024, Pinski & Benlian, 2024; Rigley *et al.* 2024). Despite increasing use of AI in workflow design and strategic decisions the existing frameworks marginalize competencies required for human-AI collaboration and ethical or governance elements (Chiu *et al.*, 2024; Sadek *et al.*, 2024). Also prevailing models lack strong empirical evidence and assessment tools limiting their application in curriculum development, skill evaluation, workflow development and managerial upskilling (Bowers *et al.*, 2024; Obi *et al.*, 2025; Atchley *et al.*, 2024).

## 1.3 Research Objectives

- To identify the skill sets and competencies required for AI-driven future workforce.
- To develop a comprehensive evidence-based AI-driven competency model for emerging AI-intensive managerial roles.
- To validate the proposed competency model through empirical testing.

The methodology followed was mixed method comprising of qualitative content analysis and triangulation with the model development using quantitative approach. The skill framework was developed after analysing the five major industry reports published by McKinsey & Company, KPMG, EY, the World Economic Forum (WEF), and the McKinsey Global Institute in 2024 and 2025. Additionally recent and relevant research papers were also studied thoroughly to develop the competency framework. For the development of the framework each reports were added to NVivo 14 as a separate case. The case attributes included Publisher, AI focus, Region, Methodology followed and geographical coverage. The coding process followed was a mix of deductive and inductive method. The initial coding was based on existing competency models like OECD DigComp and World Economic Forum digital skills. The codes developed was further refined through close reading, word frequency maps and treemaps derived from NVivo. The framework development followed cluster dendrograms to group similar cases, case-node model maps to explore relationships within each case (refer annexure Fig. 3a and Fig. 3b), and cross-case comparisons to identify common competency patterns. The primary focus was to capture common patterns and not on opinion.

The proposed research model was developed based on the variables identified from qualitative research and was further tested and verified using smart PLS 4.0. The target population comprised of professionals who are in lead roles in diverse sectors.

### **2.1 Survey Process and Sample**

Responses were collected from domain experts from IT/ITES, E-Commerce, Quick Commerce, Consulting, EdTech, Telecom, BFSI sectors. A simple random sampling was followed for data collection. The participants profile varied from Team Leads to leadership positions across India. 167 responses were found to be complete and valid out of 183 total participants and were retained for further analysis. PLS-SEM using Smart PLS 4.0 was employed to validate the research model.

### **3.0 FINDINGS**

The following seven digital and AI competencies appeared repeatedly across reports. They were: AI literacy, data literacy, digital fluency, automation tools use, cybersecurity basics, human-AI collaboration, and technical AI/ML ability (ref Annexure fig 4). AI literacy and AI/ML ability were merged into one code due to strong overlap. Similar approach was followed for data literacy, digital fluency. Other codes were reviewed for overlaps and retained as distinct codes. The competency identified from the reports based on relevance and frequency were

- AI literacy,
- Digital Fluency
- Cybersecurity skills
- Human-AI collaboration

The language in the reports focused heavily on data, skills, learning, tech, and machine concepts. Cluster analysis grouped human-AI collaboration, AI literacy, and digital fluency very closely. AI literacy and human-AI collaboration showed the highest coding density. Cybersecurity and technical AI skills were less frequent and appeared only in a few reports.

The developed framework was triangulated using literature evidence and from the latest reports from the industry on skills required for future work force as detailed in the introduction. The proposed competency model was drafted and reviewed, and a pilot study was conducted with senior industry professionals. Further the model was tested and was found to have validity and explanatory power.

