







“Digital leadership and AI performance assessment impact on organisational performance: Role of empowerment and engagement”

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DIGITAL LEADERSHIP AND AI PERFORMANCE ASSESSMENT IMPACT ON ORGANISATIONAL PERFORMANCE: ROLE OF EMPOWERMENT AND ENGAGEMENT

Abstract

In the era of digital transformation, organizations are increasingly integrating digitalization and artificial intelligence to enhance employee behavior and organizational outcomes. This study examines the associations among digital leadership, AI-based performance assessment, employee empowerment, work engagement, and organizational performance in a Chennai-based IT company in India. Specifically, the study investigates the direct and indirect effects of digital leadership and AI performance assessment on organizational performance through employee empowerment and work engagement. Data were collected from 373 IT employees using an online survey conducted between June and August 2025 and analyzed using partial least squares structural equation modelling (PLS-SEM). A stratified random sampling technique based on organizational job levels (entry, mid, and senior) was adopted to ensure adequate representation of hierarchical positions within the organization. Hypothesis testing revealed that digital leadership and AI performance assessment significantly enhance employee empowerment and work engagement ($\beta = 0.490, 0.415, 0.527$; $p < 0.001$), which in turn positively influence organizational performance ($\beta = 0.383, 0.477, 0.195, 0.287$; $p < 0.001, 0.033$). Furthermore, employee empowerment and work engagement significantly mediate the relationships between digital leadership, AI performance assessment, and organizational performance ($\beta = 0.135, 0.199, 0.265, 0.244$; $p < 0.001$). In addition, a multi-group analysis was conducted to examine differences across employee hierarchical levels. The findings highlight that transformations in modern workplaces and digitalized HR practices contribute to organizational performance across the workforce, while ensuring that employees from different hierarchical levels are adequately represented in the sample.

Keywords

digital leadership, information technology, AI performance assessment, employee empowerment, work engagement, organizational performance, Chennai, India

JEL Classification

M10, M12, M15

INTRODUCTION

The integration of digital technologies has become a fundamental driver of organizational sustainability and performance in today's rapidly evolving work environment. The COVID-19 pandemic compelled organizations to intensify the adoption of digital technologies to maximize the use of online platforms; however, the rapid shift towards digital work has also created several workplace challenges that require systematic investigation and resolution (Abbas Khan, 2021). A new era of digital transformation has emerged, significantly reshaping organizational management practices and innovation processes (Grigorescu et al., 2021). Through digital channels, employees can express themselves more freely and exercise greater control over the information they choose to share (Ellmer & Reichel, 2021).

In this phase of digital transformation, digital leadership has emerged as a critical leadership approach that influences how employees think, collaborate, and perform (Krug et al., 2018). Prior studies indicate that digital leadership plays a vital role in supporting organizations during digital transformation initiatives (AlNuaimi et al., 2022; Wang et al., 2024). At the core of this transformation is the integration of artificial intelligence (AI) across a wide range of organizational functions, with human resource management being one of the most significantly affected domains. In particular, AI technologies are transforming performance appraisal systems by not only enhancing their efficiency but also fundamentally reshaping the way employee performance is evaluated in the digital environment. Despite the growing relevance of digital leadership and AI-based performance assessment, empirical evidence on their combined influence on organizational performance remains limited. Specifically, the impact of digital leadership and AI-enabled performance appraisal on organizational performance has not been sufficiently examined.

1. LITERATURE REVIEW AND HYPOTHESES

Information technology has become a major driving force in almost every aspect of human life in the era of Industry 4.0. In today's highly competitive business environment, where digital knowledge represents a key organizational asset and effective management is essential, the role of digital technologies is particularly significant. Within this context, digital leadership and AI-based performance assessment systems play a crucial role in enhancing employee empowerment and work engagement, which in turn contribute to improved organizational performance.

According to Men et al. (2018), digital leaders are characterized by specific dimensions that enable them to anticipate and simplify digital transformation. Employees who possess proficiency in digital tools and demonstrate active engagement in their roles are better prepared to develop the competencies required for effective digital leadership. Strategic orientation, transformational vision, forward-thinking attitudes, and high adaptability are key characteristics of digital leadership that are essential for remaining competitive in the digital environment (Weber et al., 2022; Zhu et al., 2022). Moreover, Zia et al. (2024) emphasized that leaders who effectively integrate digital technologies into organizational processes not only enhance organizational efficiency but also positively shape employees' attitudes and perceptions. Consequently, digital leadership is recognized as a dynamic driver of innovative work behavior (Møller et al., 2022). Digital leaders possess the capabilities required to strategically leverage digi-

tal resources in the workplace, thereby generating benefits for both organizational performance and operational effectiveness. Although several studies have confirmed the positive influence of digital leadership on employees' cognition, vision, creativity and motivation (Wang et al., 2022), limited research has examined its impact on employees' behavioral outcomes. Furthermore, as noted by Bartsch et al. (2021), digital leadership encompasses multiple leadership styles and behaviors, including inspiring leadership, which focuses primarily on motivating employees to realize their full potential. Digital leadership often operates through social exchange mechanisms (Li et al., 2024). When leaders use digital technologies in a supportive and enabling manner, employees perceive organizational care and support, which helps them build psychological resources and enhances their work engagement. In addition, digital leaders foster a sense of empowerment among employees, strengthening their motivation and commitment to work (Yang et al., 2024).

