Research Article

Artificial Intelligence in Strategic Talent Development: A Literature Review of Frameworks for Workforce Readiness and Organizational Resilience (2020–2025)

Hasan Ali [1]

[1] Saudi Aramco, Dhahran, Saudi Arabia

Abstract

The accelerated digitalization of high-risk sectors, including the oil and gas industry, has put a strain on superior workforce skills uniting the aspects of artificial intelligence (AI), big-data analytics, and cybersecurity skills. With the burgeoning skills gaps, cyber threats, and pressure to maintain organizational resilience because of Industry 4.0 and 5.0 technologies changing the landscape of operating spaces, organizations stand to face more challenges. This paper examines the way in which AI-based strategic talent development (STD) models can be used to improve workforce readiness and resilience in critical infrastructure environments. The systematic literature review (SLR) was performed based on PRISMA guidelines that utilized peer-reviewed articles published from 2020 to 2025. The IEEE Xplore, Scopus, ScienceDirect, and ACM Digital Library databases were searched to find the relevant research. High-quality studies amounting to seventy-five were chosen and followed up on the premise of industry applicability, technological depth and empirical rigor. The synthesis covers models of AI adoption, practices of working with the workforce, and the use of cybersecurity in high-risk industries, the oil and gas industry being primarily discussed. The review shows that AI-based skill mapping, custom learning opportunities, and human-AI interaction play a vital role in improving the level of workforce preparedness. All adoption models (TOE, TAM, UTAUT, and AI-readiness indices) have a complementary role in transforming technological competence into effective talent results. The alignment between the big-data analytics and AI-enhanced cybersecurity comforts predictive threat detection and contributes to the active organizational resilience. The results also indicate that a new Resilience Loop has emerged where adoption of AI, talent preparedness, resilient cybersecurity, and resilient organizational performance are connected.

Keywords

AI-driven talent development, Workforce resilience, Cybersecurity integration, Human–AI collaboration, Predictive security analytics, Skills mapping and personalized learning, Critical infrastructure protection, Digital transformation in oil and gas

1. Introduction

1.1. Background: The digital transformation of the Oil & Gas industry (Industry 4.0/5.0)

Digital revolution in the oil and gas industry, developed in

*Corresponding author: Hasan Ali

Email addresses:

ha7386615@gmail.com (Hasan Ali)

the frames of Industry 4.0 and industry 5.0, is significantly enhancing efficiency in operations. Digital twins complemented by artificial intelligence (AI) and deep analytics have produced performance improvements as well as cost-savings on various facets of operation [1]. As an example, digital-twin-like models can help companies optimize the processes of managing resources and controlling their assets to decrease the downtime and boost the production volumes due to real-time data analytics [2,3]. The mentioned technological solutions make strategic talent development an essential requirement, as they are trusted to have the workforce skilled in AI technologies and digital solutions, which is critical to organizational resilience. Nevertheless, oil and gas industry is facing challenges that are based on slow moving systems and industrial resistance, irrespective of the bright prospects of digital transformation. The reason why many organizations cannot use new digital solutions is in established infrastructures, cyber threats, and the cultural barriers that hinder change [2,4]. The obstruction to the changing the traditional operation may be a barrier to the industry to take advantage of the digital opportunities. As a result, businesses are also forced to invest in technological developments as well as their employees to aid the process of digital maturity [5,4,6]. To make the situation in the oil and gas industry even more tricky, the increased interest in environmental sustainability is present. As stake holders' subject corporations to increase accountability scrutiny, companies are forced to engage in a more transparent nature of functioning as well as sustainable processes [2]. The use of digital technologies does not only guarantee better operational results but can also help to achieve sustainability goals, including reducing the emission of greenhouse-gases through the optimization of the resources use [3,7]. The efficiency and sustainability duality proves the crucial place of AI in strategic talent building in providing the organizations with a workforce that is both information-technologically skilled and environmentally aware. The sphere of oil and gas is getting transformed due to the ongoing digital transformation, which is driven by the development of AI and the associated technologies. Although the issues related to the legacy systems and a demand to achieve sustainability are still present, the strategic planning of the talent that would manage this digital move and guide them are required in the future to ensure organizational resilience and preparedness. An in-depth interpretation of these dynamics is bound to benefit the industry stakeholders and the workforce development exercises.

1.2. Problem Statement

Though the benefits of using AI to understand strategic talents have been extensively discussed, organizations, especially in the oil and gas industry, do not have empirically

tested and ethically sound systems that can effectively operationalize AI and hence create a problem of organizational preparedness, algorithmic discrimination, employee resistance, and negative labor results.

The adoption of Artificial Intelligence (AI) in strategic talent development is extremely challenging, and organizations must ensure there are critical challenges that they need to overcome in that regard. With the oil and gas industry and other sectors reacting to the digital revolution introduced by Industry 4.0 and 5.0, organizations are striving to find productive models that can realize the effectiveness of Artificial Intelligence (AI) in streamlining talent management procedures. Nevertheless, they have challenges in operationalizing such frameworks due to worries about algorithmic bias, transparency, and ethical issues [3]. Moreover, despite an abundance of literature on the advantages of AI, there is still a huge gap between theoretical literature and empirical evidence about the feasibility of AI applications in various areas of talent development, specifically, the validation of AI systems in actual organizational conditions [9,10]. This issue is further complicated by organizational preparedness to adopt AI that may play a hindering role in the achievement of desired results that include enhanced employee engagement and retention [4]. To adjust their talent management policies to meet the demands of an increasingly computerized world, companies should also develop a culture that advantages flexibility to succeed in an increasingly automated world to the latter extent, control the psychological effects of the latter on employees [12,11]. Therefore, there is a pressing need to have exhaustive frameworks that would not only help to explain the strategic worth of AI in talent development but also solve the challenges of resistance to change and implications of AI usage, thus enabling organizations to create strong workforces that can survive in a more technological world.

1. 3 Research Objectives

The aims of the research are:

1. To determine and critically explore existing models of artificial intelligence (AI) application in talent development models within organizations.

2. To examine how AI and big data technologies have improved the readiness of cybersecurity personnel, especially concerning skills acquisition, threat identification, and adaptive learning.

3. The aim of the research is to determine how AI-enhanced talent development and cybersecurity management influence organizational resilience and responsiveness to crisis.

4. To determine the role of strategic integration of AI in talent development within the context of

long-term sustainability of the organization and competitive advantage.

1.4. Significance of Study

The unique aspects of the oil and gas sector are that the environment in which its activities take place is complex, and the infrastructure is essential and, therefore, requires the use of specific Artificial Intelligence (AI) models when developing talents. The introduction of Industry 4.0 technology has put institutions in this industry at significant crossroads in terms of staff expertise and work safety measures [5]. Current literature reiterates the necessity of AI to redesign the process of decision making as it allows them to analyze the data on a real time basis, which is important in risk management and maintenance of operations integrity [5]. The proper systematic involvement of AI in strategic talent management structures can help organisations to improve the skills of employees, overcome the negative impacts of business risks, and eventually to get a more resilient workforce that will face new challenges of the unstable market [6]. The AI systems are also very critical in enhancing the workforce preparedness in the oil and gas industry, by providing the employees with the necessary skills to operate in the technologically advanced systems. It has been shown that AI does not only automatize regular processes but also encourages personalized learning processes that match employee skills with the requirements of the industry [7]. This change in training and development approaches will lead to a worker being skilled in the new technology and thus the ability to adequately respond to critical events like safety violations or equipment malfunctions of the equipment [6]. The paper also assumes that AI-based workforce preparedness can also contribute greatly to the efficiency of operations and the overall resilience of organizations, especially in case of crisis situations. Specialized AI solutions have been taken up to organizational resilience fortification. The nature of the oil and gas industry, with its inherent uncertainties and risks requires a workforce that would quickly adapt to the changing conditions.

The management of talents with the help of AI can help to cultivate the culture of agile and constant learning [7]. This flexibility is necessary to reduce the risk, handle the expectations of the stakeholders, and adhere to the regulations [8]. With the aid of AI potential, companies can become more resilient by becoming better prepared, and they will be able to withstand market fluctuations and operational difficulties [5]. Such frameworks ensure continuity in operations in the business at the same time improving the general business performance. To sum up, specialized AI frameworks implementation in the oil and gas industry can be considered a vital component of creating an effective workforce, increasing readiness, and creating organizational strength. The

implications of this study include the focus on a proactive strategy that considers short-term talent requirements and provides strategic positioning of organizations to undergo long-term growth in an ever-growing environment.