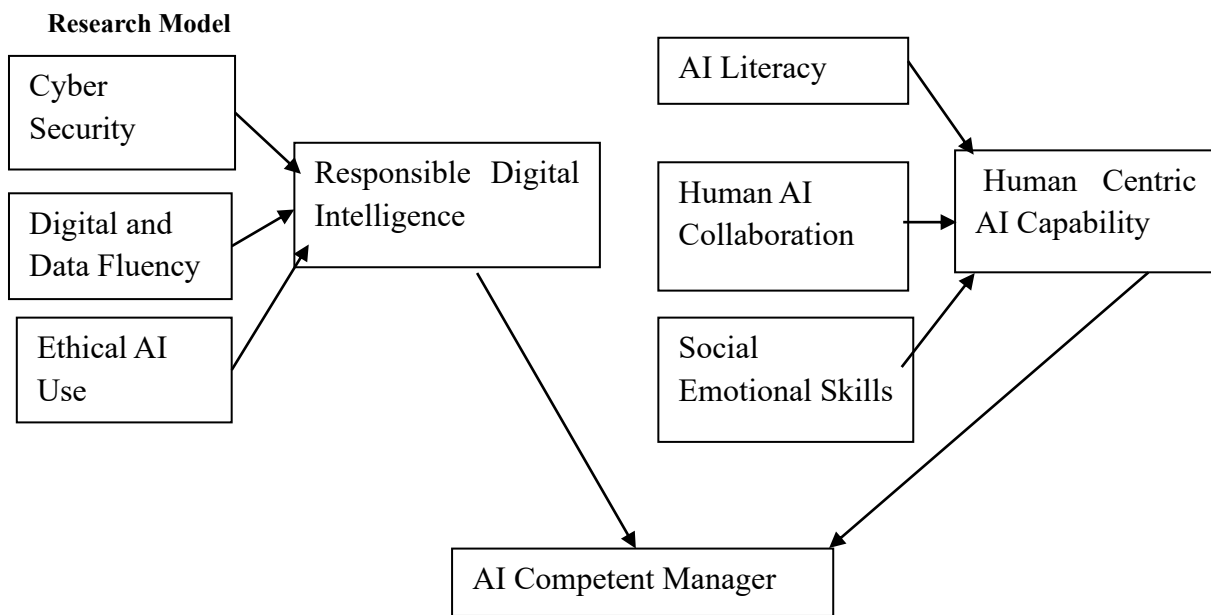


Figure 1. Research Model

The research design involved the testing of the relationships between First Order Constructs (FOCs) and Higher Order Constructs (HOCs). The model employed a reflective-formative relationship between the FOCs and HOCs. The First order construct “Responsible Digital Intelligence” was measured as reflective using the constructs cyber security, Digital and Data Fluency and Ethical use of AI.

Human Centric AI Capability was also hypothesised as FOC and was measured reflectively using the constructs AI Literacy, Human AI Interaction and Social Emotional Skills.

The dependent variable ‘AI Competent Manager were defined by the first order constructs “Responsible Digital Intelligence” and “Human Centric AI Capability”. The model hypothesized that these two constructs contribute to AI competent manager. To ensure that the data is fit to proceed with smart PLS a Common Bias Test was conducted. The result was within the approved range of 50 %.

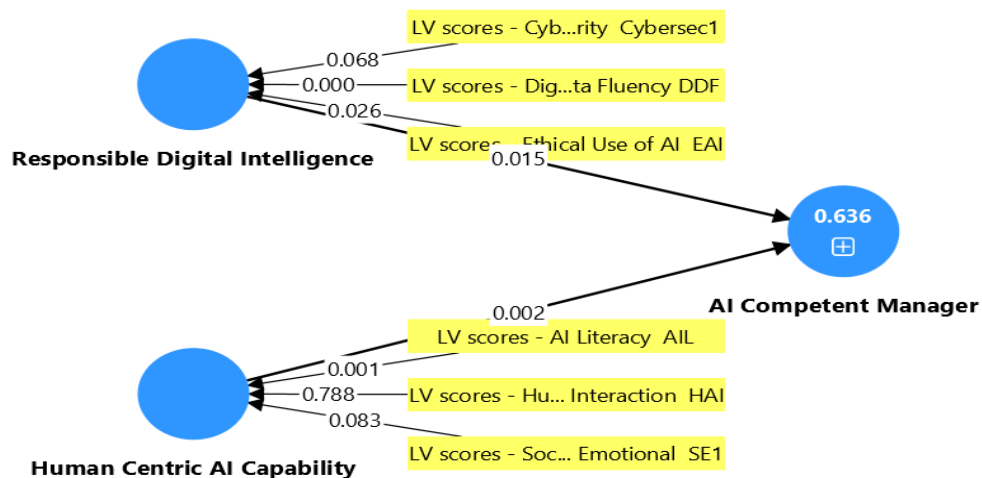


Figure 2. Structural Equation Model (FOC and HOC)