AI-based performance assessment has the potential to reduce bias, enhance efficiency, consistency, and promote fairness, thereby enabling employees to perceive greater procedural fairness in evaluation processes. However, effective performance assessment requires a balanced integration of AI technologies and human judgment to ensure fair and accurate evaluations (Tambe et al., 2019). Prior studies indicate that employees perceive performance assessment systems as more reliable when human judgment complements the analytical accuracy of AI systems (Lim & Ravesangar, 2025). The integration of AI with human supervision has been shown to improve the fairness and

efficiency of performance assessments in a rapidly evolving technological environment. This is particularly important when managing a diverse and geographically dispersed workforce (Vrontis et al., 2022; Malik et al., 2023). Accordingly, AI-based performance assessment systems employ machine learning algorithms and predictive analytics to evaluate employee performance. These systems integrate data from multiple sources, including employee behavior, performance indicators, feedback, and organizational outcomes, thereby providing managers with deeper insights to support more informed and effective decision-making (Emon et al., 2024; Natrajan et al., 2025).

Work engagement plays a crucial role in enhancing job performance. Highly engaged employees demonstrate elevated levels of vigor, dedication, and absorption in their work. Consequently, engaged employees tend to be more productive, more committed to achieving organizational goals, and more likely to exhibit innovative and proactive behaviors, thereby improving overall job performance (Nabhan & Munajat, 2023). The success or failure of an organization largely depends on its employees, and employee engagement is recognized as one of the most important and consistent indicators of employee involvement within organizations (Ismail et al., 2021). Digital leadership facilitates organizational digitalization by articulating a clear digital vision that highlights both the short-term and long-term benefits of digital transformation for employees. This approach enhances employees' sense of purpose and motivates them to actively support and commit to digital initiatives (Oberländer & Bipp, 2022). Increased commitment subsequently improves productivity and fosters a culture of innovation in which employees feel empowered to share and implement new ideas. Therefore, organizations that prioritize digital leadership and employee engagement are better positioned to succeed in an increasingly competitive and technology-driven environment. Prior studies in the information technology sector indicate a positive and statistically significant relationship between digital leadership and job performance, with employee engagement acting as a mediating mechanism. Employees' levels of work enthusiasm are strongly influenced by key cognitive and psychological experiences, such as perceived safety, meaningfulness of work, and responsive-

ness within the organization (Van Heerden et al., 2022). In addition, digital leaders encourage employees to learn rapidly, accept failure in digital contexts, and provide informal emotional support, which enhances employees' feelings of security and well-being (Monje-Amor et al., 2021). Work engagement is defined as an individual's deliberate and conscious involvement in professional roles, encompassing physical, emotional, and cognitive investment aimed at achieving both organizational objectives and personal growth (Bulan et al., 2025). Research findings suggest that effective digital leadership is positively associated with employee engagement, innovation, and improved organizational performance (Kludacz-Alessandri et al., 2025).

Employee empowerment refers to an individual's perception of their abilities, skills, and competence to accomplish tasks and effectively manage their work environment, including the authority and autonomy to bring about change in the workplace (Men & Stacks, 2013). Furthermore, employee empowerment enhances the meaningfulness of work by providing employees with greater involvement, responsibility, and satisfaction, which contribute to a stronger sense of achievement and value in their roles. Employees are therefore more likely to feel positive about themselves and their jobs when they believe they can organize their responsibilities and have the discretion to choose how tasks should be performed (Rana, 2015). Previous studies indicate that empowered employees demonstrate higher levels of capability and involvement in their work, leading to improved organizational outcomes. Managers across various industries can adopt empowering practices to develop employees' competencies and foster a stronger sense of ownership over their tasks (Nkrumah, 2024). In addition, when leaders successfully integrate digital technologies into organizational processes, they not only enhance organizational performance but also positively influence employees' attitudes and perceptions (Zia et al., 2024). Recent research shows that managers can empower employees through both formal and informal practices by granting authority and providing appropriate support, such as access to resources, relevant information, constructive feedback, participation in decision-making, and organizational support (Kim & Fernandez, 2017). Digital leadership further le-

verages digital technologies to create innovative workplaces and to facilitate employees' access to, integration of, and effective use of high-quality digital information. This increased autonomy enables employees to work more independently and strengthens employee empowerment within the organization (Kuo & Lee, 2011; Khan et al., 2025).

Prior research indicates that engaged employees tend to demonstrate higher levels of motivation, commitment, and job satisfaction, which in turn generate multiple organizational benefits. Engaged employees are generally more focused, proactive, and willing to go beyond formal job requirements, thereby improving productivity and work efficiency (Gupta & Sharma, 2018). Organizational performance refers to an organization's overall effectiveness and success in achieving its goals and objectives. It encompasses several dimensions, including productivity, profitability, employee satisfaction, innovation, and employee retention (Robianto & Masdupi, 2020). In addition, organizational performance is influenced by a variety of factors, such as the efficiency of business processes, employee productivity, the extent to which organizational goals are achieved, alignment between business functions and organizational strategy, and the quality of organizational culture and climate (Soomro et al., 2021). As profitability is a central objective for all organizations, employee performance plays a critical role in determining organizational success. Poor employee performance significantly reduces an organization's chances of achieving sustainable outcomes (Siddique et al., 2023). Moreover, prior studies emphasize the importance of managerial competencies in shaping organizational performance, concluding that effective leadership skills enhance employee performance and lead to superior organizational outcomes (Soebbing et al., 2015). Organizational performance can also be understood as the extent to which employees successfully accomplish the tasks and responsibilities defined in their job roles and deliver results that meet organizational expectations. It is commonly assessed based on the outcomes achieved in relation to assigned duties (Abelha et al., 2018). Furthermore, Corbeanu and Iliescu (2023) found that vigor, as a core dimension of work engagement, has a positive effect on organizational performance. Given that digital transformation in the workplace is still an

emerging phenomenon, organizational leaders are increasingly required to make effective decisions under conditions of uncertainty and incomplete information. Accordingly, leadership capability is considered a critical factor influencing organizational performance in digitally evolving environments (Chatterjee et al., 2023).