2. Methodology

2.1. Search Strategy

2.1.1 Databases Utilized

Multiple authoritative scholarly databases were used in the systematic literature review (SLR) that was conducted when developing this research to cover extensive literature on AI and strategic talent development. The IEEE Xplore, ScienceDirect, Scopus, and the ACM Digital Library databases were used because they contain numerous articles, peer-reviewed materials, and high-impact journals related to the sphere of technology and management [18,19,20]. This multi-database allows a wide range of views and conclusions, which leads to the whole picture of the existing scientific situation in the field.

Table 1: Search String Used in Databases

Search String
Artificial Intelligence" OR "Machine Learning") AND ("Talent Development" OR "Workforce Readiness") AND ("Oil and Gas" OR "Critical Infrastructure") AND ("Cybersecurity" OR "SOC Automation"

The search was conducted on 05 January 2026 with a time restriction set from 2020 until the search date.

2.1.2 Inclusion and Exclusion Criteria

The search strategy involved some inclusion criteria based on the area of research on AI structures, the state of workforce preparedness, and organizational resilience in the context of different sectors in articles published in the past five years. To eliminate the studies, which were not closely related to the purposes of the review, such as ones without empirical data, or those studying unconnected topics, exclusion criteria were implemented. Through such stringent selection only literature that meets the academic requirements is reviewed and provides actionable knowledge relevant to the strategies of talent development.

2.1.3 Keyword Search Methodology

The efficiency of the search process was based on a clear keyword strategy. The keywords were used in the selected databases, such as Artificial Intelligence, Talent Development, Workforce Readiness, Organizational Resilience, and AI

Frames. The search results were narrowed down using the Boolean operators, so the articles that directly relate to the topic of AI and its role in developing talent strategies could be found. The approach to stringency of the methodology assisted a selective synthesis of the literature, which made it possible to identify the central themes and gaps in the current research. Both the sound choice of databases, inclusion and exclusion criteria application and systematic search approach of the key words all appear as factors supporting the strength of the literature review process in the study. The approach to the methodology will ensure that the results are based on an overall exploration of the relevant research environment, thus giving them a firm annotation to the ensuing informed analysis and discussion.

2.2. Inclusion/Exclusion Criteria

2.2.1 Timeline Considerations

This literature review had clear inclusion criteria, i.e. it included research published between 2020 and 2025, as these technologies (AI) develop rather fast and new applications to talent development can arise [22,23]. This timeframe encompasses the latest development in those areas, hence being able to gain a recent grasp of the current trends, practices, and findings related to the introduction of AI in labor force and organizational dynamics. Omitting older literature will help eliminate the danger of using old frameworks that may not be representative of the current issues and developments in the field [9].

2.2.2 Keyword Relevance

The use of certain keywords was embraced to make the search refined on key themes that are central in the study. The chosen keywords include AI, Big Data, Cybersecurity, Talent Development, Oil and Gas, Workforce Readiness and organizational Resilience were selected based on the current themes that were found during an initial study [25,26]. These keywords coincide with the main themes of the study and the context in which those concepts are functioning, which is why it is possible to select the relevant literature devoted to the intersection of AI with strategic talent development.

2.2.3 Exclusion Criteria

The exclusion criteria were used to narrow down the review scope to include research papers that were not directly related to the main purpose of this investigation. Articles that lacked empirical evidence, theoretical models, or articles that were not directly related to the field of study under study of the application of AI to talent development were eliminated. This approach to methodology ensures that only methodologically rigorous and peer-reviewed studies are added to the

evidentiary base of the study [12,27]. In addition, the research articles that did not focus on the oil and gas industry or articles that did not illustrate a clear correlation to the workforce readiness and organizational resilience were also excluded. The mentioned inclusion and exclusion criteria, thus, centralize to maintain the academic integrity and applicability of the systematic literature review.

Table 2: Study characteristics of included and excluded studies in the systematic review

Study Author, Year	Design	Study Setting	Total N / Reason for Exclusion
Included studies			
Ejjami, R. (2024)	Integrative Review	Moroccan Organizations (Leadership)	48 papers reviewed
Adabara et al. (2025)	Review	Agentic AI in Cybersecurity	62 papers reviewed
Aljuaid (2025)	Empirical (Survey)	Organizations (AI & Flexible HR)	312 participants
Belhadi et al. (2021)	Empirical Investigation	Supply Chain Dynamism/ Resilience	246 organizations
Egasmara (2025)	Systematic Literature Review	Workforce Planning (VOSviewer)	54 papers reviewed
Roppelt et al. (2024)	Multiple Case Study	Multi-national Corporations (Talent Acquisition)	8 MNC cases
Hržica et al. (2025)	Dual-Level Model	Public Sector AI Readiness	290 participants

	(UTAUT)			vs. Management).
Yi et al. (2024)	Systematic Review	Emergency Dept. Triage (Healthcare)	15 studies reviewed	
Ayasrah et al. (2025)	Scale Validation	Secondary Schools in Jordan (AIIMLR Scale)	450 students	
Delgado-Sánchez et al. (2025)	Survey (TOE Framework)	AI Adoption in SMEs	215 SME managers	

Excluded studies

Zhang et al. (2014)	Technical Analysis	Deep Learning Algorithm Architectures	Excluded: Published before 2018 (Outdated).	
Schmidt & Weber (2023)	Qualitative Study	AI Ethics in Berlin Healthcare	Excluded: Not published in English.	
Muller (2022)	Editorial / Opinion	The Future of Generative AI	Excluded: Non-empirical commentary/Lack of rigor.	
Li & Chen (2024)	Engineering / Lab Experiment	Transformer Model Efficiency in IoT	Excluded: Purely technical focus (No organizational link).	
Brown et al. (2023)	Clinical Review	AI Applications in Robotic Surgery	Excluded: Wrong domain (Medical/Clinical	
Roberts (2021)	Book Chapter	History of Automation in Industry	Excluded: Document type (Book chapter/Narrative).	
Gupta (2024)	White Paper	AI Trends in 2024 (Industry Report)	Excluded: Not a peer-reviewed academic source.	
Lopez (2025)	Case Study	AI for Climate Change Prediction	Excluded: Scope irrelevant to Leadership/HR/Talent.	

2.3. Study Selection (PRISMA Flow Diagram)

2.3.1 Identification Phase

The identification of the systematic literature review (SLR) involved an extensive amount of the searching of the relevant articles published within 2020-23. The search has been made throughout the recognized academic databases, among them IEEE Xplore, ScienceDirect, Scopus, and the ACM Digital Library, with the search keywords used being Artificial Intelligence, Big Data, Cybersecurity, Talent Development, Oil and Gas, Workforce Readiness, and Organizational resilience. The application of such databases guarantees a variety and relevance of studies that reflect modern achievements of AI use in strategic talent development. The initial search provided about 1240 articles, which were later catalogued to be screened.

2.3.2 Screening and Eligibility Phase

At the screening stage, relevant articles were identified by use of titles, abstracts, and keywords. Out of the first search, 790 articles were found to be relevant to the objectives and the main themes of the research. The eligibility stage involved a full-text review of the rest of the articles to ensure that they conformed to the pre-set inclusion criteria, that is, that they covered the main topics of the study, which are AI

frameworks in workforce readiness and organizational resilience. In the end, 103 articles were at the inclusion phase as the articles offered considerable empirical or theoretical data that would be germane to the research.

2.3.3 Inclusion Phase

Inclusion criteria were put on the fact that the actual articles had to be peer-reviewed, related to the intersection of AI and talent development, and published during a certain time. Moreover, the research had to be oriented towards overt challenges and opportunities in industries, namely, in the oil and gas industry. The final selection included 103 articles, which formed the basis of the literature on this systematic review and indicated its solid and comprehensive vision of the impact of AI on the dynamics of workforce in the context of the rapid technological change.

