

SUSTAINABLE WORKFORCE RETENTION THROUGH HR ANALYTICS AND PREDICTIVE MODELLING

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Abstract

Employee retention has emerged as a significant strategic issue for firms owing to heightened labour mobility, evolving employee expectations, technology upheavals, and competitive market conditions. Elevated personnel turnover adversely impacts organisational productivity, operational continuity, employee morale, and long-term viability. In recent years, HR analytics and predictive modelling have become powerful tools that enable firms to anticipate employee departures, identify retention concerns, and implement evidence-based workforce management initiatives. Increasing sustainable staff retention in businesses is the focus of this study, which analyzes the impact that HR analytics and predictive modeling can have on employee retention. The purpose of this study is to investigate the influence that predictive workforce analytics, employee performance evaluations, engagement metrics, and data-informed HR initiatives have on employee retention, job satisfaction, organizational commitment, and workforce stability. The research was conducted using a quantitative technique, and it gathered primary data from individuals working in a variety of organizational functions by use of standardized questionnaires. Numerous statistical methods, including percentage analysis, estimates of mean and standard deviation, correlation analysis, and regression analysis, were utilized to examine the data that was gathered. The findings demonstrate that HR analytics is essential for worker retention by identifying employee unhappiness, turnover intents, absenteeism patterns, and engagement deficiencies early on. Predictive modelling aids firms in implementing proactive retention strategies, tailored employee development programs, and supportive workplace initiatives. The research reveals that firms employing HR analytics solutions exhibit enhanced employee engagement, lower turnover intention, and increased workforce sustainability. This research enhances the existing literature on HR analytics, predictive workforce management, and sustainable human resource practices, offering practical implications for firms seeking to improve employee retention and organisational stability through data-driven HR initiatives.

Keywords: HR Analytics, Predictive Modelling, Workforce Retention, Employee Turnover, Sustainable HRM, Employee Engagement, Organisational Commitment, Workforce Analytics.

1. INTRODUCTION

The modern corporate landscape is increasingly defined by technical progress, labour evolution, globalisation, and competitive organisational dynamics. Human resources are regarded as a crucial strategic asset that enhances organisational growth, operational efficiency, and long-term

sustainability. Organisations across all sectors encounter considerable difficulties in retaining skilled personnel due to increased job mobility, shifting employee expectations, work-related stress, and transforming career goals.

Employee turnover has emerged as a significant organisational concern, as elevated attrition rates lead to recruitment costs, productivity declines, operational disruptions, knowledge loss, and diminished organisational effectiveness. Thus, labour retention has become a critical strategic objective for firms seeking to sustain growth and competitive advantage.

The rapid digital evolution of human resource management has led to the development of HR analytics and predictive workforce modeling as essential tools for employee management and retention. These tools are essential for ensuring that employees maintain their employment. HR analytics is the process of systematically collecting, analyzing, and interpreting data pertaining to employees in order to facilitate decision-making around human resources that is motivated by evidence. Predictive modeling utilizes statistical methods, artificial intelligence, and data-driven forecasting instruments to foresee employee behavior, attrition risks, and workforce trends.

Organisations are progressively utilising HR analytics to assess employee engagement, absenteeism, job satisfaction, performance trends, turnover intentions, and workplace behaviour. Predictive workforce analytics enables firms to identify employees at risk of attrition, understand the causes of employee dissatisfaction, and implement targeted retention measures. Data-driven methodologies assist firms in bolstering workforce stability, reinforcing organisational commitment, and augmenting employee experiences.

Sustainable workforce retention refers to an organisation's capacity to maintain skilled employees over an extended period by supporting human resource practices, employee engagement strategies, career advancement opportunities, and a conducive work environment. HR analytics facilitates sustainable retention by enabling firms to proactively identify workforce challenges and develop tailored staffing management solutions.

