

Data-driven workforce analytics for improving employee retention and workforce resilience in critical U.S. Industries: A systematic review

Aminat Jumoke Folawewo ^{1,*}, Jessica Fosua Agyei ², Matthew Oman-Amoako ³ and Solomon Doe Adjaottor ⁴

¹ School of Management and Labor Relations – Rutgers University, New Brunswick, NJ, USA.

² School of Business – University of Cape Coast, Ghana.

³ Department of Business Administration – Accra Institute of Technology, Ghana.

⁴ Department of Accounting and Finance – Kwame Nkrumah University of Science and Technology, Ghana.

Magna Scientia Advanced Research and Reviews, 2026, 17(02), 372–385

Publication history: Received on 16 June 2026; revised on 06 August 2026; accepted on 08 August 2026

Article DOI: <https://doi.org/10.30574/msarr.2026.17.2.0156>

Abstract

Background: Organizations across critical U.S. industries continue to face workforce challenges, including employee turnover, labor shortages, skills gaps, and workforce disruptions. Data-driven workforce analytics has emerged as a strategic approach for improving employee retention, workforce resilience, and organizational performance. This study aimed to synthesize evidence regarding the effectiveness of workforce analytics in enhancing employee retention and workforce resilience across critical U.S. industries.

Methods: A systematic review was conducted of peer-reviewed studies published between 2021 and 2026. Studies examining workforce analytics, people analytics, predictive HR analytics, artificial intelligence (AI)-enabled workforce management systems, employee retention, workforce resilience, and talent management were included. Following screening and eligibility assessment using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guideline, 22 studies met the inclusion criteria and were included in the qualitative synthesis.

Results: The reviewed studies consistently demonstrated positive associations between workforce analytics and workforce outcomes. Workforce analytics improved employee retention through the identification of turnover risks, enhanced talent management, workforce planning, and employee engagement. AI-enabled HR analytics supported recruitment effectiveness, talent optimization, and workforce decision-making, while workforce analytics contributed to workforce resilience by improving organizational adaptability, workforce agility, and preparedness for labor market disruptions. These benefits were observed across healthcare, education, manufacturing, technology, and hospitality sectors.

Conclusion: The findings suggest that workforce analytics represent a valuable strategic tool for improving employee retention, strengthening workforce resilience, and enhancing organizational performance. The increasing adoption of predictive analytics and AI-enabled workforce management systems may contribute to stronger human capital development, workforce sustainability, and long-term economic competitiveness in critical U.S. industries.

Keywords: Workforce Analytics; Employee Retention; Organizational Performance; Human Capital Development

1. Introduction

Human capital remains one of the most important drivers of economic growth, organizational productivity, and national competitiveness in the United States. However, persistent workforce shortages, high employee turnover, skills gaps,

* Corresponding author: Aminat Jumoke Folawewo

and changing workplace dynamics continue to challenge organizations across critical industries, including healthcare, education, manufacturing, and technology (Ompong & Cudjoe-Mensah, 2025; Serha & Djokoto, 2025). These challenges have increased the need for evidence-based workforce management strategies capable of strengthening employee retention, improving workforce resilience, and enhancing organizational performance.

Recent advances in workforce analytics, people analytics, and artificial intelligence (AI) have transformed how organizations collect, analyze, and utilize workforce data for strategic decision-making. Workforce analytics enables organizations to leverage employee data, predictive models, and performance metrics to optimize recruitment, talent development, retention, and workforce planning processes (Gurusinghe et al., 2021; Yoon et al., 2024). Similarly, AI-driven human resource management systems have expanded organizations' ability to predict employee turnover, identify workforce risks, and support data-driven talent management decisions (Alabi et al., 2024; Basnet, 2024; Căvescu & Popescu, 2025).

Growing evidence suggests that data-driven workforce management practices can improve employee engagement, enhance talent retention, and support organizational adaptability in rapidly changing environments (Odionu et al., 2024; Tasleem, 2025). Organizations increasingly utilize predictive HR analytics to identify factors influencing employee turnover intentions and develop targeted interventions that strengthen workforce stability and organizational resilience (Kamaruzzaman et al., 2025; Abdelhay, 2024). Furthermore, AI-enabled workforce analytics has emerged as a strategic tool for building workforce agility and resilience, particularly in industries characterized by labor shortages, technological disruption, and high operational complexity (Karami, 2026; Hansson & Simrén, 2025).

The importance of these developments extends beyond individual organizations. Workforce challenges affecting healthcare, education, manufacturing, and technology sectors have significant implications for national productivity, innovation, economic competitiveness, and the effective delivery of essential services (Nabi et al., 2025; Serh & Shardey, 2025). Research has also highlighted the growing role of AI and analytics in addressing labor shortages, improving workforce adaptation, and supporting sustainable organizational performance across critical sectors of the U.S. economy (Ompong & Aryee, 2025; Ompong & Oman-Amoako, 2025; Serha & Djokoto, 2025).