Prior research has highlighted the benefits of digital leadership and AI-driven performance appraisal systems; however, these elements have largely been examined in isolation, with limited attention given to organizational outcomes (Yang et al., 2024). Moreover, existing studies have insufficiently explored the underlying mechanisms through which leadership influences employee empowerment, work engagement, and overall organizational performance. Addressing this gap, the present study integrates digital leadership, AI-based performance appraisal practices, and employee empowerment to provide a more comprehensive understanding of their combined effects on organizational performance, particularly in dynamic and digitally driven work environments.

This study aims to examine the impact of digital leadership and AI-based performance assessment on organizational performance, with a particular focus on the mediating roles of employee empowerment and work engagement in the IT sector in Chennai. Therefore, the following Hypotheses are proposed:

- H1: *Digital leadership shows a positive and beneficial impact on organizational performance.*
- H2: *AI performance assessment has a positive and favorable impact on organizational performance.*
- H3: *Digital leadership has a beneficial influence on employee empowerment.*
- H4: *AI performance assessment has a significant effect on employee empowerment.*
- H5: *Digital leadership shows a significant beneficial effect on work engagement.*
- H6: *AI performance assessment exerts a positive and statistically significant influence on employee work engagement.*

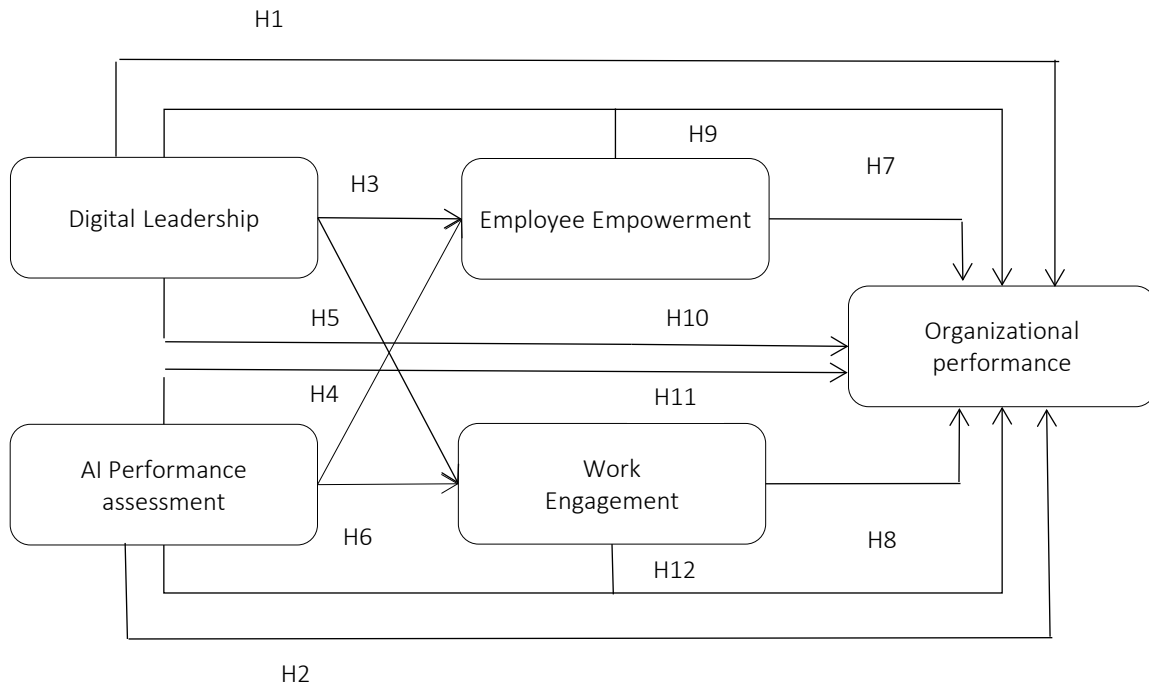


Figure 1. Conceptual framework

- H7: Employee empowerment has a beneficial relationship with organizational performance.*
- H8: Work engagement has a significant influence on the performance of the organization.*
- H9: Empowerment of employees has a significant mediating relationship between digital leadership and performance of the organization.*
- H10: Empowerment of employees has a substantial mediating relationship between AI performance assessment and performance of the organization.*
- H11: Work engagement serves as a beneficial mediator between digital leadership and the performance of an organization.*
- H12: The AI performance assessment and organizational performance relationship is mediated by work engagement.*

examining the relationships between indicators and constructs, and the structural (inner) model by evaluating the relationships among the constructs. The survey focused on employees working in top-tier IT companies operating in Chennai, including Tata Consultancy Services, Infosys, Wipro, HCL-Tech, and Cognizant. These organizations were selected for this study because they are well-established market leaders with a substantial presence in Chennai and have widely implemented digital leadership practices and AI-enabled HR systems across core HR functions, including recruitment, performance management, learning and development, and employee engagement.