There is a dearth of empirical research that specifically explores the influence that HR analytics and predictive workforce technologies have on sustainable workforce retention, particularly in organizational contexts that are relatively new. This is the case despite the fact that the utilization of these technologies is growing. The majority of previous research places a greater emphasis on the performance and productivity of organizations than it does on the long-term sustainability and retention outcomes of workers. The purpose of this study is to evaluate the impact that HR analytics and predictive modeling have on the long-term management of staff retention.

2. REVIEW OF LITERATURE

2.1 HR Analytics and Workforce Management

Angrave et al. (2016) highlighted that HR analytics converts workforce data into strategic insights for organisational decision-making, facilitating evidence-based human resource management and workforce planning. Boudreau and Cascio (2017) argued that human capital analytics enables firms to enhance workforce efficiency, talent management, and organisational sustainability through predictive workforce initiatives.

Davenport, Harris, and Shapiro (2010) emphasised that talent analytics affords firms a competitive edge by enhancing worker decision-making and discerning employee performance trends. Huselid (2018) asserted that workforce analytics substantially enhances corporate effectiveness via predictive personnel management and data-informed workforce planning.

An evidence-based analysis on human resource analytics was carried out by Marler and Boudreau (2017). The findings of this inquiry revealed that firms are increasingly relying on analytical HR solutions to enhance strategic workforce management and employee decision-making. In their 2015 study, Rasmussen and Ulrich made the observation that human resource analytics has developed into a strategic organizational competency rather than merely a technological trend.

2.2 Predictive Modelling and Employee Retention

Predictive modelling has gained significance in anticipating employee turnover and worker behaviour. Fitz-enz and Mattox (2014) explained that predictive analytics enables firms to identify turnover risks, absence patterns, and employee discontent by analysing workforce data. Zhao and Russell (2020) indicated that predictive modelling substantially enhances employee turnover management by facilitating proactive workforce actions.

Mohapatra and Sharma (2022) found that predictive HR analytics enhances employee retention strategies by identifying factors contributing to workforce discontent and intentions to leave. Yadav and Saini (2021) highlighted that workforce analytics enhances sustainable employee retention by facilitating employee engagement and workforce stability measures.

Hausknecht, Rodda, and Howard (2009) noted that firms employing focused retention methods have reduced turnover rates and enhanced employee commitment. Hom et al. (2017) elucidated that employee retention is affected by organisational support, job satisfaction, career advancement prospects, and interpersonal workplace relationships.

2.3 Employee Engagement and Organisational Commitment

Employee engagement and organisational commitment are critical factors influencing workforce retention. Singh and Sharma (2020) noted that engaged employees exhibit increased organisational commitment, productivity, and an increased desire to remain with the organisation. Ferreira and de Oliveira (2014) similarly discovered that employee involvement and supportive workplace policies favourably affect employee engagement and long-term retention.

Agarwal (2021) examined the correlation between employee well-being and workforce performance, concluding that supportive HR systems enhance employee satisfaction and corporate commitment. Deery and Jago (2015) highlighted that work-life balance, professional advancement, and supporting human resource strategies are essential for sustained employee retention.

Kaur et al. (2021) emphasised that HR analytics enhances employee engagement and corporate effectiveness via tailored workforce management and employee-centric HR interventions.

2.4 Sustainable HR Practices and Workforce Retention

Sustainable methods in human resource management place an emphasis on long-term employee development, organizational stability, and the well-being of employees of the business. In their 2009 study, Becker, Huselid, and Beatty highlighted the fact that strategic talent management strategies considerably improve the sustainability of organizations and the retention of their employees. Cascio and Boudreau (2016) observed that global talent management and workforce sustainability have become essential organizational issues in competitive company environments.

Strohmeier and Parry (2014) elucidated that digital HR technologies and workforce analytics enhance organisational responsiveness and the efficacy of workforce management. Minbaeva (2018) observed that reliable HR analytics solutions enhance corporate competitiveness and facilitate sustainable workforce management methods.

3. RESEARCH GAP

Current literature indicates that HR analytics and predictive workforce technologies substantially enhance company performance, workforce planning, and employee management. Nevertheless, few studies have particularly investigated the impact of HR analytics and predictive modelling on enhancing sustainable staff retention. Most prior research has focused on employee turnover prediction, productivity enhancement, and organisational efficacy, rather than on long-term employee retention and workforce sustainability.