Despite increasing scholarly attention to workforce analytics and people analytics, the existing literature remains fragmented across disciplines, industries, and analytical approaches. Previous studies have examined predictive analytics in talent management (Gurusinghe et al., 2021), AI-enabled retention strategies (Basnet, 2024), HR technology transformation (Tasleem, 2025), and workforce resilience frameworks (Karami, 2026), yet there remains limited synthesis of the collective evidence regarding how data-driven workforce analytics contributes to employee retention and workforce resilience across critical U.S. industries.

Therefore, this systematic review aims to synthesize and critically evaluate the existing literature on data-driven workforce analytics and its role in improving employee retention and workforce resilience. Specifically, the review seeks to identify the workforce analytics approaches most commonly employed, evaluate their reported outcomes, examine sector-specific applications, and assess their implications for workforce development, organizational performance, and long-term U.S. economic competitiveness.

2. Methods

A systematic review was conducted on evidence regarding the effectiveness of data-driven workforce analytics in improving employee retention and workforce resilience across critical U.S. industries. The methodology was based on established systematic review guidelines and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework.

2.1. Eligibility Criteria

A systematic search was carried out for peer-reviewed manuscripts published between 2021 and 2026. The population, intervention, comparison, outcome, and study design (PICOS) framework was used to guide study selection: P (population) = employees, workforce populations, and organizations operating within critical industries, including healthcare, education, manufacturing, technology, and hospitality; I (intervention) = data-driven workforce analytics, people analytics, predictive HR analytics, artificial intelligence-enabled workforce management systems, and analytics-based talent management strategies; C (comparison) = traditional workforce management approaches, organizations with limited analytics adoption, or pre-intervention workforce conditions; O (outcome) = employee retention, workforce resilience, workforce stability, employee engagement, talent optimization, turnover reduction, and

organizational performance; and S (study design) = empirical studies, case studies, systematic reviews, narrative reviews, conceptual frameworks, and evidence-based reviews.

2.2. Information Sources

The evidence base for this review consisted of published scholarly literature addressing workforce analytics, predictive HR analytics, AI-enabled workforce management, talent retention, workforce resilience, organizational performance, and related workforce outcomes. The review incorporated studies representing diverse organizational contexts, including healthcare, education, manufacturing, technology, hospitality, and other knowledge-intensive industries. Particular attention was given to studies investigating the practical implementation of workforce analytics and their impact on employee retention, workforce stability, organizational adaptability, and talent optimization.

2.3. Search Strategy

A structured search strategy was developed to identify studies relevant to workforce analytics, employee retention, workforce resilience, and talent management. The search incorporated keywords and term combinations related to workforce analytics, people analytics, HR analytics, predictive HR analytics, artificial intelligence in human resource management, employee retention, employee turnover, talent management, workforce resilience, organizational resilience, workforce planning, talent optimization, data-driven decision-making, and human capital management. Search terms were combined using Boolean operators to maximize the retrieval of relevant studies. Additional articles were identified through manual screening of the reference lists of eligible studies.

2.4. Study Selection

The study selection process was conducted in accordance with the eligibility criteria established for this review. Records identified through the literature search were initially screened based on their titles and abstracts to determine relevance to workforce analytics, employee retention, workforce resilience, talent management, and organizational performance. Studies that did not address the review objectives, lacked a workforce analytics component, or failed to meet the inclusion criteria were excluded at this stage. The full texts of potentially eligible studies were subsequently assessed for inclusion. Articles were evaluated based on their relevance to the review question, study design, workforce analytics approach, and reported outcomes related to employee retention, workforce resilience, talent optimization, or organizational performance. Following the screening and eligibility assessment process, 22 studies were included in the final review and synthesized qualitatively. The study selection process is summarized in Table 1 and illustrated in the PRISMA flow diagram (Figure 1).

Table 1 Summary of Study Selection Process

Screening Stage	Number of Studies
Records identified through database searching	186
Records after duplicates removed	152
Records screened by title and abstract	152
Full-text articles assessed for eligibility	44
Full-text articles excluded	22
Studies included in qualitative synthesis	22

2.5. Data Extraction

Data extraction was conducted using a standardized framework developed to capture information relevant to the review objectives. Information extracted from each study included the authors, publication year, study objectives, industry or organizational context, workforce analytics approaches, analytical methods, workforce outcomes examined, key findings, and reported implications for employee retention and workforce resilience. Data on recommendations for organizational practice were also collected where available. The extracted information was subsequently organized into evidence tables to facilitate comparison, synthesis, and interpretation of findings across the included studies.

2.6. Quality of the Evidence Assessment

The quality of evidence assessment was conducted using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework, which provides a systematic approach for evaluating the certainty and strength of evidence across studies. The GRADE approach classifies the quality of evidence into four levels: high, moderate, low, and very low, reflecting the degree of confidence that the reported findings accurately represent the true effect.

Given the diversity of study designs included in this review, the GRADE framework was adapted to assess the overall certainty of evidence regarding the use of workforce analytics to improve employee retention and workforce resilience. The assessment considered several factors, including study design, methodological limitations (risk of bias), consistency of findings across studies, reporting transparency, direct relevance to the review objectives, and the applicability of conclusions to workforce analytics, employee retention, workforce resilience, and organizational performance. Particular attention was given to the robustness of analytical approaches, clarity of outcome measures, and the overall strength and consistency of the reported evidence.