The respondents included HR specialists, software developers, project managers, data analysts, and other technical and non-technical staff. This approach enabled the collection of diverse perspectives from professionals at different organizational levels and functional domains and helped capture varying degrees of interaction with digital leadership practices and AI-enabled performance measurement systems. A stratified random sampling technique was adopted to ensure adequate representation of employees across different organizational levels. In this study, the term levels refer to the hierarchical position of employees within the organizational structure, namely entry-level

2. METHODS

The study employs a partial least squares structural equation modeling (PLS-SEM) approach, which assesses the measurement (outer) model by ex-

employees (operational staff), middle-level employees (supervisory and managerial staff), and senior-level employees (strategic decision makers). Accordingly, data were collected from 373 IT employees representing entry-, middle-, and senior-level positions. This sampling method helped to reduce sampling bias, thereby enhancing the reliability and generalizability of the findings to the broader population of IT employees in Chennai. Since Chennai is a major IT hub where employees are highly familiar with digital practices, the selected sample provided a comprehensive view of the impact of digital leadership and AI-based HR practices on employee engagement, employee empowerment, and organizational performance. The inclusion of participants from multiple functional areas facilitated an in-depth understanding of both strategic and operational perspectives related to AI in HR. This sampling strategy reduced potential sampling bias and enhanced the reliability and generalizability of the findings to the broader population of IT employees in Chennai.

Data were collected using an online questionnaire. A total of 450 questionnaires were distributed to IT employees for the purpose of data collection. Due to practical constraints, 400 responses were initially received, representing a response rate of more than 50 percent of the distributed questionnaires. According to Cochran's (1977) sample size formula, a minimum of 384 responses was required for this study. Following data screening procedures, including the treatment of missing values, detection of outliers, and assessment of response reliability, 27 responses (7.71%) were excluded. As a result, 373 valid responses were retained for the final analysis. In addition, the adequacy of the sample size was further confirmed using the ten-times rule recommended for PLS-SEM analysis (Kock & Hadaya, 2018). All data used in this study are original and have not been published previously. Data collection was conducted between June 2025 and August 2025.

A pilot study was conducted to assess the reliability and validity of the questionnaire. In addition, all ethical principles were strictly followed, and respondents were assured of anonymity, thereby enhancing the credibility of the data. Participation in the study was voluntary, and informed consent was obtained from all respondents. The collected

data were kept confidential and securely protected. Ethical approval for the study was obtained from the Institutional Review Board. The survey instrument consisted of two sections. The first section collected demographic information about the respondents, while the second section measured the study constructs using a five-point Likert scale.

Table 1. Demographic profile

Description	Frequency	Percentage
Gender		
Male	245	65.8%
Female	128	34.2%
Age		
Under 25 years	88	23.5%
25 to 34	135	36.3%
35 to 44	79	21.2%
45 to 54	42	11.3%
55 years and above	29	7.7%
Education		
Diploma/ITI	58	15.6%
Bachelor degree	156	41.7%
Master degree	122	32.8%
Others	37	9.9%
Marital status		
Married	159	42.7%
Unmarried	214	57.3%
Length of work		
Less than 5 Years	74	19.93%
6-10 Years	202	54.09%
11-15 years	53	14.23%
More than 15 years	44	11.74%
Job Level		
Entry-level	93	24.9%
Mid-level	206	55.3%
Senior-level	74	19.8%

Table 1 displays the demographic data of the survey respondents.

The survey instrument comprised 41 items representing five constructs: digital leadership, AI-based performance appraisal, employee empowerment, work engagement, and organizational performance (Table 2). A closed-ended questionnaire was used in this study.

The responses collected from the participants were stored in Google Sheets. With the recommendations of Hair et al. (2021), the partial least squares (PLS) approach was adopted, as it is well-suited for both predictive and explanatory research. Data analysis was conducted using Smart PLS 4.0 to as-

Table 2. Measurement scales

No.	Name of the Variable	Scale Adopted	No. of items
1	Digital Leadership	Roman et al. (2019)	10
2	AI Performance Appraisal	Wijayati et al. (2022)	5
3	Employee Empowerment	Wong Humborstad and Perry (2011)	8
4	Work Engagement	Schaufeli et al. (2006)	9
5	Organizational Performance	Kim (2004), Brewer and Selden (2000)	9

sess the measurement and structural models, including convergent validity, discriminant validity, and hypothesis testing. To examine potential multicollinearity and correlations among the study variables, variance inflation factor (VIF) values were calculated and evaluated, as presented in Table 3. According to the multicollinearity criteria suggested by Hair et al. (2019), this study does not exhibit multicollinearity issues, as all VIF values were below the threshold of 5.0. In addition, tolerance values exceeded 0.20, and no inter-construct correlations above 0.70 were observed. Data entry and demographic analyses were performed using SPSS version 27.0. Furthermore, Multi-Group Analysis (MGA) was conducted to examine differences across hierarchical employee levels in the IT organizations, specifically comparing entry-level, mid-level, and senior-level employees to determine whether the structural relationships varied across these groups.

