INTERNATIONAL JOURNAL OF LATEST TECHNOLOGY IN ENGINEERING, MANAGEMENT & APPLIED SCIENCE (IJLTEMAS)

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XIV, Issue XII, December 2025

Impact of Technological Interventions on Human Resource Practices and Organizational Effectiveness: An Empirical Study

Dr. Nagabhushana S.

Assistant Professor, Department of Commerce, Government Ramnarayan Chellram College of Commerce and Management, Palace Road, Bengaluru – 560 001

DOI : https://doi.org/10.51583/IJLTEMAS.2025.1412000143

Received: 05 January 2026; Accepted: 10 January 2026; Published: 20 January 2026

ABSTRACT

Human Resource Management (HRM) has moved far beyond its traditional administrative role and now functions as a strategic driver of organizational effectiveness. In recent years, rapid advances in information and digital technologies have fundamentally reshaped HR practices through the adoption of Human Resource Information Systems (HRIS), e-HRM platforms, automation tools, and analytics-driven decision-making. These technological interventions have transformed core HR functions such as recruitment, selection, training, performance appraisal, compensation, and employee engagement. The present study empirically examines the influence of technological interventions in HR practices on HR efficiency and organizational effectiveness in selected IT firms operating in Bengaluru. Primary data were collected from 300 respondents using a structured questionnaire. The data were analyzed using descriptive statistics, factor analysis, ANOVA, and multiple regression techniques. The findings reveal a statistically significant and positive relationship between technology-enabled HR practices and HR efficiency, indicating that digital HR systems contribute meaningfully to improved employee satisfaction, operational efficiency, and strategic alignment. The study highlights the growing importance of integrating technology with HR strategy to achieve sustainable organizational performance.

Key Words: Human Resource Management, HRIS, e-HRM, Technological Intervention, HR Efficiency, Organizational Effectiveness

INTRODUCTION

The contemporary business environment is characterized by rapid technological change, intense competition, and an increasing emphasis on knowledge-based work. In this context, Human Resource Management has emerged as a critical function for building and sustaining organizational capability. The integration of technology into HR practices has significantly altered the way organizations manage their human capital. Digital tools such as HRIS, cloud-based platforms, artificial intelligence-enabled recruitment systems, and performance analytics have reduced manual workload while improving accuracy, transparency, and speed of HR operations.

In technology-driven sectors such as the IT industry, where talent is a key competitive resource, the effective use of HR technology is no longer optional but essential. Technology-enabled HR practices allow organizations to shift focus from routine administrative tasks to strategic activities such as talent development, workforce planning, and employee engagement. Against this backdrop, the present study seeks to examine how technological interventions in HR practices influence HR efficiency and overall organizational effectiveness.

Recruitment and Selection: Technology has made the recruitment and selection process more efficient and effective by automating the process of collecting and processing resumes, scheduling interviews, and conducting assessments. This has reduced the time and cost involved in the recruitment process, enabling HR professionals to focus on strategic talent acquisition. Additionally, by using data analytics and machine learning, HR professionals can identify the most qualified candidates for the job, leading to better hiring decisions.

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Onboarding: Technology has also revolutionized the onboarding process. HR professionals can use software to create personalized onboarding plans for new hires, which can include videos, interactive training modules, and other digital resources. This makes the onboarding process more engaging and effective, leading to higher levels of employee satisfaction and retention.

Performance Management: Technology has enabled HR professionals to implement more sophisticated performance management systems. Performance management software can track employee goals and progress, provide real-time feedback, and facilitate ongoing coaching and development. This can lead to higher levels of employee engagement and productivity.

Employee Engagement: Technology has also had a significant impact on employee engagement. HR professionals can use digital platforms to communicate with employees, provide training and development resources, and recognize and reward employee achievements. By leveraging technology to create a more engaging workplace, organizations can improve employee satisfaction and retention.

Organizational Effectiveness: Finally, technology has had a significant impact on organizational effectiveness. By automating routine HR tasks, HR professionals can spend more time on strategic initiatives that drive business growth. Additionally, by using data analytics and machine learning, HR professionals can identify areas for improvement and develop targeted interventions to improve organizational effectiveness.