The quality assessment was conducted independently by two reviewers using the GRADE framework. Any differences in the assessment were discussed and resolved through consensus, with the involvement of a third reviewer where necessary, to ensure consistency and reliability in the evaluation of the included studies.

2.7. Data Synthesis

Given the diversity of study designs, organizational contexts, industries, and outcome measures represented in the literature, a narrative synthesis approach was adopted. The synthesis focused on examining the role of workforce analytics in employee retention, predictive HR analytics and talent management, workforce resilience, and AI-enabled workforce management and organizational performance. In addition, a thematic analysis was conducted to identify sector-specific findings across critical industries, including healthcare, education, manufacturing, technology, and hospitality. The findings were subsequently integrated to evaluate the overall contribution of data-driven workforce analytics to employee retention, workforce resilience, organizational effectiveness, and human capital development.

3. Results

Figure 1 summarizes the study selection process. A systematic literature search was conducted across Google Scholar, Scopus, Web of Science, and ResearchGate, yielding a total of 186 records. After removing 34 duplicate records identified across the databases, 152 unique studies remained for title and abstract screening. Of these, 108 studies were excluded because they did not align with the review objectives, lacked a workforce analytics component, or did not report outcomes related to employee retention, workforce resilience, talent management, or organizational performance. The remaining 44 full-text articles were assessed for eligibility, of which 22 were excluded due to insufficient relevance to the review question or failure to meet the inclusion criteria. Ultimately, 22 studies were included in the final qualitative synthesis.

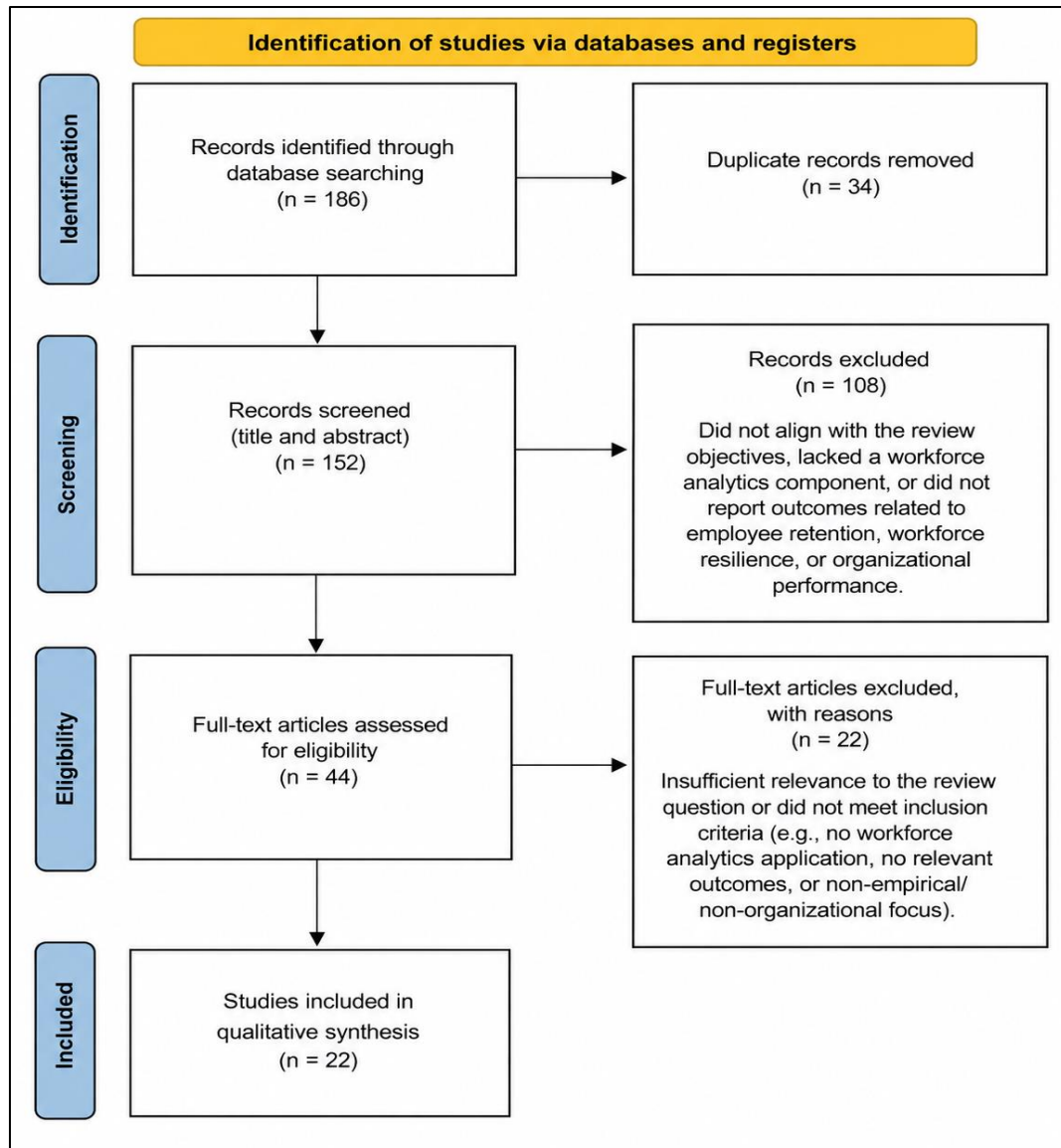


Figure 1 PRISMA flow diagram study selection process

3.1. Characteristics of Included Studies

The review included 22 studies published between 2021 and 2026 that examined the application of workforce analytics, people analytics, predictive HR analytics, artificial intelligence (AI)-enabled workforce management systems, and data-driven decision-making approaches within organizational settings. The included studies comprised conceptual frameworks, systematic reviews, evidence-based reviews, empirical investigations, and industry case studies. Most studies focused on workforce retention, talent management, workforce resilience, organizational performance, and AI-enabled workforce optimization across critical sectors of the economy.