Finally, PRISMA Flow Diagram represents the systematic and organized field of the procedure of the research selection, including identification, screening, eligibility determination and final selection. This methodology was used to make sure that the SLR has attracted a wide range of appropriate literature and therefore an informed analysis of AI frameworks in strategic talent development was undertaken.
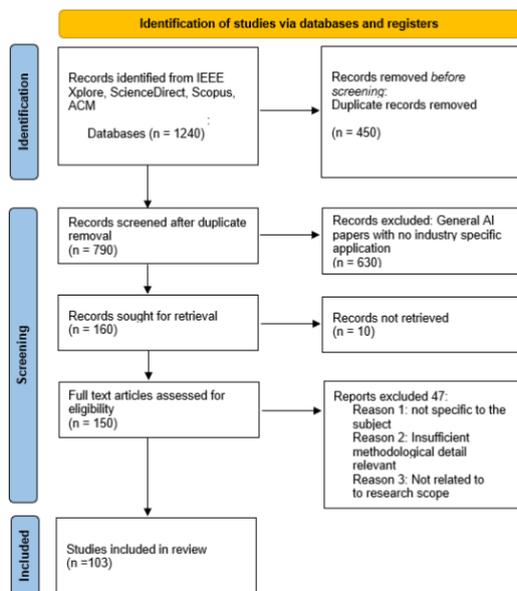

Figure 1. *PRISMA Framework*

3. Thematic Analysis of Literature

3.1 Cutting-Edge Technologies

3.1.1 Big Data Analytics in Oil & Gas

Big Data analytics in the oil and gas industry has evolved from predictive maintenance toward broader organizational applications, including talent analytics and threat intelligence. Organizations now utilize real-time workforce data to align employee development with operational needs and strategic objectives [5], [15]. At the same time, Big Data infrastructures enhance cybersecurity by detecting anomalies that may signal cyber intrusions, insider threats, or operational inefficiencies [16]. This dual functionality improves workforce preparedness, operational safety, and resilience. Ultimately, Big Data enables organizations to proactively manage complex operations while optimizing human capital, though its effectiveness depends on how well technological systems are integrated into talent development strategies [5].

3.1.2 AI Adoption Models for Talent Development in Oil & Gas

AI adoption in oil and gas requires structured frameworks that guide workforce development and organizational readiness. The Technology–Organization–Environment (TOE), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and AI-Readiness Index provide complementary perspectives by examining infrastructure readiness, employee acceptance, and strategic capability development.

3.1.3 Technology–Organization–Environment (TOE)

The TOE framework evaluates AI adoption through technological capacity, organizational readiness, and environmental conditions. It is particularly relevant for asset-intensive and highly regulated oil and gas environments where governance structures, regulatory compliance, and infrastructure maturity influence implementation decisions [17]. The model supports macro-level analysis by identifying structural barriers such as legacy systems and regulatory uncertainty, thereby guiding long-term workforce capability planning [35,36].

3.1.4 Technology Acceptance Model (TAM)

TAM explains technology adoption based on perceived usefulness and ease of use. In oil and gas settings, it helps assess how engineers and operators respond to AI-enabled tools such as predictive dashboards and training simulators [18]. By focusing on user trust, usability, and relevance, TAM provides insight into employee engagement and readiness, making it valuable for evaluating AI-based training outcomes and human–AI interaction in high-risk environments [19].

3.1.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT expands adoption analysis by incorporating performance expectancy, social influence, and facilitating conditions. This model is well suited to hierarchical and safety-driven oil and gas organizations, where peer norms and managerial support significantly affect technology use [17]. Its multi-stakeholder perspective supports coordinated AI implementation across operational and regulatory environments.

3.1.6 AI-Readiness Index

The AI-Readiness Index benchmarks organizational preparedness across infrastructure, data, human capital, and strategy. In geographically dispersed oil and gas operations, it enables internal capability audits and identifies readiness gaps across subsidiaries [20]. The framework supports strategic workforce planning by guiding investments in skills development, governance, and leadership capacity.

Collectively, these adoption models provide a comprehensive conceptual foundation for integrating AI into talent development, combining macro-level readiness assessment with individual acceptance and organizational capability analysis.

3.1.7 AI/ML in Cybersecurity

Artificial intelligence and machine learning are central to protecting Industrial Control Systems (ICS) and SCADA environments. Generative AI enables realistic threat simulations, while reinforcement learning detects anomalous system behavior through continuous monitoring [21], [39,40]. These capabilities strengthen operational reliability and require a workforce capable of interpreting AI-generated alerts and responding to sophisticated cyber threats [16], [22].

3.1.8 Convergence of Cyber-Physical Systems

The integration of cyber-physical systems connects data analytics with operational infrastructure, increasing efficiency but also expanding cyber risk exposure [23]. This transformation requires interdisciplinary workforce capabilities that combine data analytics and cybersecurity competencies. Integrated training programs improve collaboration among engineers, data scientists, and cybersecurity professionals, thereby enhancing organizational resilience and decision-making quality [24], [15]. Overall, technological advancement in oil and gas necessitates aligned adoption strategies and targeted workforce development to sustain resilience in digitally intensive environments.

3.2 AI Adoption Models for Talent Development

3.2.1 TOE Framework Application

The TOE framework identifies technological infrastructure, organizational readiness, and environmental pressures as key determinants of AI adoption in oil and gas operations [43,44,45]. Technological factors include advanced analytics and predictive maintenance capabilities [25], while organizational factors involve culture, size, and change readiness [47,48]. Environmental pressures such as regulation and competition further shape adoption intensity [26]. The framework supports strategic workforce planning by identifying skill gaps and aligning training with organizational AI capabilities [27].

3.2.2 TAM and Employee Readiness

TAM evaluates employee willingness to engage with AI-driven training by assessing perceived usefulness and ease of use [28]. Employee attitudes strongly influence adoption outcomes, particularly when concerns regarding job displacement or skill gaps are addressed through targeted training [50,51]. Organizations applying TAM principles report higher adoption rates and improved workforce performance [29].

3.2.3 AI-Specific Talent Development Frameworks

Customized AI-based strategic talent development frameworks support the transition of engineers into cybersecurity-focused "Cyber-Analysts." These frameworks emphasize applied learning, simulations, and AI-based threat detection training to address evolving cybersecurity risks [30], [31]. Evidence indicates that such targeted programs enhance cybersecurity capacity while fostering continuous learning and workforce adaptability [19], [32].

Overall, combining adoption models enables organizations to align technological readiness with workforce capability development, supporting proactive talent transformation in response to emerging cyber risks.

Table 3: Comparative Analysis of AI Adoption Frameworks for O&G Strategic Talent Development

Frame work	Core Construct	O&G Application	Strategic Strength
TOE	Technology, Organization, Environment	Assessing if the O&G firm has the data lakes and regulatory clearance	Best for macro-level organizational readiness.

		for AI.	
TAM	Perceived Usefulness & Ease of Use	Assessing if engineers find AI-driven training simulators intuitive.	Best for predicting individual user acceptance.
UTAUT	Performance Expectancy & Social Influence	Capturing how "Safety Culture" and peer influence in HROs drive or stall AI adoption.	Most comprehensive for multi-stakeholder environments.
AI-Readiness Index	Infrastructure, Data, Talent, Strategy	A benchmarking tool to rank subsidiaries by their ability to implement SOC automation.	Best for auditing and gap analysis.

3.3 Strategic Talent Development for Workforce Readiness

3.3.1 AI-Driven Skill Mapping

AI-based skill mapping identifies emerging competency gaps related to data analytics and cybersecurity within the oil and gas workforce [33]. By analyzing performance and industry trends, organizations can align workforce capabilities with strategic objectives [15], [7], [8]. This proactive approach ensures preparedness for digitally integrated operations.

3.3.2 Personalized Learning Pathways

AI-enabled personalized training adapts learning content to individual skill levels and career trajectories [34]. Immersive technologies such as VR and AR simulate operational environments, improving knowledge retention and practical skill application [35]. Continuous feedback mechanisms allow training programs to evolve alongside operational demands.

3.3.3 Human-AI Collaboration

Human-AI collaboration enhances decision-making by combining real-time analytics with human judgment [36]. Effective implementation requires technical training and change-management support to build trust in AI systems [37]. AI reduces manual monitoring tasks and improves risk detection, enabling employees to focus on strategic responses [38].