REVIEW OF LITERATURE

Early research on HR technology primarily focused on automation and administrative efficiency. Studies by Ashbaugh and Miranda (2002) highlighted how HRIS facilitated decentralization and employee self-service, though concerns were raised regarding managerial control and employee autonomy. Caldwell (2001) emphasized the evolving role of HR professionals as change agents in technologically enabled organizations. Stone et al. (2006) observed that HR information technologies enhanced managerial feedback and monitoring capabilities, thereby influencing performance management outcomes.

More recent scholarship has shifted attention toward the strategic and employee-centric dimensions of digital HRM. Bondarouk and Brewster (2016) conceptualized e-HRM as a mechanism for implementing HR strategies through digital platforms, emphasizing value creation rather than mere efficiency. Stone et al. (2020) further argued that digitalization and analytics would redefine HR decision-making and organizational agility.

Contemporary empirical studies reinforce these arguments. Recent research indicates that digital HRM systems significantly improve HR efficiency and organizational performance when supported by organizational agility and leadership commitment (Mahmoud, 2025). Similarly, studies on AI-enabled HR practices demonstrate improvements in recruitment accuracy, process automation, and real-time performance monitoring, particularly in technology-intensive industries (Nawaz, 2024). Empirical evidence also suggests that HRIS functionalities such as e-recruitment, e-training, and e-payroll positively influence employee performance and engagement (Ondimu et al., 2024). Collectively, these studies underscore the strategic relevance of technological interventions in HR practices and provide a strong theoretical foundation for the present research.

The literature reviews on intervention and impact of the Information Technology on HR practices in Multinational Information Technology organizations as Change Agent, suggested that technology makes the human resource work simple and easier. IT intervention in HR practices are very impressive in organizational learning, effective communication with the employees, for the impressive organizational learning process and of the availability of information anytime and anywhere as manager required this to use their skills and abilities in organization and for timely decrease their weakness and other aspects and has changed the organization including human resources following function such as recruiting, training, performance management, human resource management, idea management tools. HRIT provides information about employee's data, job characteristics, employment application requirement, selection and staffing, the procedure of employment, professional and individual improvement, corporate structure, educational costs, performance appraisal, organizing, personal planning, etc.

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Statement of the Problem

Despite widespread adoption of HR technologies, organizations vary considerably in how effectively these tools are utilized to enhance HR efficiency and organizational outcomes. In many cases, investments in HR technology are driven by trends rather than systematic evaluation of their impact. This creates a gap between technological adoption and realized benefits. Therefore, there is a need for empirical research that examines whether and to what extent technological interventions in HR practices contribute to improved HR efficiency and organizational effectiveness, particularly in the IT sector.

Objectives of the Study

1. To examine the impact of technological interventions in HR practices on HR efficiency in selected IT firms.

2. To analyze the relationship between technology-enabled HR practices and organizational effectiveness.

Hypothesis

H01: There is no significant relationship between technological intervention in HR practices and HR efficiency in selected IT firms.

RESEARCH METHODOLOGY

The study adopts an exploratory and analytical research design. Primary data were collected from employees of IT firms operating in Bengaluru. A structured, closed-ended questionnaire was administered using both online and offline modes. A sample size of 300 respondents was selected based on accessibility and adequacy for multivariate analysis. Convenience sampling was employed due to time and organizational constraints.

The questionnaire consisted of items measuring technological interventions in HR practices and HR efficiency, assessed on a five-point Likert scale ranging from strongly disagree to strongly agree. The reliability of the instrument was established through Cronbach's alpha, while construct validity was confirmed using factor analysis. The Kaiser-Meyer-Olkin (KMO) value of 0.861 indicated sampling adequacy. Data were analyzed using descriptive statistics, factor analysis, ANOVA, and step-wise multiple regression.

Data Analysis and Discussion

Descriptive analysis revealed a high level of agreement among respondents regarding the effectiveness of technology-supported HR practices. Factor analysis confirmed the suitability of the data for further statistical examination. Regression analysis demonstrated a strong and positive relationship between technological interventions, such as time and labour management systems, web-based HR services, digital dissemination of HR information, and transactional HR functions and HR efficiency.