3. RESULTS AND DISCUSSION

Table 3 presents the outer loadings and Variance Inflation Factor (VIF) values for all measurement items. The results indicate that the items load more strongly on their respective constructs than on other constructs, thereby confirming the adequacy of the measurement model. As shown in Table 3, the majority of item loadings exceed the recommended threshold value of 0.70. Specifically, the item loadings for Digital Leadership range from 0.622 to 0.792, those for AI Performance Appraisal range from 0.682 to 0.746, Employee Empowerment range from 0.617 to 0.811, and Work Engagement range from 0.619 to 0.763. In addition, the item loadings for Organizational Performance range from 0.604 to 0.723, indicating that all items adequately represent their respective constructs. Totally, forty-one measurement items were used to assess the five constructs. The outer

Table 3. Measurement items analysis

Constructs and Items	Loading Values	VIF
Digital Leadership		
The leader presents an innovative plan for digital transformation with clarity	0.740	1.696
The leader discusses the alignment of digital technology with our company's objectives	0.714	1.834
The supervisor is attentive to adopting innovations that enhance our work processes	0.657	1.442
Leader offers resources for the testing and execution of digital ideas	0.673	2.024
The leader promotes the utilization of contemporary tools to enhance the effectiveness of workflows	0.730	2.347
The leader employs digital platforms for clear and frequent communication	0.792	2.038
The leader encourages the application of digital data to assess performance	0.764	1.498
The leader facilitates the enhancement of staff's digital competencies	0.682	2.309
Leader enables teams to make judgments utilizing digital tools and data	0.622	2.985
Superior depends on data and analytics for decision-making	0.639	2.188
AI Performance Appraisal		
Artificial intelligence technologies effectively verify the specifications for performance assessment	0.746	2.104
Employee performance is assessed by artificial intelligence technologies, strengthening the organizational culture	0.682	2.538
AI technologies facilitate the identification of employees who deserve career advancement	0.721	1.918
AI technologies designed to assess employee performance are anticipated to positively influence the company's success	0.682	2.546
Employees maintain their motivation when their performance is evaluated by artificial intelligence technologies	0.711	2.216

Table 3 (cont.). Measurement items analysis

Constructs and Items	Loading Values	VIF
Employee Empowerment		
Trusting that I will effectively finish my professional tasks	0.705	1.701
Employees solve the majority of the problems that arise at work	0.672	2.611
Employees have the capacity to choose how to do my job duties	0.617	2.428
Influence over how I organize my everyday work tasks	0.811	1.496
I can decide how I complete my work	0.716	1.974
Actions have an enormous impact on my team's performance	0.759	2.118
Efforts positively impact our job, motivating me to work hard every day	0.749	2.896
Personally involved in the achievement of my job responsibilities	0.725	1.540
Work Engagement		
When I wake up in the morning, I have a strong urge to get to work comfortably	0.621	1.669
I feel inspired in my current position of employment	0.625	1.545
I consistently display perseverance at work, regardless of the conditions	0.635	1.563
My job encourages me	0.763	2.562
I am extremely proud of the job that I do	0.721	2.965
I believe that the work I do is significant and purposeful	0.654	1.745
When I'm working, I ignore everything else	0.702	1.548
I become absorbed in my task	0.652	2.967
I am immersed in my work	0.619	2.435
Organizational Performance		
The Organization succeeds in meeting its objectives	0.604	1.734
The Organization effectively meets every requirement of its clients/customers	0.715	1.818
The company creates high-quality services	0.642	1.654
The Organization is creative in generating new services and processes	0.656	2.337
The Organization makes efficient use of its resources	0.678	2.027
The Organization beats similar organizations	0.723	1.635
The Organization continues to enhance its internal processes	0.608	1.732
The Organization has a high overall performance	0.637	2.995
The Organization has been recognized for its achievements	0.670	3.442

loadings of the measurement items meet the recommended threshold of 0.70 (Sarstedt et al., 2020), indicating that each item makes a meaningful contribution to its assigned construct. Accordingly, all measurement items were retained for further analysis. Furthermore, the VIF values for all indicators are below 5.0 (Hair et al., 2019), confirming that multicollinearity is not a concern in the measurement model.

The reliability and validity results of the measurement model are presented in Table 4. The findings indicate that the average variance extracted (AVE) for all constructs exceeds the recommended threshold of 0.50, with values ranging from 0.552 to 0.572. In addition, Cronbach's alpha values are above 0.70, ranging from 0.743 to 0.823, and composite reliability (CR) values also exceed the acceptable threshold of 0.70, ranging from 0.745 to 0.825. According to Hair et al. (2019), these results provide strong evidence that all constructs sat-

isfy the requirements for convergent validity and internal consistency reliability. Collectively, the findings determine that the measurement instruments used in this study are reliable and that the constructs exhibit an adequate level of consistency in measuring the intended variables.

This study employed the Fornell-Larcker criterion, as presented in Table 5, which is a widely accepted method for assessing discriminant validity. This approach compares the square root of the average variance extracted (AVE) of each construct with its correlations with other constructs in the structural model, as suggested by Kaushal et al. (2017).

The model's goodness-of-fit was examined using the standardized root mean square residual (SRMR) as the primary fit indicator. The SRMR value of 0.058 is below the recommended threshold of 0.08, indicating a good model fit and strong explanatory power (Hu & Bentler, 1998). The Normed

Table 4. Reliability and average

Variables	Cronbach's Alpha	Composite Reliability	Average
Digital Leadership	0.765	0.767	0.572
AI Performance Appraisal	0.743	0.745	0.561
Employee Empowerment	0.768	0.770	0.550
Work Engagement	0.778	0.780	0.552
Organizational Performance	0.823	0.825	0.537

Table 5. Discriminant validity

Dimensions	Digital Leadership	AI Performance Appraisal	Employee Empowerment	Work Engagement	Organizational Performance
Digital Leadership	0.756				
AI Performance Appraisal	0.720	0.748			
Employee Empowerment	0.631	0.726	0.741		
Work Engagement	0.623	0.689	0.698	0.742	
Organizational Performance	0.567	0.663	0.669	0.712	0.732

Table 6. Model fit assessment

Index	Value
Standardized Root Mean Square Residual (SRMR)	0.058
Normed Fit Index (NFI)	0.912
Root Mean Square Theta (RMS)	0.102

Fit Index (NFI) value of 0.912 exceeds the acceptable threshold of 0.90, demonstrating an adequate level of model fit. In addition, the RMS theta value of 0.102 is below the recommended criterion of 0.12, indicating a high level of internal consistency among the reflective indicators. The results suggest that the model adequately represents the observed data and satisfies the key criteria for assessing the overall adequacy of the PLS-SEM model.