3.3.4 Big Data and Workforce Preparedness

Big Data integration through data lakes enhances predictive analytics and workforce planning [39]. Predictive insights enable proactive training strategies and skill forecasting aligned with organizational goals [24], [37], [40]. As a result, strategic talent development becomes central to organizational resilience in technologically evolving environments.

3.4 Organizational Resilience in Oil & Gas

3.4.1 Proactive Resilience

Proactive resilience requires a workforce capable of using Big Data analytics to predict cyber threats before disruption occurs [5]. Real-time monitoring and AI-based anomaly detection strengthen organizational defenses and reduce operational risk [15], [7]. Data-driven workforce development fosters a culture of cybersecurity awareness and continuous learning.

3.4.2 Adaptive Capacity

AI-trained employees enhance organizational adaptability during market volatility and cyber incidents by enabling data-driven decision-making and rapid response capabilities [41], [42]. AI-based simulations support scenario planning and strengthen organizational foresight [8]. Evidence suggests that organizations fostering AI-enabled agility achieve greater resilience and competitive advantage in uncertain environments [43].

4. Discussion

4.1. Interplay of Variables

Artificial intelligence (AI) implementation in the oil and gas industry has an inseparable connection with the improvement of cyber preparedness and corporate

sustainability. Within an industry that is characterized by critical infrastructures and where cyber threat is high, it is important to integrate AI technologies as a critical mechanism to build defensive capabilities against cyber-attacks. The studies show that AI-based systems can determine possible vulnerabilities and expect threats to sensitive operating networks, thereby enabling organizations to develop and maintain solid standing and operational continuity with minor chances of disruption [44]. AI adoption and cybersecurity preparedness correlate in a two-way manner, whereby successful cybersecurity practices promote a strong organizational culture to accept innovation and efficiency [45].

As an illustration, threat detection organizations using AI can devote resources with increased efficiency, thus their adaptive ability to the market dynamics or attack [46]. Employee empowerment in using AI tools to track and react to threats builds greater resilience in the organization because the overall workforce competence gets enhanced. Furthermore, the AI analytics allow organizations to perform attack simulations and evaluate their consequences and develop holistic incident-response procedures [47]. The constant learning and adjustment strengthen a culture of resilience, and the positivity between the adoption of AI and better cybersecurity preparedness and long-term survival is straightforwardly associated. More recent research supports the claim that those companies that are successful in implementing AI in their cybersecurity systems tend to be less vulnerable to catastrophic breaches, thus not losing the efficiency of their operations and stakeholder confidence in an increasingly digitized environment (Cortez & Bifet, 023).

Overall, AI adoption, cybersecurity preparedness, and organizational resiliency interdependence in the oil and gas industry highlight the necessity of organizations taking advantage of advanced technologies. Through a thoughtful approach of leveraging AI power, organizations will be able to enhance their cyber resiliency against cyber threats four times over and create a culture of readiness, which will make them more likely to survive in the stormy environment.

4.2. Industry-Specific Challenges: Legacy systems in O&G, data privacy concerns, and resistance to AI in high-stakes environments

In the oil and gas (O&G) sector, there are unique problems that make the introduction of artificial intelligence (AI) technologies difficult. The use of legacy systems tends to be a significant challenge, and they are usually outdated and cannot be integrated with the current AI-based solutions. Such legacy systems hinder organizations from riding the full potential of AI as data analytics and, as such, limit their

operational efficiency and adaptability to market forces [51,13]. Most of the operational technologies in the industry are not built with data interoperability in consideration, and therefore, organizations might be incapable of leveraging real-time insights needed to predict results and improve decision-making activities. Along with software and hardware limitations, data-privacy issues are also a major obstacle to the application of AI in the O&G industry.

The industry is home to large volumes of sensitive information, including exploration and drilling initiatives, customer relations, among others, which should be preserved [48]. There are legal mandates, including the General Data Protection Regulation (GDPR), that enforce strict data-management habits, which have made it difficult to integrate AI technologies that often demand massive datasets to train machine-learning algorithms. These regulatory waters are complicated, and organizations should go through them with a bit of caution, staying firmly grounded in the significance of strong data analytics, as well as ensuring that they comply with the regulations to prevent extreme punishment and loss of reputation. In addition, the lack of AI acceptance is another challenge specific to the industry.

Employers are full of anxiety and skepticism toward AI technologies, especially in such high-stakes workplaces as oil and gas, where reliability in the work is essential [15]. Employees might fear losing their jobs, or they might feel that AI is an enemy of their free will to make decisions. Such resistance cannot be overcome by merely upskilling but by a workplace culture to support AI literacy [8]. As a result, organizations should take some change-management initiatives that will inform individuals about the benefits of AI, how such tools will multiply human capabilities, and not eliminate them.

4.2.1 Data Privacy Concerns and Compliance Issues

Data protection remains one of the critical issues that can make oil and gas companies avoid using artificial intelligence technologies. In the fiercely competitive data landscape in the sector, any violation of data protection laws may result in legal consequences that will trickle down to operations. Application programming interfaces and data-sharing models, which are fundamental to the operation of AI, can be a privacy risk if not properly managed. It is thus necessary that organizations put stringent security measures in place that will help to encrypt sensitive information and keep track of access [40]. When handling cybersecurity threats, organizations are faced with a further degree of organizational complexity in adhering to the current rules and standards of data usage.

Compliance requires an investment in training the personnel on legal data-privacy requirements, further complicating the issue of integrating technology implementation into the practices of human resource

management. These factors, combined, form a rather subtle landscape in which the potential of AI technologies must be balanced against regulatory constraints and the organizational culture that exists. The risks can be reduced by proactive data governance based on AI, and improve the performance of AI. Organizations would have the capacity to implement AI without jeopardizing the integrity of data by laying the necessary foundation in terms of powerful security and compliance systems [7]. Finally, the oil and gas industry has major challenges to the adoption of AI, which are industry-specific, such as the dependency on legacy systems, data-privacy issues, and resistance to technological change within the company. These difficulties, however, can be overcome with the help of strategic planning, sound data governance, and efficient change management. Those organizations that consider these issues proactively will be able to leverage AI to their advantage to increase the efficiency of their operations and increase the readiness of their workforce to enter an even more competitive environment successfully.

4.3. The "Resilience Loop": Synthesizing a conceptual framework that links

4.3.1 The "Resilience Loop"

The tendency of the chain relation between the use of AI, talent preparation, the intensity of cybersecurity, and organizational resilience is essential to businesses, especially in the oil and gas (O&G) society. The so-called Resilience Loop conceptual framework has become a broad conceptual framework in understanding the interaction between these variables that enhance organizational performance. Since more organizations are integrating AI technologies, they will be able to generate better talent preparedness of the workforce, which will in turn strengthen the security of cybersecurity and eventually translate into better preparedness to disruptions [49].

Firstly, the use of AI produces an organizational ripple effect mainly through the increase of the decision-making process based on data and proactive approaches to the operations [49]. By implementing AI technologies, companies will be able to optimize their processes, as well as enhance their security systems. Using data trends and identifying abnormalities, AI systems can help companies predict potential cyber-attacks before they occur and start to take proactive steps instead of a reactive one [50].

4.3.2 Talent Readiness as a Precursor to Organizational Resilience

The ability and flexibility of employees to adapt to new technologies is called talent readiness and is essentially

facilitated by continuous training and development programs. By implementing AI in their talent management systems, including through an AI-based system of customized learning and ability mapping, organizations can help their employees turn into efficient cyber-data experts. This has become significant in developing a pool of talent that will be sensitive to the changing needs of the operating environments [51]. Studies show that companies that promote an AI-focused culture are likely to have increased engagement and productivity of their employees, which intensifies their workplace capabilities to manage risks [49]. This preparedness can drive organizations to become more operationally resilient, especially in the highly volatile oil and gas industry, where the market remains volatile (volatility of prices) and Web-based security is at risk [52].