At the first-order level, constructs were operationalized using latent variable scores derived from lower-level sub-dimensions. Responsible Digital Intelligence were operationalized using latent variable scores from cyber security, Digital and Data Fluency and Ethical use of AI. Human Centric AI Capability was derived using the constructs AI Literacy, Human AI Interaction and Social Emotional Skills. The model was estimated using the disjoint two-stage approach.

Cronbach’s alpha ( $\alpha$ ), composite reliability (CR), and average variance extracted (AVE) was evaluated for establishing the reliability of the constructs. Convergent validity was also established, as all AVE values were above the minimum criterion of 0.50.

At the higher order level validity was examined through content, collinearity assessment, and the significance of indicator weights.

**Table 1. Measurement model (Lower Order Components)**

	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Ethical Use of AI	0.949	0.963	0.867
AI Literacy	0.955	0.964	0.818
Human AI Interaction	0.962	0.970	0.844
Social and Emotional Skills	0.967	0.974	0.861
Cyber Security Skills	0.976	0.981	0.914
AI Competent Manager	0.979	0.982	0.856

This research employed Fornell-Larcker Criterion and cross loadings to confirm the Discriminant validity for the first order (lower-order) constructs.

**Validity of Higher Order Construct.**

The higher order constructs were assessed by verifying their outer weights and outer loadings. The lower order constructs that contributed to higher order construct “Responsible Digital Intelligence had ‘p values’ less than 0.05 indicating their significant contribution. The higher order construct Human Centric AI Capability demonstrated a weak statistical contribution at the formative level. However, this variable was decided to be retained as its outer loading is significantly high and the comprehensive industry reports highlighted the significance and relevance of this variable. The multicollinearity for each of the construct was well within the acceptable limits.

**Table 2.: Higher Order Constructs**

HOC	LOC	Outer Weight	T Statistics	P Values	Outer Loadings	VIF
Responsible Digital Intelligence	Digital and Data Fluency	0.455	3.528	0.000	0.883	1.9
	Ethical Use of AI	0.393	2.227	0.013	0.892	2.2
	Cyber Security	0.314	1.844	0.033	0.788	1.6
	AI Literacy	0.692	3.366	0.000	0.973	4.1

Human Centric AI Capability	Social and Emotional Skills	0.310	1.734	0.041	0.862	2.5
	Human AI Interaction	0.065	0.272	0.393	0.973	4.7

Table 3. Structural Model and Results

	Original sample	T statistics	P values
Human Centric AI Capability -> AI Competent Manager	0.464	3.109	0.001
Responsible Digital Intelligence -> AI Competent Manager	0.353	2.454	0.007

The positive effects of Human Centric AI Capability ( $\beta = 0.464, t = 3.109, p < 0.05$ ) on AI competent Manager was established from the structural equation model. These findings provide strong empirical evidence of the research model that ‘Human Centric AI Capability’ and ‘Responsible Digital Intelligence’ are significant contributors towards the development of managerial competence in the AI enabled world. This result highlights the “human in the loop“ philosophy, that effective managers should go beyond the technical skills. They should judiciously utilise the appropriate AI tools and should be mindful about the AI hype. The managers also play a significant role to successfully anchor the team during digital transition and should be able to design a workflow where the human judgment and machine intelligence can complement each other. This research brings out that exclusive focus on technical skills is not the only competency required to handle AI driven work force.

The structural equation model demonstrated a positive and statistically significant impact of the FOC Responsible Digital Intelligence on the outcome variable ( $\beta = 0.353, t = 2.454, p = 0.007$ ). This result highlights the need to have a responsible engagement with digital technologies and AI system as a crucial determinant for AI Competent managers.