Table 7 presents the effect size (f^2) values for the constructs in the model. In line with Cohen's (2013) framework, the effect sizes were examined based on changes in the coefficient of determination (R^2) in order to assess the relative importance of the exogenous constructs. The f^2 values for Digital Leadership were 0.121 and 0.186, indicating a moderate effect on employee empowerment and work engagement, respectively. In addition, the f^2 values for AI performance appraisal were

0.285 and 0.344, demonstrating a strong effect on employee empowerment and work engagement. The endogenous construct, organizational performance, the f^2 values for Digital Leadership, AI performance appraisal, employee empowerment, and work engagement were 0.084, 0.157, 0.227, and 0.318, respectively. According to Cohen's (1988) guidelines, these results indicate that the explanatory variables exert small-to-large effects on organizational performance, thereby confirming their substantive contribution to the model.

Table 8. Coefficient of determination (R^2) and predictive relevance (Q^2)

Construct	R^2	Q^2
Employee Empowerment	0.481	0.324
Work Engagement	0.554	0.373
Organizational Performance	0.623	0.412

Table 7. Effect size (f^2)

Variables	Employee Empowerment (f^2)	Work Engagement (f^2)	Organizational performance (f^2)
Digital Leadership	0.121	0.186	0.084
AI Performance Appraisal	0.285	0.344	0.157
Employee Empowerment	–	–	0.227
Work Engagement	–	–	0.318

Table 8 presents the adjusted R² values for the endogenous constructs. The results show that employee empowerment has an R² value of 0.481, indicating that 48.1% of its variance is explained by the independent variables, which reflects a moderate level of explanatory power. The R² value for work engagement is 0.554, suggesting that 55.4% of its variance is explained by the predictors. Organizational performance demonstrates the highest R² value of 0.623, indicating that 62.3% of its variance is explained by the model, thereby reflecting a substantial level of model explanatory power. The Q² values for organizational performance (0.412), employee empowerment (0.324), and work engagement (0.373) are all positive, indicating that the model has adequate predictive relevance. Collectively, these findings confirm that the proposed model exhibits strong predictive accuracy across all constructs.

The results presented in Table 9 indicate that the structural path analysis confirms all hypothesized relationships in the model are statistically significant and empirically supported.

The results reported in Table 9 demonstrate that digital leadership has a significant and positive effect on organizational performance, as evidenced by a standardized path coefficient of $\beta = 0.195$, a t-value of 2.145 exceeding the critical threshold of 1.96, and a p-value of 0.033, thereby supporting Hypothesis 1 in the proposed direction. Similarly, AI performance appraisal has a positive and statistically significant effect on organizational performance, with a path coefficient of $\beta = 0.287$, a t-value of 3.764, and a p-value of 0.001, providing empirical support for Hypothesis 2.

Digital leadership is found to be positively and significantly associated with employee empower-

ment, as indicated by a standardized coefficient of $\beta = 0.341$, a t-value of 4.120, and a p-value of 0.001, confirming Hypothesis 3. In addition, AI performance appraisal exhibits a strong and significant relationship with employee empowerment, reflected in a path coefficient of $\beta = 0.490$, a t-value of 6.257, and a p-value of 0.001, thereby validating Hypothesis 4.

The analysis further reveals that digital leadership positively influences work engagement, with a statistically significant coefficient of $\beta = 0.415$, a t-value of 5.029, and a p-value of 0.001, which supports Hypothesis 5. Likewise, AI performance appraisal demonstrates a strong and significant positive effect on work engagement, as shown by a coefficient of $\beta = 0.527$, a t-value of 7.118, and a p-value of 0.001, thereby confirming Hypothesis 6.

Moreover, employee empowerment is significantly and positively related to organizational performance, with a path coefficient of $\beta = 0.383$, a t-value of 4.897, and a p-value of 0.001, providing strong support for Hypothesis 7. Finally, work engagement shows a substantial and positive association with organizational performance, as indicated by a coefficient of $\beta = 0.477$, a t-value of 6.036, and a p-value of 0.001, thus strengthening support for Hypothesis 8.

Collectively, the structural model results confirm that all hypothesized relationships (H1–H8) are statistically significant and empirically supported.

Table 10 indicates significant mediating effects of employee empowerment and work engagement on the relationships between digital leadership, AI-based performance appraisal, and organizational performance. The analysis reveals a significant beta coefficient ($\beta = 0.135$) and p-value ($p = 0.001$), in-

Table 9. Direct path results (hypothesis testing)

Hypotheses (H)	Path	β	t-value	p-value	Result
H1	Digital Leadership → Organizational Performance	0.195	2.145	0.033	Supported
H2	AI Performance Appraisal → Organizational Performance	0.287	3.764	< 0.001	Supported
H3	Digital Leadership → Employee Empowerment	0.341	4.120	< 0.001	Supported
H4	AI Performance Appraisal → Employee Empowerment	0.490	6.257	< 0.001	Supported
H5	Digital Leadership → Work Engagement	0.415	5.029	< 0.001	Supported
H6	AI Performance Appraisal → Work Engagement	0.527	7.118	< 0.001	Supported
H7	Employee Empowerment → Organizational Performance	0.383	4.897	< 0.001	Supported
H8	Work Engagement → Organizational Performance	0.477	6.036	< 0.001	Supported