Furthermore, empirical studies on predictive HR analytics related to employee retention are notably limited, particularly in developing organizational environments. The current research offers a limited amount of information regarding the concurrent effects of predictive workforce analytics on employee engagement, organizational commitment, and sustainable retention tactics. In an effort to bridge the gap in the existing body of research, this study will investigate the influence that HR analytics and predictive modeling have on the long-term retention of employees.

4. CONCEPTUAL FRAMEWORK

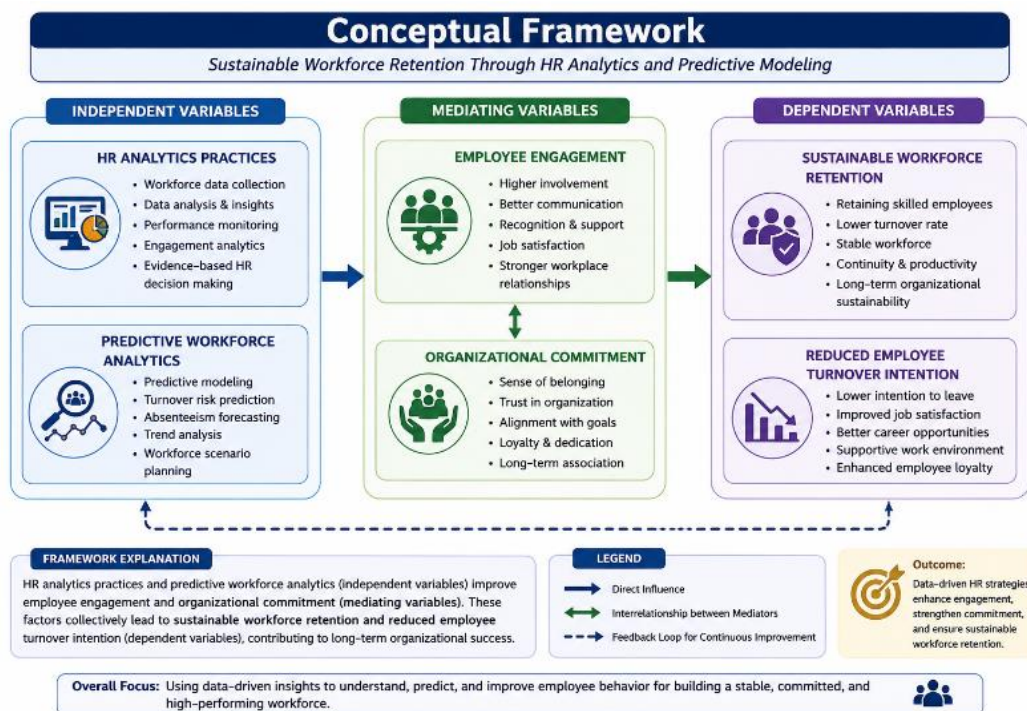


Figure 1: Conceptual Framework of the Study

The conceptual framework delineates the interconnections among HR analytics, predictive workforce analytics, employee engagement, organisational commitment, and sustainable workforce retention. Within this concept, HR analytics techniques and predictive workforce analytics serve as independent variables affecting employee-related outcomes in enterprises. HR analytics empowers firms to gather, analyse, and interpret workforce data to facilitate evidence-based decision-making, whereas predictive workforce analytics helps organisations identify turnover risks, absenteeism trends, and patterns of employee dissatisfaction.

Employee engagement and organisational commitment serve as mediating variables that enhance the association between HR analytics techniques and workforce retention outcomes. Efficient HR analytics

tools augment employee engagement, job happiness, motivation, communication, and organisational trust, ultimately bolstering employee loyalty to the organisation.