4.3.3 Enhancing Cybersecurity Strength Through AI Integration

AI technologies are instrumental in supporting the effort of increased cybersecurity levels and organizational strength in general. By investing in AI-based cybersecurity systems, companies will be able to track their systems from a distance, assess their possible weak points, and apply the threat-handling mechanisms automatically [50]. Such a proactive style allows institutions to prepare themselves to reduce the risks and minimize the potential effects because of major operational disruptions that may follow a cyber incident. Also, the presence of a qualified workforce with adequate know-how to utilize AI tools to manage cybersecurity directly correlates with the level of competence displayed by such organizations to respond to cyber threats [51]. With adequate training, combined with the impact of AI analytics to monitor, a culture of resilience will be established, which entails employees being empowered to make decisions based on being exposed to cyber threats. It is a positive relationship that enables a loop of resilience because the capability to increase cybersecurity also deepens organizational resilience.

4.3.4 A Framework for Future Resilience

To sum up, the framework of the Resilience Loop is an informative source of information concerning the interaction of the adoption of AI, talent preparation, the level of cybersecurity, and overall organizational resiliency. Organizations can make it through the intricacies of the O&G industry better by developing a workforce capable of taking advantage of the opportunities provided by AI and improving cybersecurity provisions. This symbiotic relationship not only equips the firms to deal with short term operational risks but makes sure that they are sustainable in the long term in an environment where there is a lot of volatility in the environment. As a result, the resilience loop establishes a way through which organizations can succeed in an ever-changing

world with an ever-technological environment and threats and ensure their presence in the market that can never be predicted.
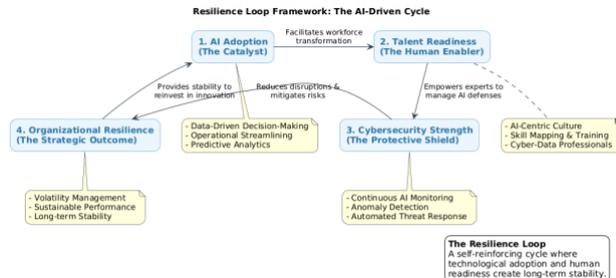

Figure 2: Resilience Loop Framework: The AI-Driven Cycle

Artificial intelligence adoption acts as a proactive driver, leaving organizations in the reactive mode of addressing problems to anticipatory and data-driven decision-making [49]. AI can be used to create predictive insights out of real-time data on operations that can be accessed by decision-makers, rather than depending on retrospective reports and, consequently, enable the prediction of market changes, system malfunctions, and other risks more accurately and in a timely [49]. Strategic agility can only be fulfilled with the help of talent preparedness, which is the crucial human interface between the world of technology and performance [51]. With organizations making investment in AI-enabled transformation, employees no longer face the old operational tasks, but become experienced cyber-data professionals, who can read AI outputs and operate complex digital systems [51]. Fostering an AI-based culture enhances change of resistance and efficiency, further becoming a guarantee that new technologies can be appropriately integrated into the daily working processes [49].

With the maturation of talent readiness, AI-based cybersecurity becomes a cyber protective means, especially in high-risk markets like oil and gas, where cyberspace can cause both physical and operational damage to the market [52]. The use of artificial intelligence in security systems offers round-the-clock surveillance, automated threat recognition, and quick response, and the chances of preventing a major disruption in operating the system are high. This human-machine synergy can provide opportunities to perform 24-hour monitoring of the system and fast reactions to attacks when added with efficient human labor, which is trained to use these tools [51]. Combined, these forces lead to organizational resilience, the strategic final point that firms not only survive crises but also carry on with operations and are competitive [49]. And resilient organizations may absorb these shock events like cyber-attacks or a turbulent market

and keep building momentum, thus establishing a sustainable feedback loop to further invest in the sophisticated AI capabilities and long-term sustainability [70,73].

5. Future Research Directions & Recommendations

5.1 The Role of Generative AI (LLMs): Moving Beyond 2025 in Automating Cybersecurity Policy and Training

5.1.1 Moving Beyond 2025 in Automating Cybersecurity Policy and Training

The application of Generative Artificial Intelligence, and in particular large language models (LLM), is becoming a cornerstone of automating cybersecurity policies and training programs within organizations, particularly in the oil and gas industry. Generative AI technologies can support large-scale data analysis, the creation of holistic training solutions, and the simulation of various threat scenarios, boosting the efficiency and effectiveness of cybersecurity education programs [5].

Generative AI can support automatically generated training modules that respond to emerging cybersecurity threats or compliance requirements, ensuring employees remain updated on current practices and protocols [8]. This dynamism lowers the effort and time spent on creating content manually and allows companies to focus on strategic needs. Automated training systems based on LLMs can provide real-time updates and feedback, creating an environment of continuous learning.

However, organizations must address data privacy and ethical concerns associated with AI implementation. Effective adoption requires a clear understanding of data usage and compliance with data protection laws [48]. Balancing AI-based automation with governance frameworks can strengthen cybersecurity policies and proactive learning systems [53].

5.1.2 Developing Better Organizational Resilience Using Generative AI

Generative AI can transform talent advancement and enhance organizational resilience by supporting lifelong learning and AI-derived analytical insights [42]. AI enables organizations to model operational effects and test cybersecurity policies against hypothetical scenarios, identifying weaknesses and improving preparedness [54].

The integration of AI technologies with adaptive training approaches supports leadership development and organizational adaptability in unpredictable conditions [54].

Generative AI integration enhances human capital through personalized training and policy restructuring, while requiring attention to data privacy and ethical considerations.

5.2 Ethics and Governance

The use of Generative Artificial Intelligence and large language models in tracking worker performance raises ethical concerns related to data confidentiality, transparency, and misuse of analytics. AI-based monitoring can create perceptions of surveillance, undermining employee trust, job satisfaction, and productivity [55], [56].

Organizations must establish ethical frameworks governing AI use in performance evaluation, including informed consent, data protection, and accountability [57]. Transparency regarding data collection and evaluation processes fosters trust and balances performance monitoring with ethical standards.

5.2.1 Governance Structures for AI Implementation

Governance frameworks are essential for integrating AI technologies into the workforce. Organizations should establish policies, roles, and responsibilities governing AI systems and ensure alignment with legal and ethical standards [58], [59].

Governance systems must remain adaptive as AI technologies evolve. Future research should examine best practices in governance across sectors and explore employee participation in governance processes to promote accountability [60].

5.2.2 Navigating the Ethical and Governance Landscape

Implementing generative AI for employee performance monitoring requires strong ethical and governance mechanisms. Organizations must balance AI benefits with privacy protection and responsible use. Future studies should develop best-practice guidelines that support ethical AI implementation and workforce resilience.

5.3 Cross-Industry Learning

5.3.1 What Oil & Gas Can Learn from FinTech and Aerospace

Artificial intelligence enhances cybersecurity approaches in FinTech and Aerospace, offering insights for the oil and gas industry to strengthen cybersecurity talent and organizational resilience [3,4]. FinTech integrates AI-based analytics and predictive models to identify vulnerabilities and manage risks proactively. Oil and gas organizations can adopt similar approaches to improve compliance and mitigate emerging cybersecurity threats [3,4].

The Aerospace sector demonstrates the value of collaborative simulations and scenario-based cybersecurity training. AI-enabled simulations and immersive learning environments can prepare employees for real-time incident management and support proactive talent development [61].

5.3.2 Ethical and Governance Considerations in Cybersecurity Talent Development

As oil and gas organizations adopt AI-inspired practices from FinTech and Aerospace, ethical and governance challenges must be addressed. AI-based talent development requires attention to data privacy, algorithmic bias, and transparency to maintain stakeholder trust [6,7].

Cross-industry governance models can inform best practices for AI implementation in cybersecurity training. Establishing clear governance and ethical standards enhances the effectiveness and reliability of cybersecurity talent development programs.

6. Conclusions

6.1 Summary of Findings

This literature review has discussed the position of artificial intelligence in strategic talent development, workforce preparedness, and organizational resilience in the oil and gas (O&G) industry.

The findings show that AI enhances operational efficiencies by mapping skills, enabling personalized learning paths, and strengthening cybersecurity mechanisms [62]. AI allows organizations to predict workforce needs and operational risks, creating a culture of readiness. A correlation exists between AI adoption, talent preparedness, and cybersecurity resilience, which supports competitive advantage in technologically dynamic environments.