The included studies were conducted across diverse geographic contexts, including the United States, Canada, Australia, Sri Lanka, Malaysia, Egypt, Italy, Sweden, Romania, and multinational organizational settings. Although several studies originated outside the United States, they addressed workforce analytics practices and organizational challenges that are common across modern labor markets, including employee turnover, workforce shortages, talent optimization, workforce resilience, and AI-enabled human resource management. Consequently, the findings provide evidence that is transferable to critical U.S. industries facing similar workforce challenges, while acknowledging that differences in institutional, economic, and regulatory environments may influence the implementation and outcomes of workforce analytics strategies.

Table 2 Characteristics of Included Studies

Author(s)	Year	Country/Region	Study Focus	Workforce Analytics Domain	Key Outcome(s)
Gurusinghe et al.	2021	Sri Lanka	Predictive HR analytics and talent management	Predictive HR Analytics	Talent management optimization, workforce planning
Yoon et al.	2024	United States	People analytics and HR development	People Analytics	Strategic workforce development, organizational learning
Alabi et al.	2024	Nigeria	AI-enabled predictive analytics in HR	AI-Driven HR Analytics	Data-driven decision-making, talent management
Basnet	2024	Nepal	Predictive analytics and employee retention	Employee Retention Analytics	Reduced turnover, retention improvement
Abdelhay	2024	Egypt	HR analytics and employee retention	Employee Analytics	Employee engagement, retention outcomes
Odionu et al.	2024	Nigeria	Data-driven HR decision-making	Workforce Analytics	Talent acquisition and retention
Tasleem	2025	Pakistan	HR technology transformation	People Analytics	Workforce management effectiveness
Kamaruzzaman et al.	2025	Malaysia	Turnover prediction models	Predictive HR Analytics	Employee turnover prediction
Căvescu & Popescu	2025	Romania	AIHR and talent retention	AI-Enabled Talent Analytics	Talent retention improvement
Karami	2026	International	AI-driven workforce resilience	Workforce Resilience Analytics	Workforce agility and resilience
Hansson & Simrén	2025	Sweden	Workforce management framework	Workforce Planning Analytics	Workforce adaptability in volatile industries
Ompong & Aryee	2025	United States	AI and HR recruitment management	Recruitment Analytics	Improved recruitment effectiveness
Ompong & Cudjoe-Mensah	2025	United States	Talent retention strategies	Retention Analytics	Labor shortage mitigation
Ompong & Oman-Amoako	2025	United States	HR policies and workforce stability	Workforce Resilience	Workforce stability during crises

Egbunu & Cudjoe-Mensah	2025	United States	Performance management systems	Performance Analytics	Organizational productivity
Nabi et al.	2025	United States	Teacher readiness for AI	Workforce Development Analytics	Workforce capability development
Serha & Djokoto	2025	United States	AI impacts across economic sectors	Workforce Adaptation Analytics	Sectoral workforce adaptation
Serh & Shardey	2025	United States	Equity in workforce adaptation	Workforce Inclusion Analytics	Inclusive workforce resilience
Adegoke et al.	2025	United States	Supply chain redesign and agility	Workforce and Operational Analytics	Organizational agility
Ogunsola et al.	2025	United States	AI-driven decision support systems	Decision Analytics	Operational efficiency
Addison & Cudjoe-Mensah	2025	United States	Agile management practices	Organizational Performance Analytics	Sustainability and performance outcomes
Margherita	2022	Italy (Global literature review)	Human resource analytics research	Human Resource Analytics	Strategic HR decision-making, talent management, organizational performance

The studies also represented diverse industry contexts, including healthcare, education, hospitality, manufacturing, technology, supply chain management, and knowledge-intensive organizations. Several studies specifically examined predictive HR analytics and people analytics as tools for identifying turnover risks, improving talent retention, and supporting strategic workforce planning (Gurusinghe et al., 2021; Kamaruzzaman et al., 2025; Yoon et al., 2024). Other studies explored the role of AI-enabled workforce management systems in enhancing employee engagement, organizational agility, workforce resilience, and decision-making effectiveness (Alabi et al., 2024; Basnet, 2024; Karami, 2026; Tasleem, 2025).

The evidence presented in Table 2 indicates a growing international adoption of workforce analytics across industries, with organizations increasingly leveraging data-driven approaches to improve employee retention, workforce stability, organizational productivity, and long-term workforce sustainability. While the evidence is drawn from multiple geographic regions, the recurring workforce challenges and consistent findings across studies strengthen the applicability of the review to critical U.S. industries.