Table 10. Mediation analysis

Hypotheses	Independent variable	Indirect β	p-value	VAF	Mediation Type
H9	Digital Leadership → Employee Empowerment → Organizational Performance	0.135	< 0.001	41%	Partial
H10	Digital Leadership → Work Engagement → Organizational Performance	0.199	< 0.001	50%	Partial
H11	AI Performance Appraisal → Employee Empowerment → Organizational Performance	0.265	< 0.001	40%	Partial
H12	AI Performance Appraisal → Work Engagement → Organizational Performance	0.244	< 0.001	46%	Partial

dicating that employee empowerment significantly mediates the relationship between digital leadership and organizational performance. Therefore, Hypothesis 9 is supported. Work engagement significantly mediates the relationship between digital leadership and organizational performance, as evidenced by a beta value of $\beta = 0.199$ and a p-value of 0.001, thereby supporting Hypothesis 10. Furthermore, a substantial beta coefficient ($\beta = 0.265$) and a p-value of 0.001 indicate that employee empowerment significantly mediates the relationship between AI-based performance appraisal and organizational performance. Hence, Hypothesis 11 is supported. The results also demonstrate that work engagement significantly mediates the relationship between AI-based performance appraisal and organizational performance, as reflected by a beta value of $\beta = 0.244$ and a p-value of 0.001, thus confirming Hypothesis 12. In addition, the Variance Accounted for (VAF) values range between 20% and 80%, confirming the presence of partial mediation and indicating that both direct and indirect effects coexist.

Table 11 indicates that the Multi-Group Analysis (MGA) was conducted using Smart-PLS to examine whether the structural relationships differ across different levels of employees, namely entry-level, mid-level, and senior-level employees.

The results indicate that for entry-level employees, Digital Leadership, AI Performance Appraisal, Employee Empowerment, Work Engagement, and Organizational Performance are significantly related, as all the p-values are below the threshold level of 0.05. These findings suggest that digital leadership and AI-based appraisal systems play an important role in empowering entry-level employees, enhancing their engagement, and ultimately improving organizational performance.

For mid-level employees, the results indicate that Digital leadership, employee empowerment, work engagement, and organizational performance of the relationships are statistically significant, as the p-values are below the threshold level of 0.05. While AI Performance Appraisal is not statistically significant, as the p-value is greater than 0.05. The result suggests that while digital leadership and employee empowerment significantly enhance work engagement and organizational performance among mid-level employees, AI Performance Appraisal does not significantly influence employee empowerment in this group.

For senior-level employees, the results indicate that Digital Leadership, AI Performance Appraisal, Employee Empowerment, Work Engagement, and Organizational Performance are positively and

Table 11. Multi-group analysis (MGA) by employee level

Employee levels	Groups	Digital Leadership	AI Performance Appraisal	Employee Empowerment	Work Engagement	Organizational Performance
Levels of employees in the organization	Entry level	$\beta = 0.228$, t = 2.45, p = 0.041	$\beta = 0.312$, t = 2.66, p = 0.038	$\beta = 0.372$, t = 4.76, p = 0.029	$\beta = 0.502$, t = 3.24, p = 0.021	$\beta = 0.447$, t = 4.52, p = 0.033
	Mid-Level	$\beta = 0.289$, t = 3.87, p = 0.001	$\beta = 0.228$, t = 5.35, p = 0.145	$\beta = 0.192$, t = 4.90, p = 0.000	$\beta = 0.687$, t = 2.76, p = 0.009	$\beta = 0.320$, t = 5.36, p = 0.019
	Senior Level	$\beta = 0.148$, t = 6.82, p = 0.000	$\beta = 0.242$, t = 5.11, p = 0.001	$\beta = 0.361$, t = 4.17, p = 0.000	$\beta = 0.261$, t = 5.33, p = 0.000	$\beta = 0.634$, t = 3.87, p = 0.001

significantly related, as all the p-values are less than 0.05. The results indicate that digital leadership and AI-based appraisal systems play an important role in empowering senior-level employees, enhancing their engagement, and improving organizational performance

The initial findings indicate that digital leadership has a positive and statistically significant impact on employee empowerment and work engagement. This result is consistent with previous studies showing that digital leaders promote employee adaptability, collaboration, and autonomy (Avolio et al., 2014; Philip & Gavrilova Aguilar, 2022). Although earlier studies identify leadership as the primary determinant of employee-related outcomes, the present study demonstrates that both digital leadership and AI-based performance assessment jointly exert a stronger influence on organizational performance outcomes. This finding reflects a shift away from traditional leadership approaches and supports recent research suggesting that employees increasingly value data-driven and transparent decision-making and appraisal practices enabled by AI technologies (Meijerink et al., 2021; Ali et al., 2024). Furthermore, the results show that digital leadership significantly enhances employee empowerment and work engagement. This indicates that leaders who effectively integrate digital technologies, innovation, and transformational behaviors create work environments in which employees feel valued, empowered, and actively engaged.

The findings are consistent with prior studies demonstrating that employee empowerment and work engagement are essential mechanisms through which HR practices improve organizational outcomes (Saks, 2019; Breevaart et al., 2016). The results of the present study further suggest that both employee empowerment and work engagement are critical factors in enhancing organizational performance. Moreover, the findings imply that in workplaces where digital technologies are integrated into leadership and performance assessment systems, dimensions of work engagement, namely vigor, dedication, and absorption, may be more responsive to digital HR interventions than empowerment initiatives alone.