The review also highlights ethical concerns related to AI implementation, including data privacy and employee surveillance, requiring strong governance practices [5]. Organizational resistance to AI adoption emphasizes the importance of continuous training and awareness programs to support employee engagement and trust [7]. Cross-industry insights from FinTech and Aerospace further support strategic talent development and resilience in the oil and gas sector [8].

6.2 Contribution to Theory: New Insights into AI Adoption Models

The review contributes to theoretical understanding of AI adoption through the integration of frameworks such as the Technological-Organizational-Environmental (TOE)

framework and the Technology Acceptance Model (TAM) [48]. These models explain how technological readiness, organizational culture, and environmental conditions influence AI adoption.

By linking AI adoption with talent readiness and organizational resilience, the review highlights the need for structured implementation strategies aligned with business objectives [24]. Industry-specific adaptation of adoption models is necessary to address regulatory requirements and cybersecurity challenges in the oil and gas sector [63].

6.3 Contribution to Practice: Actionable Strategies for O&G HR and IT Leaders

The findings provide practical guidance for HR and IT leaders in oil and gas organizations. Structured talent development programs using AI-based skill assessment and personalized training support workforce capability and resilience [42]. Developing a data-literate workforce capable of AI-supported decision-making enhances organizational adaptability.

Ethical AI governance and transparent communication regarding data usage are essential for workforce acceptance and trust [43]. Cross-industry collaboration supports knowledge sharing and strengthens AI adoption strategies.

The review successfully highlights the critical role of AI in strengthening workforce preparedness and organizational resilience in the oil and gas industry and provides a foundation for future research and strategic implementation.

Abbreviations

AI	Artificial Intelligence
STD	Strategic Talent Development
SLR	Systematic Literature Review
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
TOE	Technology–Organization–Environment
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
ICS	Industrial Control Systems
SCADA	Supervisory Control and Data Acquisition
ML	Machine Learning
LLM	Large Language Models
GDPR	General Data Protection Regulation

Acknowledgments

Acknowledgments

Author Contributions

Hasan Ali: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing.

Funding

Data Availability Statement

The data supporting the outcome of this research work has been reported in this manuscript.

References

[1]   Kreuzer, T., Papapetrou, P., & Zdravkovic, J. (2024). Artificial intelligence in digital twins—A systematic literature review.

Data & Knowledge Engineering, 151, 102304. https://doi.org/10.1016/j.datak.2024.102304

[2] Anaba, D., Kess-Momoh, A., & Ayodeji, S. (2024). Digital transformation in oil and gas production: Enhancing efficiency and reducing costs. International Journal of Management & Entrepreneurship Research, 6(7), 2153-2161. https://doi.org/10.51594/ijmer.v6i7.1263

[3] Sudhakar, R. (2023). Robust Digital Twin Approach Towards Operational Excellence and Sustainability Goals. https://doi.org/10.2118/216747-ms

[4] Torres, R., Rey-Sarmiento, C., Prado, J., Cruz, N., Castro, D., & Camargo, J. (2025). Influence of Leadership on Human–Artificial Intelligence Collaboration. Behavioral Sciences, 15(7), 873. https://doi.org/10.3390/bs15070873

[5] Esiri, A., Sofoluwe, O., & Ukato, A. (2024). Digital twin technology in oil and gas infrastructure: Policy requirements and implementation strategies. Engineering Science & Technology Journal, 5(6), 2039-2049. https://doi.org/10.51594/estj.v5i6.1221

[6] Wang, H., Li, X., Pu, W., Fu, L., Zhou, W., Li, J., … & Huang, X. (2025). Study on Digital Twin Technology to Drilling Performance Improvement and Risk Reduction. https://doi.org/10.2118/225043-ms

[7] Agho, M., Okogwu, C., Daraojimba, C., Adeyinka, M., Okem, E., & Ogunjobi, O. (2023). The Evolution of Supply Chain Integration in the Oil Industry: A Comprehensive Review and Future Perspectives. j.trd.wrld.econ, 1(2), 103-111. https://doi.org/10.26480/jhcdc.02.2023.103.111

[8] Yun, J., Kim, S., & Kim, J. (2024). Digital Twin Technology in the Gas Industry: A Comparative Simulation Study. Sustainability, 16(14), 5864. https://doi.org/10.3390/su16145864

[9] Mohasin, K., & Mane, P. (2024). Beyond Automation: AI as a Strategic Partner in Talent Development for KPO/BPO/ITES Sector. Shodhkosh Journal of Visual and Performing Arts, 5(2). https://doi.org/10.29121/shodhkosh.v5.i2.2024.6455

[10] Boit, A., & Patil, B. (2025). [Incomplete reference—needs full details]

[11] Roppelt, J., Greimel, N., Kanbach, D., Stubner, S., & Maran, T. (2024). Artificial intelligence in talent acquisition: a multiple case study on multi-national corporations. Management Decision, 62(10), 2986-3007. https://doi.org/10.1108/md-07-2023-1194

[12] Olutimehin, D., Ofodile, O., Ejibe, I., Odunaiya, O., & Soyombo, O. (2024). Implementing AI in Business Models: Strategies for Efficiency and Innovation. International Journal of Management & Entrepreneurship Research, 6(3), 863-877. https://doi.org/10.51594/ijmer.v6i3.940

[13] Hutagalung, D. (2025). Transformasi Digital dan Integrasi Kecerdasan Buatan dalam Manajemen Strategis: Analisis Dampak dan Strategi Adaptasi di Era Disrupsi. Optimal Jurnal Ekonomi Dan Manajemen, 5(2), 293-301. https://doi.org/10.55606/optimal.v5i2.5885

[14] Essandoh, S. (2025). Artificial Intelligence and the Future of Work: Impacts on Employment and Job Roles. International Journal of Multidisciplinary Futuristic Development, 6(1), 31-41. https://doi.org/10.54660/ijmfd.2025.6.1.31-41

[15] [15] Sridar, D. (2025). Strategic Talent Management in the Digital Era: Aligning Workforce Capabilities with Organizational Goals. Lex Localis - Journal of Local Self-Government, 23(S6), 4013-4022. https://doi.org/10.52152/802381

[16] [16] Silveira, P. (2025). Transforming Global Education through AI: Addressing Cross-Cultural Competencies and HRM Challenges in the Digital Age. Journal of Integrative Education Studies, 1(1), 20-29. https://doi.org/10.64229/6na0be71

[17] [17] Shabbir, M. (2025). Corporate Sustainability Reimagined: A Bibliometric–Systematic Literature Review of Governance, Technology, and Stakeholder-Driven Strategies for SDG Impact. Business Strategy and the Environment, 34(7), 9203-9222. https://doi.org/10.1002/bse.70070

[18] [18] Budiyanto, M. (2025). Artificial Intelligence in Public Administration: A Systematic Literature Review on Opportunities and Ethical Challenges. Kne Social Sciences, 10(30), 244-257. https://doi.org/10.18502/kss.v10i30.20347

[19] [19] Yesuf, Y. (2025). Artificial Intelligence Adoption as a Driver of Innovation and Competitiveness in SMEs: A Bibliometric and Systematic Review. F1000research, 14, 1187. https://doi.org/10.12688/f1000research.171494.1

[20] [20] Vaio, A., Latif, B., Gunarathne, N., Gupta, M., & D'Adamo, I. (2023). Digitalization and artificial knowledge for accountability in SCM: a systematic literature review. Journal of Enterprise Information Management, 37(2), 606-672. https://doi.org/10.1108/jeim-08-2022-0275

[21] [21] Hossain, S., Fernando, M., & Akter, S. (2025). Digital Leadership: Towards a Dynamic Managerial Capability Perspective of Artificial Intelligence-Driven Leader Capabilities. Journal of Leadership & Organizational Studies, 32(2), 189-208. https://doi.org/10.1177/15480518251319624

[22] [22] Shahzadi, G., Jia, F., Chen, L., & John, A. (2024). AI adoption in supply chain management: a systematic literature review. Journal of Manufacturing Technology Management, 35(6), 1125-1150. https://doi.org/10.1108/jmtm-09-2023-0431