Table 3 Distribution of Included Studies by Research Theme

Research Theme	Number of Studies	Percentage (%)
Workforce Analytics and People Analytics	6	27.3
Employee Retention and Turnover Analytics	5	22.7
Workforce Resilience and Adaptation	4	18.2
AI-Driven HR Analytics	4	18.2
Organizational Performance and Workforce Optimization	3	13.6
Total	22	100.0

The distribution of studies indicates that workforce analytics and employee retention remain the dominant areas of investigation within the literature, accounting for approximately half of the included studies. A growing body of evidence also focuses on AI-enabled HR analytics and workforce resilience, reflecting increasing organizational interest in leveraging advanced analytics to address labor shortages, workforce disruptions, and talent management challenges across critical industries.

3.2. Quality Assessment and Risk of Bias

The quality assessment indicated that the included studies generally provided moderate to high-quality evidence regarding the application of workforce analytics in employee retention, workforce resilience, and talent management. Most studies clearly defined their objectives, analytical approaches, and workforce-related outcomes. However, several studies were conceptual or review-based in nature, limiting the ability to establish causal relationships. Common limitations included sector-specific focus, limited longitudinal evidence, and reliance on organizational case studies. Despite these limitations, the overall evidence base demonstrated consistent findings regarding the value of workforce analytics for improving workforce outcomes, as evident in Table 4.

Table 4 Quality Assessment of Included Studies

Quality Rating	Number of Studies	Percentage (%)
High	8	36.4
Moderate	11	50.0
Low	3	13.6
Total	22	100.0

Overall, the consistency of findings across studies reduced the risk of bias and increased confidence in the observed relationships between workforce analytics adoption and organizational workforce outcomes.

3.3. Effects of Workforce Analytics on Employee Retention

A recurring finding across the reviewed literature was the positive relationship between workforce analytics and employee retention. Predictive HR analytics enabled organizations to identify turnover risks, understand employee behavior patterns, and implement targeted retention interventions before employee disengagement occurred (Gurusinghe et al., 2021; Kamaruzzaman et al., 2025). Studies also reported that data-driven decision-making improved talent acquisition, employee engagement, and workforce planning, contributing to lower turnover intentions and stronger workforce stability (Odionu et al., 2024; Abdelhay, 2024).

AI-enabled retention models further enhanced organizational capacity to identify high-risk employee groups and personalize retention strategies, particularly in industries experiencing labor shortages (Basnet, 2024; Căvescu & Popescu, 2025). Evidence from the hospitality sector similarly demonstrated that analytics-informed retention strategies can help organizations address workforce shortages and improve long-term workforce sustainability (Ompong & Cudjoe-Mensah, 2025).

Table 5 Reported Effects of Workforce Analytics on Employee Retention

Outcome	Supporting Studies
Improved employee retention	Abdelhay (2024); Basnet (2024)
Reduced turnover intention	Kamaruzzaman et al. (2025)
Enhanced employee engagement	Abdelhay (2024)
Improved talent management decisions	Gurusinghe et al. (2021)
Better workforce planning	Odionu et al. (2024); Yoon et al. (2024)
Labor shortage mitigation	Ompong & Cudjoe-Mensah (2025)

The findings suggest that workforce analytics serves as a strategic mechanism for improving employee retention through proactive, evidence-based workforce management practices.

3.4. Effects of Workforce Analytics on Workforce Resilience

The reviewed studies consistently highlighted workforce analytics as an important enabler of workforce resilience. Workforce resilience was commonly associated with an organization's ability to adapt to changing labor market conditions, technological disruptions, economic uncertainty, and workforce shortages. Analytics-driven workforce planning improved organizational preparedness by enabling decision-makers to anticipate workforce challenges and allocate resources more effectively (Hansson & Simrén, 2025; Karami, 2026).

Several studies emphasized the role of AI-enabled analytics in strengthening workforce agility, adaptability, and organizational continuity during periods of disruption (Karami, 2026; Ompong & Oman-Amoako, 2025). Evidence also suggested that workforce analytics supports more resilient organizational structures by facilitating continuous workforce monitoring, skills assessment, and strategic talent deployment (Tasleem, 2025).

Table 6 Reported Effects of Workforce Analytics on Workforce Resilience

Workforce Resilience Outcome	Supporting Studies
Workforce agility and adaptability	Karami (2026)
Improved crisis preparedness	Ompong & Oman-Amoako (2025)
Strategic workforce planning	Hansson & Simrén (2025)
Workforce stability	Ompong & Oman-Amoako (2025)
Organizational continuity	Karami (2026); Tasleem (2025)
Enhanced workforce monitoring	Tasleem (2025)

Overall, the findings indicate that workforce analytics contributes significantly to organizational resilience by supporting proactive workforce management and informed strategic decision-making.

3.5. AI-Driven HR Analytics and Talent Management Outcomes

The findings demonstrate a growing integration of artificial intelligence within workforce analytics systems to support talent management, recruitment, workforce planning, and organizational performance. AI-enabled HR analytics tools were found to enhance decision-making efficiency by processing large workforce datasets and generating predictive insights regarding employee behavior, workforce demand, and retention risks (Alabi et al., 2024; Ompong & Aryee, 2025).