The present study supports the growing body of evidence indicating that AI-based performance as-

essment significantly enhances organizational performance outcomes. This finding is consistent with earlier research highlighting the benefits of accuracy, fairness, and continuous feedback in AI-driven appraisal systems (Upadhyay & Khandelwal, 2019). However, the current results reveal a more positive employee perception of AI performance assessment than has been reported in some earlier studies. Previous research has highlighted potential risks associated with AI-based appraisal systems, including algorithmic bias, lack of transparency, and reduced human interaction (Jarrahi, 2018). The present findings indicate that AI performance assessment tools enhance fairness, reduce bias, improve procedural transparency, and enable timely feedback. These improvements increase employees' sense of empowerment and work engagement. Such developments may strengthen employees' confidence in AI tools within digitalized organizational environments, particularly among IT employees. Moreover, AI-based performance assessment demonstrates a substantial positive impact on overall organizational performance. The study results confirm the prior studies showing that AI-enabled HR systems improve appraisal accuracy and enhance employee trust.

The findings challenge several prior leadership studies that proposed a direct relationship between effective leadership and organizational performance (Gupta et al., 2022). The present study demonstrates that employee empowerment and work engagement significantly mediate the relationship between digital leadership and organizational performance. The results further indicate that leadership is evolving from a traditional position of authority toward a more collaborative and technology-enabled approach, in which leaders actively integrate digital tools into their leadership practices and promote the development of new digital competencies among employees. Consequently, organizational success is increasingly driven by employees' greater autonomy and engagement, as empowered employees feel more responsible and motivated to contribute toward achieving organizational goals. Through this mediating mechanism, digital leadership plays a significant role in enhancing organizational performance.

The findings provide valuable insights for HR professionals, managers, and decision-makers in the IT industry in Chennai. Organizations should prioritize the implementation of AI-based performance assess-

ment systems that employees perceive as transparent, fair, and motivating. Such systems can facilitate real-time feedback, reduce bias in performance evaluations, and strengthen employees' trust in organizational practices. Consequently, these initiatives can enhance employee engagement and improve organizational performance.

The findings of Multi-Group Analysis (MGA) explained that employees at the entry level are highly influenced by leadership practices and digital systems that guide their performance and development. The presence of digital leadership helps in creating transparent performance evaluation systems and enhances employee empowerment, which in turn improves work engagement and contributes to organizational performance. These findings are consistent with the study by Afsar and Masood (2018), who argued that empowering leadership and supportive organizational practices significantly enhance employee engagement and performance outcomes.

Mid-level managers often act as intermediaries between top management and operational staff, and therefore, leadership influence and empowerment play a greater role in shaping their engagement and performance. This finding aligns with Zhu et al. (2009), who highlighted that leadership behaviors significantly influence employee empowerment and engagement across organizational hierarchies.

Senior-level employees are typically involved in strategic decision-making, and therefore, digital leadership capabilities and advanced performance management systems become critical in enhancing their effectiveness and contribution to organi-

zational success. The results support the argument of Heavin and Power (2018), who emphasized that digital leadership is essential for organizations to effectively leverage digital technologies and improve performance outcomes.

AI plays a pivotal role in strengthening digital leadership, which has become indispensable in today's business environment. Senior-level employees are expected not only to enhance employees' technological competence but also to encourage open communication, promote innovation, and support employees in adapting to continuous technological changes. Therefore, leadership development initiatives should emphasize building capabilities in virtual and digital communication and data-driven decision-making. Organizations should also focus on developing leaders' ability to strategically and responsibly use AI-enabled tools to ensure sustained organizational effectiveness and competitiveness. At the same time, companies need to implement HR strategies that promote employee empowerment and engagement, as higher levels of engagement significantly enhance employee performance. Initiatives such as recognition programs, meaningful and challenging work assignments, and digital collaboration tools help sustain employees' enthusiasm, involvement, and commitment, thereby contributing to improved organizational performance. Furthermore, research findings suggest that employees should adopt a hybrid HRM model that integrates AI-driven solutions with human-centered management practices. Such a balanced approach enables organizations to advance their digital transformation while fostering a supportive, engaging, and positive work environment that supports long-term organizational success.

CONCLUSION

The purpose of this study was to examine the impact of digital leadership and AI-based performance appraisal on organizational performance in the IT sector, while considering the mediating roles of employee empowerment and work engagement. The findings also indicate differences across employee levels, where senior-level employees show the strongest contribution to organizational performance, mid-level employees demonstrate the highest level of work engagement, and entry-level employees exhibit consistent but moderate effects across the studied variables. Based on these results, it can be concluded that organizations should focus on strengthening digital leadership capabilities and implementing AI-based performance appraisal systems while simultaneously promoting employee empowerment and engagement. Such an integrated approach can enhance employee performance, improve organizational outcomes, and support long-term success in technology-driven organizational environments.

The results also indicate that employee empowerment leads to higher levels of work engagement, which in turn improves productivity and organizational outcomes. The findings also reveal that senior-level employees make the strongest contribution to organizational performance, mid-level employees demonstrate the highest level of work engagement, and entry-level employees show consistent but comparatively moderate effects across the studied variables.

Although this study provides valuable insights, several limitations should be acknowledged. First, the use of a cross-sectional research design restricts the ability to draw causal inferences among the study variables. Second, the sample was limited to employees working in the IT sector in Chennai, which may constrain the generalizability of the findings to other industries and regions. Despite these limitations, the results highlight several promising directions for future research.

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