[23] [23] Zhu, M., Ma, H., Huang, T., Wang, X., & Zhou, Q. (2025). The Impact of Time Poverty on Teachers' AI Readiness: The Mediating Role of Teacher Resilience and the Moderating Role of Career Calling. https://doi.org/10.21203/rs.3.rs-7275496/v1

[24] [24] Chowdhury, S., Budhwar, P., & Wood, G. (2024). Generative Artificial Intelligence in Business: Towards a Strategic Human Resource Management Framework. British

Journal of Management, 35(4), 1680-1691. https://doi.org/10.1111/1467-8551.12824

[25] [25] Kafetzopoulos, D. (2022). Talent development: a driver for strategic flexibility, innovativeness and financial performance. Euromed Journal of Business, 18(2), 296-312. https://doi.org/10.1108/emjb-02-2022-0042

[26] [26] Casey, A., Ansari, S., Nakisa, B., Kelly, B., Brown, P., Cooper, P., … & Mäkinen, V. (2023). Application of a Comprehensive Evaluation Framework to COVID-19 Studies: Systematic Review of Translational Aspects of Artificial Intelligence in Health Care. Jmir Ai, 2, e42313. https://doi.org/10.2196/42313

[27] [27] Ejjami, R. (2024). AI-powered Leadership in Moroccan Organizations: An Integrative Literature Review. International Journal for Multidisciplinary Research, 6(3). https://doi.org/10.36948/ijfmr.2024.v06i03.19715

[28] [28] Zou, D., Xie, H., & Kohnke, L. (2025). Navigating the Future: Establishing a Framework for Educators' Pedagogic Artificial Intelligence Competence. European Journal of Education, 60(2). https://doi.org/10.1111/ejed.70117

[29] [29] Madumuse, T., & Qutieshat, A. (2024). Mapping the Terrain of Strategy Implementation: A Scope Review of Empirical Studies from 2014 to 2024. International Journal of Professional Business Review, 9(5), e04699. https://doi.org/10.26668/businessreview/2024.v9i5.4699

[30] [30] Gupta, S. (2025). Securing ICS Environments with AI-Enabled Classification: A Proactive Threat Detection Approach. Journal of Engineering Research and Reports, 27(8), 439-453. https://doi.org/10.9734/jerr/2025/v27i81619

[31] Hržica, R., Debelak, K., & Pevcin, P. (2025). A Dual-Level Model of AI Readiness in the Public Sector: Merging Organizational and Individual Factors Using TOE and UTAUT. Systems, 13(8), 705. https://doi.org/10.3390/systems13080705

[32] Orajaka, A., & Orajaka, C. (2025). The Role of Artificial Intelligence in Enhancing Supply Chain Performance within Nigeria's Oil and Gas Sector. International Journal of Research and Innovation in Applied Science, X(V), 1236-1252. https://doi.org/10.51584/ijrias.2025.1005000110

[33] Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39(2), 273-315. https://doi.org/10.1111/j.1540-5915.2008.00192.x

[34] Eusebio, E., Baldera, P., Patiam, A., Villanueva, E., Gaa, N., Solis, A., … & Ribon, A. (2025). AI in the Classroom: A Systematic Review of Barriers to Educator Acceptance. International Journal of Learning Teaching and Educational Research, 24(9), 126-147. https://doi.org/10.26803/ijlter.24.9.7

[35] Mesadieu, F., Torre, D., & Chennamaneni, A. (2024). Leveraging Deep Reinforcement Learning Technique for Intrusion Detection in SCADA Infrastructure. IEEE Access, 12, 63381-63399. https://doi.org/10.1109/access.2024.3390722

[36] Harisha, K., Sivakumaran, N., & Radhakrishnan, T. (2025). Deep Reinforcement Learning Based Cyberattack Detection in Supervisory Control and Data Acquisition System, 7(4), 57-63. https://doi.org/10.21467/proceedings.7.4.6

[37] Bajwa, A., Tonoy, A., Rana, M., & Ahmed, I. (2025). Cybersecurity in Industrial Control Systems: A Systematic Literature Review on AI-Based Threat Detection for SCADA and IoT Networks. ASRC, 01(01), 01-15. https://doi.org/10.63125/1cr1kj17

[38] Naik, V. (2025). AI Driven HR Transformation: Opportunities, Challenges, and Ethical Implications in Talent Management. International Journal for Multidisciplinary Research, 7(6). https://doi.org/10.36948/ijfmr.2025.v07i06.64602

[39] Koa, M. (2025). Artificial Intelligence in Public Relations and Strategic Communication: Organizational, Technological, and Environmental Determinants of Adoption in Agency Contexts. Sage Open, 15(4). https://doi.org/10.1177/21582440251389267

[40] Delgado-Sánchez, E., Calderón, R., & Herrera, F. (2025). Artificial Intelligence Adoption in SMEs: Survey Based on TOE–DOI Framework, Primary Methodology and Challenges. Applied Sciences, 15(12), 6465. https://doi.org/10.3390/app15126465

[41] Ramdani, B., Duan, B., & Berrou, I. (2020). Exploring the Determinants of Mobile Health Adoption by Hospitals in China: Empirical Study. Jmir Medical Informatics, 8(7), e14795. https://doi.org/10.2196/14795

[42] Setiawan, A., & Cahya, W. (2024). The Strategic Role of AI in Enhancing MIS Performance and Innovation. Data, 2(4), 239-252. https://doi.org/10.61978/data.v2i4.723

[43] Welch, N. (2025). Exploring Underrepresented Employee Perceptions of AI Receptivity Through Leaders' Stakeholder Engagement. Business Ethics and Leadership, 9(2), 108-119. https://doi.org/10.61093/bel.9(2).108-119.2025

[44] Gayathri, G. (2025). AI and Employee Performance: Unravelling the Influence of AI Literacy, Innovation Capability, and Collaboration. Int. J. Environ. Sci., 1696-1705. https://doi.org/10.64252/f7bj2361

[45] Ramadhani, Y., & Utami, D. (2025). Digital Transformation and Change Management: An Analysis of the Impact of Artificial Intelligence and Big Data Implementation on Organizational Performance. Jurnal Nawala, 2(1), 226-236. https://doi.org/10.62872/tsp44n91

[46] Weinberg, A. (2025). A Framework for the Adoption and Integration of Generative AI in Midsize Organizations and Enterprises (FAIGMOE). https://doi.org/10.48550/arxiv.2510.19997

[47] Essandoh, S. (2025). Artificial Intelligence and the Future of Work: Impacts on Employment and Job Roles. International

Journal of Multidisciplinary Futuristic Development, 6(1), 31-41. https://doi.org/10.54660/ijmfd.2025.6.1.31-41

[48] Rahmani, S., Surya, A., Rifqi, M., Setiawan, S., & Gunawan, A. (2025). Adoption of Artificial Intelligence (AI) in Small and Medium Enterprise E-Commerce to Improve Marketing Performance. Journal of Economics and Management Sciences, 149-154. https://doi.org/10.37034/jems.v8i1.255

[49] Masod, M., & Zakaria, S. (2024). Artificial Intelligence Adoption in the Manufacturing Sector: Challenges and Strategic Framework. International Journal of Research and Innovation in Social Science, VIII(X), 150-158. https://doi.org/10.47772/ijriss.2024.81000013

[50] Hanaty, H. (2025). Determinants of Artificial Intelligence Effectiveness in Moroccan Public Institutions and Enterprises. International Journal of Scientific Research and Innovative Studies, 4(2), 24-33. https://doi.org/10.63883/ijsrisjournal.v4i2.449

[51] Natasha, G., Zhang, L., Cagan, J., & McComb, C. (2025, August). CARA: The Corporate AI Readiness Assessment. In International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (Vol. 89244, p. V004T06A010). American Society of Mechanical Engineers. https://doi.org/10.1115/detc2025-168411

[52] Devarapalli, S., Jain, A., & Sharma, M. (2025). Reinventing HR with AI and Workday: Integration Strategies for the Digital Enterprise. Global Journal of Human Resource Management, 13(2), 38-46. https://doi.org/10.37745/gjhrm.2013/vol13n33846