**R square Value**

The explanatory power of the model was determined by Coefficient of determination (R square). The results show that the model explains moderate to substantial proportion of variance in the dependent variable- AI Competent Manager. The outcome variable, recorded an R<sup>2</sup> value of 0.636

Table 7: R square Value

Endogenous Construct	R-square	Interpretation
AI Competent Manager	0.636	Moderate–Substantial

**4.0 Conclusion**

This study proposes an empirically validated multidimensional model of AI managerial competence that integrates technical fluency, responsible AI governance, and human-centric leadership capabilities. The factors were selected based on theoretically grounded, empirically supported and practical managerial competence in the context of artificial intelligence. The construct ‘Responsible Digital Intelligence’ comprises dimensions of cybersecurity, digital and data fluency and ethical use of AI. The construct ‘Human-Centric AI Capability’ includes AI literacy,

human-AI interaction and social-emotional skills. Together these constructs capture the multifaceted competencies required for effective managerial performance in AI-driven environment. The findings of this study substantiate prior research by demonstrating that constructs under responsible digital intelligence are crucial for managerial effectiveness in an AI-driven environment (Chiusano *et al.* 2022, Matei *et al.* 2023, Štrukelj & Dankova, 2025). The results align and extend prior research by confirming that constructs under Human Centric AI Capability are critical for balancing technological performance with social and human skills (Nag *et al.* 2021, Bieńkowska *et al.* 2025, Joanna *et al.* 2025). Additionally, the study contributes to a consolidated framework addressing the lack of an integrated model.

## Theoretical and Practical Implications

From a theoretical perspective this study extends the AI competency literature by offering an integrated and empirically grounded framework. The study establishes AI managerial competence as a multidimensional construct. The study bridges the gap between technology management, ethical governance and human-centred leadership research.

Practically the validated framework provides organizations with a structured tool to assess and develop AI-related managerial competencies. The model developed is strongly based on industry requirements and has considered the expectations across multiple sectors and regions. In the competency model. The model developed can support skill-building at different career levels. The framework can be used for upskilling by Learning development and HR teams. Using this framework as a benchmark policymakers can address the industry-academia gaps. This model is one among the first cross-case syntheses of industry reports using semantic clustering. The model is built on the strong foundation of real-world expectations

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Figure 3a. Case Node Model -Case Nodes representing five industry reports (McKinsey,KPMG,EY,WEF,MGI)

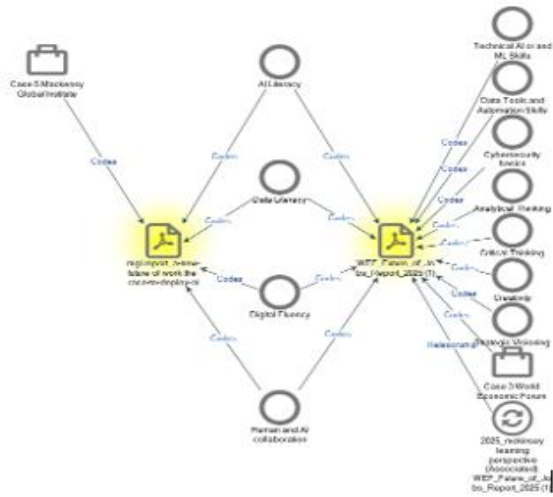


Figure 3b. Case Node Model -Case Nodes representing five industry reports (McKinsey,KPMG,EY,WEF,MGI)

Dendrogram

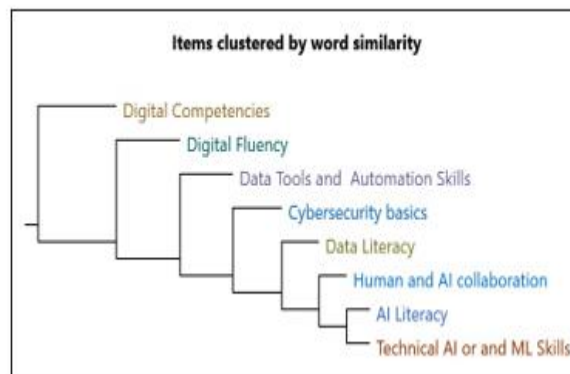


Figure 4. Dendrogram: Competencies clustered by word similarity based on NVIVO thematic codes