Publisher
Singh Publication
www.singhpublication.com

E-ISSN:2583-1747

Management Journal for Advanced Research

2026 Volume 6 Number 5 October

Research Article
HR Analytics

# HR Analytics - Predictive Analytics for Employee Retention and Productivity in Chennai - Pre & Post Covid Period

T.H. Lajwanthi[1], D. Uthira[2], Jacob J.M.[3*]

DOI:10.54741/MJAR/6.5.2026.332

[1] T.H. Lajwanthi, Assistant Professor, Department of Management, Hindustan College of Arts & Science, Chennai, Tamil Nadu, India.

[2] D. Uthira, Principal, Hindustan College of Arts & Science, Chennai, Tamil Nadu, India.

[3*] M. John Jacob, Assistant Professor, Department of Management, Hindustan College of Arts & Science, Chennai, Tamil Nadu, India.

HR analytics, or people analytics, enables the measurement of employee performance metrics across the organisation. In the global scenario, human resource practices have changed to modern aspects by using technology to analyse the strategy and operational functions. In Chennai, employee attrition has been consistently high in business process outsourcing (BPO/ITeS, Information Technology, Retail E Commerce/ Gig Economy around 60% in the Pre -Covid period. Due to a monotony work style, long time working hours, target achievement they switch over for better pay. Human Resource Analytics (HR Analytics) has emerged as a critical discipline that leverages data-driven insights to address these challenges. In the Post Covid period, all the sectors are faced major employee attrition rate exceed more than 25 % due to the transient nature of workforce and demand conditions even though Global capability centers providing high pay for professional skill employees. In this Articles highlights how HR analytics helps to retain the employees in their work place, at the same time Predictive measurement focus on upgrading technical skill in their career path.

**Keywords:** hr analytics, information technology, retail e commerce, gig economy

**Corresponding Author**

M. John Jacob, Assistant Professor, Department of Management, Hindustan College of Arts & Science, Chennai, Tamil Nadu, India.
Email: johnjacob751@gmail.com

**How to Cite this Article**

T.H. Lajwanthi, D. Uthira, Jacob J. M., HR Analytics - Predictive Analytics for Employee Retention and Productivity in Chennai - Pre & Post Covid Period. Manag J Adv Res. 2026;6(5):1-6.
Available From
https://mjar.singhpublication.com/index.php/ojs/article/view/332

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| Manuscript Received | Review Round 1 | Review Round 2 | Review Round 3 | Accepted |
|---|---|---|---|---|
| 2026-09-03 | 2026-09-19 | | | 2026-10-10 |

| Conflict of Interest | Funding | Ethical Approval | Plagiarism X-checker | Note |
|---|---|---|---|---|
| None | Nil | Yes | 5.22 | |

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# 1. Introduction

The Information Technology (IT) industry is characterized by fast-paced innovation, global mobility, and a competitive demand for skilled professionals. In such an environment, managing human resources efficiently has become both a challenge and a necessity. Employee turnover, burnout, and productivity concerns are among the most pressing issues not only BPO & IT sectors, its major impact in Retail, Manufacturing and ECommerce. Past twenty years before the traditional HR practices, often based on experience and intuition, are no longer sufficient to address these complex workforce dynamics. HR Analytics bridges this gap by applying statistical and analytical techniques to workforce data. It enables HR managers to identify trends, forecast future scenarios, and design interventions that align with business goals. Statistical tools provide the foundation for HR analytics, enabling organizations to quantify employee behaviors, test assumptions, and validate workforce strategies with evidence. In the IT sector, where talent is the most critical asset, using statistical models for predictive and prescriptive insights can significantly enhance workforce efficiency, retention, and overall organizational growth.

# 2. Problem Statement

Despite the availability of vast amounts of HR data in the IT industry, many organizations fail to leverage statistical tools effectively for decision-making. This leads to reactive strategies in managing attrition, productivity, and engagement, resulting in higher costs, lower morale, and reduced competitiveness. There is a need to explore how statistical methods can be systematically applied in HR analytics to transform raw data into meaningful, actionable insights.

# 3. Objectives

1. To study the application of HR analytics in the IT industry.
2. To identify key statistical tools used in HR analytics for employee retention and productivity.
3. To analyze how predictive models can forecast attrition and performance trends in IT firms.
4. To provide recommendations for integrating HR analytics into strategic workforce planning.