[53] Fatol, D., Manu, A., & Mocan, M. (2025). Future-Proofing Human Resources. Strategic Foresight and AI in the Revolution of Talent Management. Proceedings of the International Conference on Business Excellence, 19(1), 4519-4531. https://doi.org/10.2478/picbe-2025-0345

[54] Reddy, M. (2024). Dr.K V Subba Reddy School of Business Management. International Journal of Scientific Research in Engineering and Management, 08(06), 1-5. https://doi.org/10.55041/ijsrem36129

[55] Masudi, B., Ilham, R., & Suharto, S. (2025). Digital Talent Management: Adaptive Strategies in the Era of Industry 4.0 Transformation. Jumbiwira Jurnal Manajemen Bisnis Kewirausahaan, 4(1), 436-448. https://doi.org/10.56910/jumbiwira.v4i1.2735

[56] Kartika, K. (2025). The Role of Big Data and Analytics in Managerial Decision Making: A Global Cross Sector Bibliometric Analysis Study. International Journal of Education Social Studies and Management (Ijessm), 5(3), 1515-1527. https://doi.org/10.52121/ijessm.v5i3.899

[57] Firdaus, R., Yunus, M., Rusdi, M., & Ibrahim, M. (2025). Talent Management Research in a VUCA World: A Bibliometric and Systematic Literature Review. Kne Social Sciences, 10(18), 1093-1111. https://doi.org/10.18502/kss.v10i18.19526

[58] Odili, et al. (2024). [Incomplete reference—needs full details]

[59] Murmu, S. (2025). AI-Driven Talent Management: Shaping the Workforce of Tomorrow. Research Review International Journal of Multidisciplinary, 10(8), 69-78. https://doi.org/10.31305/rrijm.2025.v10.n8.010

[60] García, A. (2025). Strategic Talent Management in the Era of Digital Transformation. Revft, 29(143), 55-56. https://doi.org/10.69849/revistaft/ch10202502151055

[61] Moustafa, N. (2021). A New Distributed Architecture for Evaluating AI-Based Security Systems at the Edge: Network TON_IoT Datasets. Sustainable Cities and Society, 72, 102994. https://doi.org/10.1016/j.scs.2021.102994

[62] Kubilay, B., & Celiktas, B. (2025). Relationships among organizational-level maturities in artificial intelligence, cybersecurity, and digital transformation: a survey-based analysis. IEEE Access. https://doi.org/10.1109/ACCESS.2025.3571537

[63] Waltersmann, L., Kiemel, S., Stuhlsatz, J., Sauer, A., & Miehe, R. (2021). Artificial intelligence applications for increasing resource efficiency in manufacturing companies—A comprehensive review. Sustainability, 13(12), 6689. https://doi.org/10.3390/su13126689

[64] Boamah, K. G., Asante, A. F. U. A., Timean, A., & Okai, K. F. (2025). Artificial intelligence integration in cyber incident response teams to enable faster containment, forensic accuracy, and resilient business continuity. International Journal of Science and Research Archive, 17(01), 1263-1280. https://doi.org/10.30574/ijsra.2025.17.1.2933

[65] Luo, J. (2025). AI Empowers Enterprise Agility and Performance: Research Trends and Implications for Future Research. Business Information Review. https://doi.org/10.1177/02663821251384881

[66] Adabara, I., Sadiq, B., Shuaibu, A., Danjuma, Y., & Venkateswarlu, M. (2025). A Review of Agentic AI in Cybersecurity: Cognitive Autonomy, Ethical Governance, and Quantum-Resilient Defense. F1000research, 14, 843. https://doi.org/10.12688/f1000research.169337.1

[67] Ayasrah, M., Khasawneh, M., Almulla, M., & Aboutaleb, A. (2025). Design and Validation of the AI-Integrated Metacognitive Learning Resilience Scale (AIIMLR Scale) for Secondary School Students in Jordan: Insights from the Network Analysis Perspective. Journal of Computer Assisted Learning, 41(5). https://doi.org/10.1111/jcal.70127

[68] Shokry, K., Al-Ghaithi, S., & Mekhaini, E. (2024). Agile Approach for Proactive Talent Mobility. https://doi.org/10.2118/222983-ms

[69] Kubota, K., Aishima, M., & Fujita, T. (2025). Harnessing Generative AI in Nursing Informatics: A Theoretical Critique and Policy Innovation Perspective From Japan. International Nursing Review, 72(3). https://doi.org/10.1111/inr.70108

[70] Ahmed, Z., Khattak, S., & Rabbani, A. (2025). Resilient Supply Chains in the Post-Pandemic Era: Strategies for Risk Mitigation and Continuity. IJSS, 4(4), 31-44. https://doi.org/10.63544/ijss.v4i4.177

[71] Chee, H., Ahn, S., & Lee, J. (2024). A Competency Framework for AI Literacy: Variations by Different Learner Groups and an Implied Learning Pathway. British Journal of Educational Technology, 56(5), 2146-2182. https://doi.org/10.1111/bjet.13556

[72] Austin, R., Jantraporn, R., Michalowski, M., & Marquard, J. (2024). Machine learning methods to discover hidden patterns in well-being and resilience for healthy aging. Journal of Nursing Scholarship, 57(1), 72-81. https://doi.org/10.1111/jnu.13025

[73] Ulnicane, I., Knight, W., Leach, T., Stahl, B., & Wanjiku, W. (2020). Framing governance for a contested emerging technology: insights from AI policy. Policy and Society, 40(2), 158-177. https://doi.org/10.1080/14494035.2020.1855800

[74] Gahnberg, C. (2021). What rules? Framing the governance of artificial agency. Policy and Society, 40(2), 194-210. https://doi.org/10.1080/14494035.2021.1929729

[75] Yi, N., Baik, D., & Baek, G. (2024). The effects of applying artificial intelligence to triage in the emergency department: A systematic review of prospective studies. Journal of Nursing Scholarship, 57(1), 105-118. https://doi.org/10.1111/jnu.13024

[76] Cao, J., & Meng, T. (2025). Ethics and governance of artificial intelligence in digital China: Evidence from online survey and social media data. Chinese Journal of Sociology, 11(1), 58-89. https://doi.org/10.1177/2057150x241313085

[77] Chatti, H., & Argoubi, M. (2025). Artificial Intelligence in Knowledge Management: Identifying Intellectual Milestones and Emerging Domains. Electronic Journal of Knowledge Management, 23(2), 122-148. https://doi.org/10.34190/ejkm.23.2.4260

[78] Torres, R., Rey-Sarmiento, C., Prado, J., Cruz, N., Castro, D., & Camargo, J. (2025). Influence of Leadership on Human–Artificial Intelligence Collaboration. Behavioral Sciences, 15(7), 873. https://doi.org/10.3390/bs15070873 [duplicate of ref 4, can be removed]

[79] Sridar, D. (2025). Strategic Talent Management In The Digital Era: Aligning Workforce Capabilities With Organizational Goals. Lex Localis - Journal of Local Self-Government, 23(S6), 4013-4022. https://doi.org/10.52152/802381 [duplicate of ref 15, can be removed]

[80] **[80]** Essandoh, S. (2025). Artificial Intelligence and the Future of Work: Impacts on Employment and Job Roles. International Journal of Multidisciplinary Futuristic Development, 6(1), 31-41. https://doi.org/10.54660/ijmfd.2025.6.1.31-41 [duplicate of ref 14, can be removed]

Biography

Hasan Ali holds a Master's degree in Computer Science and brings over fifteen years of progressive experience at Saudi Aramco, where he serves as Lead Business Systems Analyst. His research and professional pursuits center on Data Science, Machine Learning, and Agentic AI, with a strong focus on architecting intelligent, scalable decision-support systems for enterprise environments. He has led multiple large-scale digital transformation initiatives, integrating advanced analytics with strategic business processes to enhance operational efficiency and data governance. His expertise further encompasses Talent Management and Technical Competency Mapping, where he applies quantitative modeling and AI-driven insights to optimize workforce planning and capability development. Bridging academic rigor with practical execution, Hasan is committed to advancing innovative computational methodologies that drive organizational resilience, strategic alignment, and sustainable value creation in complex, data-intensive ecosystems.and measurable business impact across complex enterprise environments.

Research Field

Hasan Ali: Data Science, Agentic AI, Talent Management, Cybersecurity