The study's dependent variables are sustainable workforce retention and diminished employee turnover intention. The framework indicates that firms that proficiently utilise HR analytics and predictive workforce technologies are more likely to retain skilled individuals, enhance workforce stability, reduce turnover intention, and achieve long-term organisational sustainability. The conceptual framework emphasises that data-driven HR initiatives are crucial for enhancing employee retention and bolstering corporate competitiveness.

5. OBJECTIVES OF THE STUDY

- To examine the impact of HR analytics on sustainable workforce retention.
- To analyse the relationship between predictive modelling and employee retention strategies.
- To evaluate the influence of HR analytics on employee engagement and organisational commitment.
- To assess the role of predictive workforce analytics in reducing employee turnover intention.
- To suggest effective HR analytics strategies for improving sustainable workforce retention.

6. HYPOTHESES OF THE STUDY

H01: HR analytics has no significant impact on sustainable workforce retention.

H11: HR analytics has a significant impact on sustainable workforce retention.

H02: Predictive modelling has no significant relationship with employee retention strategies.

H12: Predictive modelling has a significant relationship with employee retention strategies.

H03: HR analytics has no significant impact on employee engagement and organisational commitment.

H13: HR analytics has a significant impact on employee engagement and organisational commitment.

H04: Predictive workforce analytics does not significantly reduce employee turnover intention.

H14: Predictive workforce analytics significantly reduces employee turnover intention.

7. RESEARCH METHODOLOGY

7.1 Research Design

A quantitative descriptive methodology was applied in the research project in order to investigate the impact that HR analytics and predictive modeling have on the long-term retention of employees.

7.2 Population of the Study

The targeted population included individuals from various functional departments within corporations.

7.3 Sampling Technique

Data were collected from employees using convenience sampling.

7.4 Sample Size

360 respondents participated in the survey.

7.5 Sources of Data

Both primary and secondary sources of information were utilized in the research. Directly from the employees themselves, through the use of structured surveys, primary data were acquired. Books and academic publications were the sources from which secondary data were obtained. HR analytics reports, conference proceedings, industry publications, and online academic databases.

7.6 Research Instrument

In this particular study, the major tool that was utilized for the purpose of data collecting was a structured questionnaire. The survey instrument included parts on demographic data, HR analytics methodologies, predictive workforce analytics, employee engagement, organisational commitment, and workforce retention.

7.7 Statistical Tools Used

A comprehensive examination of the connection between human resource analytics, predictive modeling, and sustainable workforce retention was carried out by employing both descriptive and inferential statistical methods to assess the data that was gathered. The demographic characteristics of the respondents were evaluated through the use of percentage analysis, and the distribution of employees' comments about HR analytics procedures and retention strategies was clarified through the utilization of probability analysis. The mean and standard deviation were utilized in order to assess the reliability of employees' perceptions on worker engagement, business commitment, and retention strategies. The average responses were also evaluated to determine the reliability of the responses. An investigation into the possibility of a correlation between HR analytics variables and employee retention outcomes was carried out through the use of a correlation analysis. In addition, regression analysis was performed in order to assess the impact that HR analytics and predictive modeling have on the strategies that firms employ in order to maintain a sustainable workforce and to retain employees.

8. DATA ANALYSIS AND INTERPRETATION

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	228	63.3%
	Female	132	36.7%
Age	21–30 Years	138	38.3%
	31–40 Years	146	40.6%
	Above 40 Years	76	21.1%

The demographic study reveals that most respondents were aged 31–40 years and had substantial organisational experience. The results indicate active employee engagement across many labour segments.

Table 2: Mean and Standard Deviation Analysis

Variables	Mean	Standard Deviation
HR Analytics Practices	4.16	0.74
Predictive Workforce Analytics	4.08	0.79
Employee Engagement	4.12	0.72
Workforce Retention	4.24	0.68

The findings indicate that participants possessed a positive perception of HR analytics and predictive workforce technologies. Workforce retention exhibited the highest mean value, signifying that employees firmly assert the critical importance of HR analytics in staff retention and organizational stability.