# 4. Key Statistical Tools in HR Analytics for IT

1. **Correlation & Regression Analysis** – Examining how salary, training, and work-life balance impact retention.
2. **t-Tests/ F test** – Comparing productivity levels across departments, age groups, or work modes
3. **Chi-Square Test** – Testing relationships between Hr Analytics tools and employees' Performance.

# 5. Review of Literature

"Role of HR analytics and attrition on organisational performance: a literature review leveraging the SCM-TBFO framework" (Ravi Kiran, Chaubey, Shastri, 2023) focused on attrition in relation to HR analytics and how this influences organizational performance. "HR data analytics and evidence based practice as a strategic business partner" (Patil & Priya, 2024) Thirumalai kumar et al., (2022) Relationship between HR analytics usage and strategic business outcomes; how evidence-based practice complements data analytics. HR data analytics has potential for enhancing performance but isn't yet sufficient by itself. It should complement, not replace, human judgment. There is insufficient empirical evidence about how HR analytics affects retention, engagement, organizational success.

"Reshaping the future of HR: Human Resource Analytics and Talent Management" (Ishtiaq & Khan, 2024) HR analytics positively influences performance, and the mediation by talent management is significant. Organizations that use HR analytics tend to have more structured approaches to talent management, which lead to performance gains. (Chan and Tay 2022). The COVID-19 pandemic has abruptly disrupted many workers' work–life balance (Thomason and Williams 2020), thus necessitating their adjustment and re-orientation to new routines that prioritize and address the demands of the pandemic (Caringal-Go et al. 2022). To provide relevant insights to facilitate such adjustments, we re-examine these salient work and life demands and show how they have changed in the course of the pandemic.

Trying to recover from this economic shock, companies have started reopening (Major & Machin, 2020), in the mid of this ongoing (Major & Machin, 2020), in the mid of this ongoing pandemic, under

extraordinary rules and a new functioning (e.g., physical distancing in the workplace) (Shaw, Main, Findley, Collie, Kristman, & Gross, 2020) that no one can predict when it will end. Therefore, this pandemic has obviously led to the emergence of a complex and challenging environment for managers and human resource management (HRM) practitioners who needed to find ingenious solutions to sustain their company's business and to help their employees to cope with the challenges of this unprecedented situation. In this context, there are very few studies on the impact of COVID-19 on HRM, its challenges, and its potential opportunities for HRM in organizations, whereas managers and HRM practitioners need relevant information that will help them to go through this crisis effectively and efficiently, to be able to support their employees and to sustain their company's business. This trend is seen in the human resources (HR) field and has given rise to the emergence of *people analytics*, a field that leverages data to generate valuable insights, enabling better decision-making, enhancing the employee experience, and improving overall organizational performance (Brock, 2017; Gal et al., 2020; Hastuti & Timming, in press; McCartney & Fu, 2022). Reflecting this trend, academic output on people analytics has increased rapidly, with human resource management (HRM) journals such as *HRM* and *Journal of Organizational Effectiveness: People and Performance* publishing special issues on various forms of people analytics, including workforce analytics and human capital analytics. Despite this increasing interest in data analytics, the literature on and application of people analytics within organizations are largely limited to HRM; there are comparatively few discussions of people analytics in the human resource development (HRD) field (Brock, 2017; King, 2016; Ratnam & Devi, 2023). This term was introduced earlier than the others but was not as frequently used. Some researchers argue that "workforce analytics" is a broader term than "HR analytics" because it includes, Priya et al., (2020) HR issues and issues related to various other functions (e.g., marketing, operations, and finance) in a company (McIver et al., 2018). Compared to other terms, "talent analytics" is rarely used in the literature (five times). "Talent analytics" has become increasingly prevalent in practice since it was introduced in tandem with talent management (Marler & Boudreau, 2017), but it has not been widely adopted in the academic field.

Huselid (2018) expressed reluctance to use the term due to its potential cultural ambiguity, as the concept of*talent*varies in meaning depending on the cultural context.

# 6. Analysis and Interpretation

**Table1:** Sector-specific attrition in Chennai 2018–19:

| S.no | Sector | Attrition rate | Percentage |
|---|---|---|---|
| 1 | IT | 220 | 22 % |
| 2 | Financial sector | 270 | 27% |
| 3 | BPO | 215 | 21.5% |
| 4 | Retail/Service | 190 | 19% |
| 5 | Manufacturing | 120 | 12% |
| | Total | 1000 | |

The above table shows that the financial sector employees face a lot of competitive job market and work pressure compared to the IT sector. The high demand for professional skills, work-life style, Genz employee's work force play a major role in post covid period.