The results indicate that the web presence of HR functions and digital information systems play a particularly important role in enhancing HR efficiency. These findings are consistent with prior studies that emphasize the role of digital HR platforms in improving transparency, responsiveness, and employee engagement. The discussion links empirical findings with existing literature, reinforcing the argument that technology-enabled HR practices contribute not only to operational efficiency but also to strategic organizational outcomes.

The respondent's nature has described using descriptive analysis in the study. Multiple regressions were utilized for testing the research hypothesis, which was presented and tested.

HR transformational practices (i.e. HR activities that meet strategic organizational objectives, such as strategic planning, organizational development, knowledge management, change management, and so on) that are supported by the HRIS have contributed to an increase in overall employee satisfaction, motivation, presence (the opposite of absenteeism), and retention (obverse of turnover).

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Table - 1: Response Percentage

Parameter	Percent	Valid Percent	Cumulative Percent
Strongly disagree	2.1	2.1	2.1
Disagree	10.0	10.0	12.1
Neutral	69.3	69.3	81.4
Agree	15.0	15.0	96.4
Strongly Agree	3.6	3.6	100.0
Total	100.0	100.0	

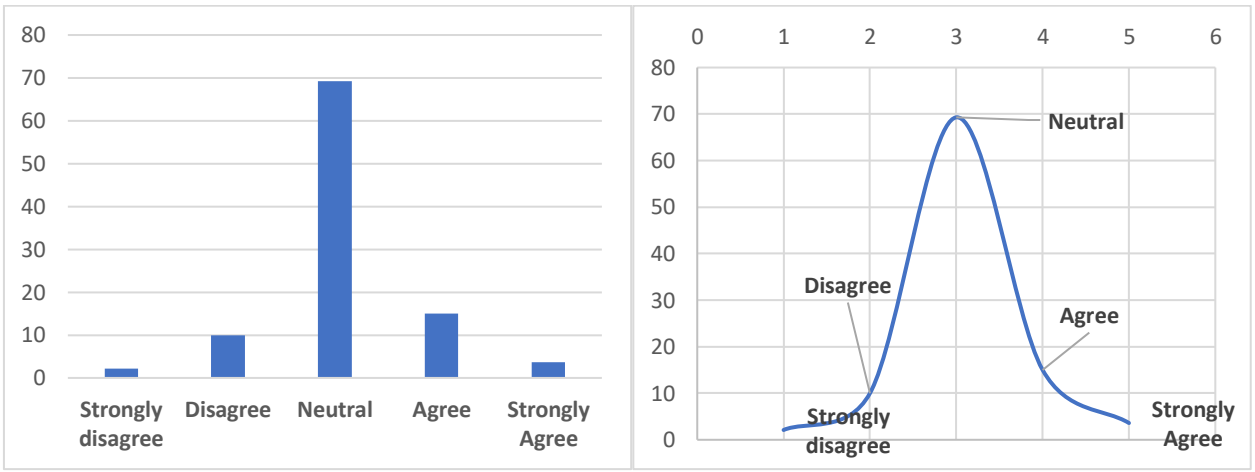

Figure - 1: Response Percentage Chart

Table - 2: **Response Descriptive Statistics**

Range	Min	Max	Mean	S.D.	Skewness	
Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
4.00	.00	4.00	2.0786	.68978	.163	.205

From the above analysis, 96.4% of the respondents were agree for the HR activities that meet strategic organizational objectives, such as strategic planning, organizational development, knowledge management, change management, etc. (i.e. HR transformational practices), that are supported by the HRIS, have contributed to the improvement of overall employee satisfaction, motivation, presence (obverse of absenteeism) and retention (obverse of turnover). HR transformational practices (i.e. HR transformational practices) that support strategic organizational objectives, such as strategic planning, organizational development, knowledge management, change management, and so on (i.e. HR transformational practices), have helped to improve overall employee involvement, trust, loyalty, commitment, and the "social climate" between workers and management.