Table 3: Correlation Analysis

Variables	HR Analytics	Predictive Analytics	Employee Engagement	Workforce Retention
HR Analytics	1			
Predictive Analytics	0.701**	1		
Employee Engagement	0.688**	0.672**	1	
Workforce Retention	0.742**	0.718**	0.726**	1

The correlation research reveals a robust positive association across HR analytics, predictive workforce analytics, employee engagement, and workforce retention. The results demonstrate that firms employing predictive HR technologies achieve enhanced employee loyalty and workforce stability.

Table 4: Regression Analysis

Variables	Beta Value	t-value	Significance
Predictive Workforce Analytics	0.402	7.218	0.000
Employee Engagement	0.381	6.924	0.000
Organizational Commitment	0.417	7.506	0.000

Table 5: Model Summary

R	R ²	Adjusted R ²	F-value	Significance
0.792	0.627	0.619	65.104	0.000

The regression analysis demonstrates that HR analytics and predictive workforce technologies have a substantial impact on sustainable staff retention. Organisational commitment appeared as the most significant indicator of worker retention, followed by predictive workforce analytics and employee engagement.

9. RESULTS AND DISCUSSION

The study's findings indicate that HR analytics and predictive modelling substantially enhance sustainable worker retention. Organisations utilising predictive workforce analytics solutions are more adept at recognising turnover concerns, employee discontent, absence patterns, and engagement deficiencies. The research indicated that predictive HR analytics enhances employee engagement, organisational commitment, and workforce stability.

Correlation and regression analyses demonstrate that firms employing data-driven HR systems achieve enhanced employee retention and lower turnover intention. Employees believe that predictive HR solutions enhance transparency, career advancement prospects, workforce planning, and employee support systems.

The research additionally noted that employee engagement and organisational commitment significantly contribute to sustained workforce retention. Employees at firms with effective HR analytics methods exhibited greater organisational loyalty and a reduced propensity to depart.

The results align with earlier research by Angrave et al. (2016), Huselid (2018), Mohapatra and Sharma (2022), and Yadav and Saini (2021), which emphasised the significance of predictive workforce analytics in enhancing employee retention and organisational sustainability.

10. MANAGERIAL IMPLICATIONS

Organisations want to use predictive HR analytics tools to identify staff turnover risks and implement proactive retention measures. Human Resource managers ought to implement workforce analytics solutions to assess employee engagement, absenteeism, performance trends, and workplace satisfaction.

Organisations should prioritise employee-centric retention tactics, including professional development initiatives, recognition systems, and flexible work arrangements. Human resources specialists want to undergo analytical training to proficiently implement predictive workforce management solutions and improve long-term employee retention.

11. LIMITATIONS OF THE STUDY

The study is limited to particular organizational personnel and may not fully represent all industries. The research relied on self-reported employee input, potentially introducing subjective bias. The study utilized a cross-sectional research methodology, limiting the examination of long-term employee retention.

12. FUTURE SCOPE OF THE STUDY

It is possible that in the future, research may investigate the relationship between predictive employee retention systems and artificial intelligence and machine learning. Comparative research across different sectors and geographical areas has the potential to yield a wealth of information regarding the implementation of human resource analytics and sustainable workforce management principles. More advanced analytical methods, such as structural equation modeling (SEM), might also be utilized in the research that will be conducted in the future.

13. CONCLUSION

This study investigated the function of HR analytics and predictive modelling in sustainable workforce retention. The results indicate that HR analytics substantially enhances employee engagement, organisational commitment, and workforce stability via predictive workforce management strategies.

The research demonstrated that firms employing predictive HR analytics tools are more adept at recognising turnover risks, enhancing employee experiences, and implementing evidence-based retention strategies. Employee engagement and organisational commitment have proven crucial to sustained workforce retention.

This research enhances the existing literature on predictive HR analytics and sustainable human resource management by emphasising the strategic significance of workforce analytics for long-term employee retention. Organisations that effectively utilise HR analytics are more likely to attain workforce sustainability, decrease employee turnover, and enhance long-term organisational competitiveness.

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