Several studies reported that AI-supported analytics improved recruitment effectiveness, talent acquisition processes, and workforce optimization efforts by reducing uncertainty in workforce decisions (Alabi et al., 2024; Ompong & Aryee, 2025). Furthermore, AI-driven analytics facilitated the development of more adaptive workforce management systems capable of responding to rapidly evolving organizational and industry conditions (Karami, 2026; Serha & Djokoto, 2025).

Table 7 AI-Driven HR Analytics and Talent Management Outcomes

Outcome	Supporting Studies
Improved recruitment effectiveness	Ompong & Aryee (2025)
Enhanced talent acquisition	Alabi et al. (2024)
Predictive workforce planning	Gurusinghe et al. (2021)
Improved retention forecasting	Basnet (2024); Kamaruzzaman et al. (2025)
Workforce optimization	Tasleem (2025)
Organizational agility and adaptability	Karami (2026)
Data-driven workforce decision-making	Alabi et al. (2024); Yoon et al. (2024)

Taken together, the evidence suggests that AI-driven HR analytics has become an increasingly important component of modern workforce management, enabling organizations to improve talent management outcomes while strengthening workforce resilience and organizational performance.

3.6. Sector-Specific Findings

The included studies demonstrated that workforce analytics is increasingly being adopted across critical industries to address workforce shortages, employee turnover, skills gaps, and organizational adaptability challenges. In healthcare, workforce analytics was associated with improved workforce planning, retention, and staffing stability, while in education it supported workforce readiness, professional development, and adaptation to emerging technologies (Nabi et al., 2025). Manufacturing organizations utilized workforce analytics to enhance workforce planning, operational agility, and organizational resilience in response to labor shortages and changing production demands (Adegoke et al., 2025). In the technology sector, AI-driven workforce analytics facilitated talent retention, workforce optimization, and organizational agility, helping firms respond to rapidly evolving skill requirements and competitive pressures (Alabi et al., 2024; Karami, 2026). The hospitality and service industries demonstrated some of the strongest applications of workforce analytics, particularly in reducing employee turnover, improving recruitment effectiveness, strengthening workforce stability, and addressing labor shortages through data-driven retention strategies (Ompong & Aryee, 2025; Ompong & Cudjoe-Mensah, 2025; Ompong & Oman-Amoako, 2025). The findings thus suggest that workforce analytics provides a scalable and adaptable approach for improving employee retention, workforce resilience, and organizational performance across diverse industry contexts.

4. Discussion

4.1. Principal Findings

This systematic review synthesized evidence from 22 studies examining the role of data-driven workforce analytics in improving employee retention and workforce resilience across critical industries. Overall, the findings indicate that

workforce analytics has emerged as a strategic tool for supporting evidence-based workforce management, enabling organizations to make more informed decisions regarding talent acquisition, employee retention, workforce planning, and organizational performance. The evidence consistently demonstrated that workforce analytics, people analytics, predictive HR analytics, and AI-enabled workforce management systems contribute to improved workforce outcomes by helping organizations identify workforce risks, optimize talent management practices, and respond more effectively to changing labor market conditions (Gurusinghe et al., 2021; Yoon et al., 2024; Alabi et al., 2024).

A key finding of this review is the growing importance of predictive analytics in reducing employee turnover and strengthening workforce stability. Several studies reported that organizations can leverage workforce data to identify employees at risk of leaving, understand factors influencing turnover intentions, and implement targeted interventions that improve retention outcomes (Abdelhay, 2024; Basnet, 2024; Kamaruzzaman et al., 2025). These findings suggest that workforce analytics has shifted human resource management from a reactive function toward a more proactive and strategic approach focused on anticipating workforce challenges before they negatively affect organizational performance.

The review also found strong evidence supporting the role of workforce analytics in enhancing workforce resilience. Studies consistently indicated that data-driven workforce planning and AI-enabled decision-making improve organizational adaptability, workforce agility, and preparedness for labor market disruptions (Karami, 2026; Hansson & Simrén, 2025; Ompong & Oman-Amoako, 2025). By enabling organizations to monitor workforce trends, identify skills gaps, and anticipate future workforce needs, workforce analytics strengthens organizational capacity to respond to economic uncertainty, technological change, and workforce shortages.

Another important finding is the increasing integration of artificial intelligence within workforce management systems. AI-driven HR analytics was associated with improvements in recruitment effectiveness, talent acquisition, workforce optimization, and strategic decision-making (Alabi et al., 2024; Ompong & Aryee, 2025; Tasleem, 2025). These technologies allow organizations to process large volumes of workforce data more efficiently and generate actionable insights that support workforce sustainability and long-term organizational success.

The sector-specific findings further demonstrated that the benefits of workforce analytics extend across healthcare, education, manufacturing, technology, and hospitality industries. Although workforce challenges varied among sectors, the evidence consistently showed that analytics-based workforce management strategies contribute to stronger employee retention, improved workforce resilience, and enhanced organizational performance, suggesting that workforce analytics has become an increasingly important mechanism for strengthening human capital and supporting workforce sustainability in critical sectors of the U.S. economy.