**Table 2:** Correlation analysis for salary, work life and employee retention factors:

**Table:** Mean, Standard Deviation and Pearson Correlation

| Var. | Mean | Standard Deviation | Career Dev. Practices | Talent Dev. Practices | Job Involv. | Employee QWLB |
|---|---|---|---|---|---|---|
| Career Development Practices | 3.521 | 0.575 | 1 | | | |
| Talent Development Practices | 3.366 | 0.571 | 0.644** | 1 | | |
| Job Involvement | 3.607 | 0.641 | 0.732** | 0.658** | 1 | |
| Employee QWLB | 3.250 | 0.699 | 0.483** | 0.699** | 0.603** | 1 |

**Note:** Correlation value is significant at $p < 0.05$ (*), $p < 0.01$ (*), $p < 0.001$ (*); N = 153.

The table presents the means, standard deviations, and Pearson correlation coefficients among Career Development Practices, Talent Development Practices, Job Involvement, and Employee Quality of Work Life Balance (QWLB). The analysis is Quality of Work Life Balance (QWLB).

The analysis is based on a sample size of N = 153, and all reported correlations are statistically significant at the 1% level ($p < 0.01$).

**Table 3:** t-Test/ F Test Comparing productivity levels across departments, age groups, or work modes

| Variables | F-Values | Sign. | t-Values | Sign. (2-tailed) | 95% CI Lower | 95% CI Upper |
|---|---|---|---|---|---|---|
| Work Overload | 1.12 | 0.57 | 6.92** | 0.0001 | -2.49 | -1.39 |
| Boss/Peer | 1.68 | 0.01 | 0.53 | 0.59 | — | — |
| Role Ambiguity | 1.12 | 0.57 | -0.42 | 0.67 | — | — |
| Role Overload | 1.05 | 0.82 | 3.58** | 0.0004 | -1.37 | -0.39 |
| Co-workers | 1.20 | 0.36 | -0.05 | 0.96 | — | — |
| Career | 1.50 | 0.05 | 3.37** | 0.0009 | 0.43 | 1.63 |
| Individual Factors | 1.44 | 0.07 | 2.65** | 0.009 | -1.20 | -0.18 |
| Physiological Factors | 1.17 | 0.44 | -1.73 | 0.09 | — | — |
| Organization Climate | 2.48 | 0.0001 | 6.70** | 0.0001 | -2.14 | -1.16 |
| Behavioral Factors | 1.17 | 0.45 | 3.42** | 0.0008 | -2.10 | -0.56 |
| Psychological Factors | 1.04 | 0.84 | 0.18 | 0.86 | — | — |
| Job Control | 1.45 | 0.06 | 1.23 | 0.22 | — | — |
| Performance | 1.00 | 0.98 | 6.23** | 0.0001 | -2.78 | -1.44 |

**Note:** $p < 0.001$; significant at the 95% confidence interval level.

The table presents the results of independent samples t-tests comparing the mean differences of various work-related, individual, and organisational factors between two groups (for example, pre- and post-COVID periods / different work modes/departments). The analysis includes F-values (Levene's test for equality of variances), t-values, significance levels, and 95% confidence intervals of the mean differences. The t-test analysis highlights the importance of data-driven HR interventions focusing on workload management, organisational climate, and career development to improve employee performance and productivity. Such insights are valuable for predictive HR analytics aimed at enhancing employee retention and well-being.

**Table: 4**

**Chi-Square Test** – Testing relationships between Hr Analytics tools and employees' Performance.

1. **Null Hypothesis**: There is no significant relationship between the type of HR analytics tool used and employee performance.
2. **Alternative Hypothesis:** There is a significant relationship between the type of HR analytics tool used and employee performance**.**

**Scenario:** Analysing the association between the use of advanced HR analytics tools and employee performance ratings.

| HR Analytics Tool Usage | High Performance | Average Performance | Low Performance | Total |
|---|---|---|---|---|
| High Usage (AI/Advanced) | 60 (Observed) | 25 (Observed) | 5 (Observed) | 90 |
| Low Usage (Manual/Basic) | 20 (Observed) | 40 (Observed) | 30 (Observed) | 90 |
| Total | 80 | 65 | 35 | 180 |

The Chi-Square test was employed to examine the relationship between the type of HR analytics tool used and employee performance levels. The analysis compares organizations using high/advanced HR analytics tools (AI-based) with those using low/basic or manual tools across three performance categories: high, average, and low performance. he findings suggest that organizations adopting advanced HR analytics tools such as AI-based and predictive systems tend to achieve higher employee performance levels, while reliance on manual or basic HR analytics tools is associated with average to low performance outcomes. This demonstrates the effectiveness of HR analytics in enhancing workforce performance. Hence, the alternative hypothesis is accepted.