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Table - 3: **Response Percentage**

Parameter	Percent	Valid Percent	Cumulative Percent
Strongly disagree	2.9	2.9	2.9
Disagree	8.6	8.6	11.4
Neutral	69.3	69.3	80.7
Agree	15.7	15.7	96.4
Strongly Agree	3.6	3.6	100.0
Total	100.0	100.0	

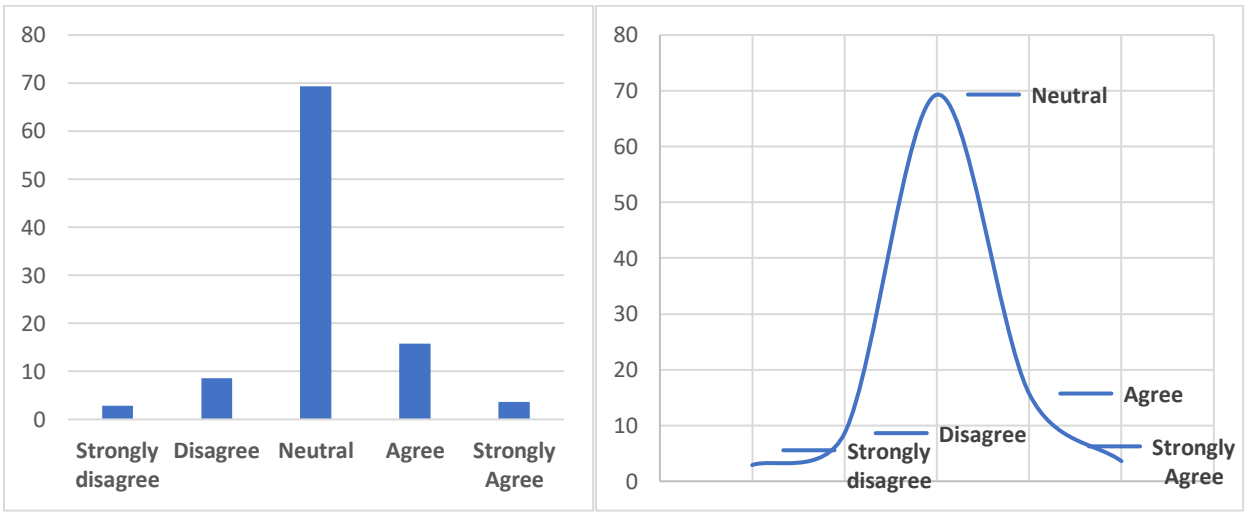

Figure - 3: Response Percentage Chart

Table - 4: Response Descriptive Statistics

Range	Min	Max	Mean	S.D.	Skewness	
Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
4.00	.00	4.00	2.0857	.70441	.004	.205

From the above analysis, 96% of the respondents were agree for the HR activities that meet strategic organizational objectives, such as strategic planning, organizational development, knowledge management, change management, etc. (i.e. HR transformational practices), that are supported by the HRIS, have contributed to the improvement of overall employee involvement, trust, loyalty, commitment and "social climate" between workers and management.

Hypothesis testing of the study

H_{01}: There is no relationship between technological intervention in HR practices and enhanced HR efficiency in sample firms.

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Independent Variable	Dependent Variable
Time and labour management (supports) Face-to-face HR services (IT replacing) Publishing of HR information (supports) Web presence of HR function Transactional HR function (supports) Human resource planning (supports)	HR efficiency

Table 5: Factor Analysis – KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.861**
Bartlett's Test of Sphericity	**Approx. Chi-Square**	**3138.791**
	Df	**13**
	Sig.	**0.000**

The KMO measures the sampling adequacy table is showing that the responses given by the sample respondents are adequate and satisfactory in factor analysis with the value .861. Bartlett's test result indicates the strength of the relationship among the technology intervention influencing HR efficiency in sample firm variables.