4.2. Workforce Analytics, Employee Retention, and Workforce Resilience

The findings of this review highlight a strong relationship between workforce analytics, employee retention, and workforce resilience. Across the included studies, workforce analytics was consistently identified as a valuable tool for understanding workforce behavior, predicting turnover risks, and supporting evidence-based talent management decisions (Gurusinghe et al., 2021; Abdelhay, 2024; Kamaruzzaman et al., 2025). By leveraging workforce data and predictive models, organizations can proactively identify factors contributing to employee disengagement and turnover, allowing targeted interventions that strengthen employee retention and workforce stability. These findings support previous research suggesting that workforce analytics enables organizations to transition from reactive workforce management practices to more strategic and data-driven approaches (Yoon et al., 2024; Odionu et al., 2024).

The review further demonstrates that workforce analytics contributes significantly to workforce resilience by enhancing organizational adaptability and preparedness for workforce disruptions. AI-enabled workforce management systems and predictive analytics tools allow organizations to anticipate labor shortages, monitor workforce trends, identify emerging skills gaps, and optimize workforce planning processes (Karami, 2026; Hansson & Simrén, 2025). Such capabilities are increasingly important in a rapidly changing labor market characterized by technological transformation, demographic shifts, and evolving workforce expectations. The evidence suggests that organizations that effectively integrate workforce analytics into their human resource strategies are better positioned to maintain workforce continuity, improve organizational agility, and sustain long-term workforce performance (Tasleem, 2025; Ompong & Oman-Amoako, 2025).

The findings indicate that workforce analytics serves as both a retention and resilience mechanism by enabling organizations to make proactive workforce decisions that improve employee outcomes while strengthening organizational capacity to respond to future workforce challenges.

4.3. Implications for Critical U.S. Industries, Human Capital Development, and Economic Competitiveness

Beyond industry-level benefits, workforce analytics also has broader implications for human capital development and U.S. economic competitiveness. A skilled, resilient, and productive workforce remains a critical driver of innovation, productivity, and economic growth. The reviewed studies indicate that data-driven workforce management practices can improve employee development, workforce adaptability, and talent optimization while enabling organizations to respond more effectively to technological and labor market changes (Yoon et al., 2024; Karami, 2026; Tasleem, 2025). As organizations increasingly adopt AI-enabled workforce management systems, workforce analytics is likely to play an increasingly important role in strengthening the nation's human capital base, enhancing labor force participation, and supporting the competitiveness of the U.S. economy in a knowledge-driven, technology-intensive global environment.

4.4. Strengths and Limitations

This review contributes to the growing workforce analytics literature by synthesizing evidence from diverse studies examining employee retention, workforce resilience, talent management, and AI-enabled workforce analytics across multiple industries. By integrating findings from healthcare, education, manufacturing, technology, and hospitality sectors, the review provides a comprehensive understanding of how data-driven workforce strategies support organizational performance and workforce sustainability. The inclusion of recent studies also captures emerging developments in predictive HR analytics and AI-driven workforce management.

However, several limitations should be acknowledged. First, many of the included studies were conceptual, review-based, or industry-specific, limiting the ability to establish causal relationships between workforce analytics and workforce outcomes. Second, variations in study design, analytical methods, and outcome measures reduced comparability across studies. Third, the relatively limited number of empirical studies examining long-term workforce outcomes suggests that the evidence base is still developing. Consequently, the findings should be interpreted in light of these methodological limitations.

4.5 Future Research Directions

The findings of this review highlight several opportunities for future research. First, additional empirical and longitudinal studies are needed to examine the long-term effects of workforce analytics on employee retention, workforce resilience, and organizational performance. Such studies would strengthen understanding of the causal mechanisms through which workforce analytics influences workforce outcomes.

Second, future research should explore the effectiveness of workforce analytics across different industries and organizational contexts, particularly in sectors experiencing persistent workforce shortages such as healthcare, education, manufacturing, and technology. Comparative studies could provide valuable insights into sector-specific workforce challenges and analytics applications.

Third, as artificial intelligence continues to transform workforce management, further investigation is needed into the ethical, organizational, and workforce implications of AI-enabled HR analytics. Future studies should examine issues related to algorithmic fairness, employee privacy, workforce inclusion, and responsible AI adoption. Finally, research evaluating the contribution of workforce analytics to human capital development, labor market adaptability, and national economic competitiveness would provide important evidence for policymakers and organizational leaders seeking to strengthen the U.S. workforce in an increasingly data-driven economy.

5. Conclusion

This systematic review synthesized evidence on the role of data-driven workforce analytics in improving employee retention and workforce resilience across critical U.S. industries. The findings demonstrate that workforce analytics, predictive HR analytics, people analytics, and AI-enabled workforce management systems are increasingly being used to support evidence-based workforce decisions, strengthen talent management practices, and improve organizational performance. Across healthcare, education, manufacturing, technology, and hospitality sectors, workforce analytics was consistently associated with improved employee retention, enhanced workforce resilience, better workforce planning, and greater organizational adaptability.