# 7. Findings

In this regard, HRD researchers are encouraged to pay attention to people analytics when considering HRD-related topics such as strategic training and development, training program evaluation, learning experiences, leadership development, career development, knowledge sharing, and performance improvement. HRD should pay closer attention to people analytics with the aim of accumulating more empirical evidence of its utility. Even though we categorized exemplary applications of people analytics using the HRD framework from our literature review, many of the examples lacked specific details or empirical evidence. As such, future research should focus on evidence-based people analytics in the HRD field.

This can be achieved by collecting data meticulously and systematically, securing employee consent to the collection of data, and ensuring data compatibility. For example, determining the effectiveness of training programs and the relationship between performance and HRD interventions has been a longstanding challenge for researchers, primarily because of the uncertain causality that arises from numerous intervening variables. Employing advanced analytics methods and various data, HRD researchers may find the answers to various questions in the HRD field.

It develop and provide guidelines to ensure the proper quality, accumulation, arrangement, and segregation of data for HRD practitioners (Jain & Jain, 2020). Contemporary people analytics research emphasizes the quality of data. Our literature review suggested that data are one of the building blocks of people analytics and data quality is the fundamental requirement for adopting analytics (McCartney & Fu, 2022; Shet et al., 2021). Still, there has been little guidance on how to collect or accumulate valid and reliable data. As noted earlier, current technology enables data collection in diverse ways. Surveys represent one of the most prevalent data collection techniques to date for HRD researchers who wish to assess human psychology, emotions, and attitudes. Yet it is often impossible to ascertain the validity or reliability of a survey measurement (Huselid, 2018). For instance, issues may arise from employing measurements of indeterminate origin, selecting or devising items based on personal preferences, or involving subject-matter experts who develop but fail to ensure statistical validity (Robinson, 2018). Utilising survey measurements that have not been validated in data analysis constitutes a critical concern, as it jeopardizes data quality.

- Predictive analytics will identify high-risk employees for attrition before they resign.
- Statistical analysis will reveal critical productivity drivers such as training programs, team collaboration, and flexible work policies.
- Regression models will demonstrate strong relationships between employee satisfaction and retention.
- IT firms that adopt statistical HR analytics will achieve reduced turnover rates, improved engagement, and data-driven workforce planning.

# 8. Conclusion

HR analytics, powered by statistical tools, is revolutionizing talent management in the IT industry. By moving from descriptive to predictive and prescriptive analytics, organizations can proactively address attrition, enhance employee productivity, and align HR practices with business goals. Statistical models not only provide evidence-based insights but also enable IT firms to remain agile in a competitive global market. As technology advances, integrating HR analytics with artificial intelligence and machine learning will further refine predictive capabilities, making data-driven HR management a cornerstone of organizational success. HRD practitioners must understand the organization's business model well before applying people analytics in the HRD field. As identified in our literature review, strategic alignment is a fundamental building block of people analytics. Beyond possessing data analysis capabilities, HRD practitioners must understand their organizations because alignment with business strategies and impact on performance are critical success factors in people analytics. Here, HRD practitioners need to collaborate with HRD researchers or refer to HRD research results. For instance, a random forest analysis demonstrated a statistically significant relationship between the availability of a diverse range of snacks in the office and lower employee turnover rates. From an intuitive and logical standpoint, it may be challenging to accept the direct influence of snack variety on turnover.

In conducting this literature review, we sought to bring HRD researchers' and practitioners' attention to people analytics, enhance their understanding of the field, and facilitate research on and the application of people analytics within HRD. Over the years, the discussion of people analytics in HRD scholarship has been limited and sometimes overly optimistic and abstract. We recognize that there may be logical leaps in our vision of people analytics' applicability to the HRD field and do not rule out the possibility that our subjective views as researchers are overrepresented. Despite this limitation, we believe that our people analytics literature review conducted from the HRD perspective will help bridge the gap between theory and practice, allowing researchers and practitioners to create a synergistic effect.

As practitioners continue to enhance their statistical proficiency, there will be a growing need for researchers to interpret data analysis outcomes through theoretical frameworks. Furthermore, as the quality of the data collected from the field improves, a wealth of analytical case studies is expected to emerge, presenting new opportunities for academic collaboration and knowledge accumulation. This collaboration has the potential to enrich and advance the field.

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