Table - 6: Descriptive Analysis on Hypothesis

Sl. No.	Factors	Mean	SD
1	Time and labour management (supports)	4.12	1.04
2	Publishing of HR information(supports)	4.22	1.02
3	Face-to-face HR services (IT replacing)	4.22	0.93
4	Web presence of HR function	4.32	0.74
5	Transactional HR function (supports)	3.80	1.20
6	Human resource planning (supports)	3.81	1.11

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Table - 7: Results of step-wise Multiple Regression of Technology intervention and the HR Efficiency in sample firms

Model	Variables Entered	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	Time and labour management (supports)	0.546	0.298	0.296	4.856
2	Publishing of HR information(supports)	0.646	0.418	0.415	4.411
3	Face-to-face HR services (IT replacing)	0.686	0.471	0.466	4.212
4	Web presence of HR function	0.707	0.500	0.494	4.099
5	Transactional HR function (supports)	0.720	0.519	0.512	4.029
6	Transactional HR function (supports)	0.745	0.554	0.544	5.895

Table - 8: Results of step-wise Multiple Regression of Technology intervention and the HR Efficiency in sample firms

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5460.91	1	5460.91	136.98	0.002
	Residual	8158.45	300	38.15		
	Total	11599.57	300			
2	Regression	4847.58	2	2423.79	132.55	0.01
	Residual	6751.98	300	38.4		
	Total	11599.57	300			
3	Regression	5460.46	3	1820.15	103.58	0.005
	Residual	6158.9	300	38.53		
	Total	11599.57	300			
4	Regression	5801.98	4	1450.49	86.51	0.004
	Residual	5797.59	300	38.66		

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Model		Sum of Squares	Df	Mean Square	F	Sig.
	Total	11599.57	300			
5	Regression	6015.24	5	1205.04	75.1	0.003
	Residual	5584.15	299	38.79		
	Total	11599.57	300			
6	Regression	6450.54	6	805.79	56.01	0
	Residual	5169.05	298	38.92		
	Total	11599.57	300			

Interpretation of Hypothesis

H_{01}: There is no relationship between technological intervention in HR practices and enhanced HR efficiency in sample firms

Results

The null hypothesis has been rejected for the following reasons

Multiple Regression: The result of multiple regression between technology intervention influencing HR Efficiency with the value of the correlation coefficient of ranging from .546 to .745, squared R value ranged from .296 to .544.

ANOVA: The results of the analysis of variance between technology intervention variables influencing HR Efficiency. The value of the resultant F ratio ranged between 55.02 and 147.98 and with significance levels less than 0.05.

RESULT & DISCUSSION

1. It was found that Web presence of HR function variables scored better on technology intervention in HR practices and HR efficiency.

2. HR efficiency, Time and labour management (supports), Face-to-face HR services (IT replacing), Publishing of HR information (supports), Web presence of HR function, Transactional HR function (supports), Human resource planning variables are identified for the research.

3. On the other factors i.e., Time and labour management (supports), Publishing of HR information (supports), Face-to-face HR services (IT replacing), Transactional HR function (supports Human resource planning (supports) also scored better.

4. The result of multiple regression between technology intervention influencing HR Efficiency are as following results were observed with the value of the correlation coefficient of ranging from **.546 to .745,** squared R value ranged from **.296 to .544.**

5. The results of the analysis of variance between technology intervention variables influencing HR Efficiency. The value of the resultant F ratio ranged between **55.02** and **147.98** and with significance levels less than **0.05.**

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6. Time and labour management (support) resulted with the F ratio significant value of **.002**. It shows that this variable influence positively on organizational effectiveness.

7. Publishing of HR information (supports) resulted with significant value of **.010** which means it is influencing positively on organizational effectiveness.

8. Face-to-face HR services (IT replacing) variable resulted with the F ratio significant value of **.005.** It shows that this variable influence positively on organizational effectiveness.

9. Web presence of HR function variable resulted with the F ratio significant value of **.004.** This variable also positively influencing organizational effectiveness.

10. Transactional HR function (supports) variable resulted with F ratio significant value of **.003**. Hence this factor also influencing positively.

11. Transactional HR function (supports) factor resulted with F ratio significant value of **.000.** Hence this variable also positively influencing on organizational effectively.

CONCLUSION

The study concludes that technological interventions in HR practices have a significant and positive impact on HR efficiency and organizational effectiveness. Digital HR systems enable organizations to streamline processes, enhance employee satisfaction, and support strategic decision-making. For IT firms operating in a highly competitive environment, aligning HR technology with organizational objectives is essential for sustaining performance and growth. Future research may extend this study by adopting longitudinal designs, larger samples, or cross-sectoral comparisons to further validate the findings.

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