The review further highlights the growing importance of data-driven workforce strategies in addressing labor shortages, workforce disruptions, and evolving skill demands. By enabling organizations to anticipate workforce challenges and optimize human capital management, workforce analytics contributes to workforce sustainability and

organizational competitiveness. Generally, the evidence suggests that workforce analytics represents a valuable strategic approach for strengthening human capital development and supporting the long-term resilience and economic competitiveness of critical industries in the United States.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Abdelhay, S. (2024). The impact of HR analytics on employee retention in Egypt: Mediating role of employee engagement and the moderating role of organizational culture. *SSRN Electronic Journal*.
- [2] Addison, I. T., & Cudjoe-Mensah, Y. M. (2025). The impact of agile project management on sustainability initiatives in the U.S. corporate sector. *Journal of Entrepreneurship and Business Management*, 4(9), 1–12.
- [3] Adegoke, A. M., Samuel-Anonye, C., & Buabin, W. K. A. (2025). Strategic redesign of U.S. supply chain networks for operational agility and competitive advantage. *International Journal for Multidisciplinary Research (IJFMR)*, 7(5).
- [4] Alabi, K. O., Adediji, A. A., Mahmuda, S., et al. (2024). Predictive analytics in HR: Leveraging AI for data-driven decision making. *International Journal of Research and Innovation in Social Science*.
- [5] Basnet, S. (2024). The impact of AI-driven predictive analytics on employee retention strategies. *International Journal of Research and Review*.
- [6] Căvescu, A. M., & Popescu, N. (2025). Predictive analytics in human resources management: Evaluating AIHR's role in talent retention. *AppliedMath*, 5(3).
- [7] Egbunu, A. S., & Cudjoe-Mensah, Y. M. (2025). The role of performance management systems in enhancing organizational productivity: A comprehensive review. *Journal of Economics and Business Management*, 4(8), 14–19.
- [8] Gurusinghe, R. N., Arachchige, B. J. H., & Dayarathna, D. (2021). Predictive HR analytics and talent management: A conceptual framework. *Journal of Management Analytics*, 8(2), 195–221. <https://doi.org/10.1080/23270012.2021.1899857>
- [9] Hansson, A., & Simrén, M. (2025). A data-driven workforce management framework for knowledge-intensive, high-volatility industries: A case study at a large pharmaceutical company.
- [10] Kamaruzzaman, Z. A., Tan, Y. P., & Kamaruzzaman, Z. A. (2025). Predicting the employee turnover intention: How organizations leverage data-driven HR predictive analytics for talent management decision-making. *Journal of Human Capital Development (JHCD)*, 18(1), 56–81. <https://doi.org/10.54554/jhcd.2024.18.1.5>
- [11] Karami, M. (2026). AI-driven HR analytics for workforce resilience and agility: A strategic framework for the digital era. *Strategic HR Review*. <https://doi.org/10.1108/SHR-11-2025-0119>
- [12] Margherita, A. (2022). Human resources analytics: A systematization of research topics and directions for future research. *Human Resource Development Review*, 21(4), 457–495. <https://doi.org/10.1177/15344843221118147>
- [13] Nabi, F., Vortia, W., & Shardey, E. (2025). Teacher readiness for AI and digital tools in K–12 classrooms: A review of professional development trends and gaps. *International Journal for Multidisciplinary Research*, 7(5), 17.
- [14] Odionu, C. S., Bristol-Alagbariya, B., & Okon, R. (2024). Data-driven decision making in human resources to optimize talent acquisition and retention. *International Journal of Scholarly Research and Reviews*, 5(2), 103–124. <https://doi.org/10.56781/ijssr.2024.5.2.0051>
- [15] Ogunsola, O., Adikorley, I. J. N., & Opoku, J. A. (2025). Mitigating cognitive load in supply chain decision-making: An AI-driven framework for enhanced operational efficiency.
- [16] Ompong, E., & Aryee, C. (2025). The role of artificial intelligence and data analytics in enhancing human resource (HR) recruitment management in U.S. hospitality management. *EPRA International Journal of Economics, Business and Management Studies (EBMS)*, 12(9).

- [17] Ompong, E., & Cudjoe-Mensah, Y. M. (2025). Optimizing talent retention strategies to combat labor shortages in the U.S. hospitality sector.
- [18] Ompong, E., & Oman-Amoako, M. (2025). Developing resilient human resource policies for crisis management and workforce stability in U.S. hotels and restaurants post-COVID.
- [19] Serh, L. Z., & Shardey, E. (2025). Equity in workforce adaptation: Who is left behind in the AI-driven economy? *Sarcouncil Journal of Education and Sociology*, 4(10), 1–7.
- [20] Serha, L. Z., & Djokoto, N. K. (2025). Sectoral vulnerability and adaptation: Mapping artificial intelligence's variable impacts across key U.S. economic sectors. *EPRA International Journal of Economics, Business and Management Studies (EBMS)*, 12(9).
- [21] Tasleem, N. (2025). HR technology transformation and the impact of people analytics on workforce management. *IRE Journal*.
- [22] Yoon, S. W., Han, S., & Chae, C. (2024). People analytics and human resource development: Research landscape and future needs based on bibliometrics and scoping review. *Human Resource Development Review*. <https://doi.org/10.1177/15344843231209362>