AI-BASED PERFORMANCE APPRAISAL SYSTEMS AND HR ANALYTICS ADOPTION: EVIDENCE FROM KUWAIT'S GOVERNMENT SECTOR

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Highlight

AI-enabled performance appraisal systems significantly enhance employee performance and HR analytics outcomes. Empirical analysis using CB-SEM confirms strong relationships between AI appraisal, performance systems, and HRA benefits.

Abstract

This research seeks to investigate the part involved by performance appraisal schemes based on Artificial Intelligence (AI)skill in the enabling of employee performance systems and the achievement of the advantages of Human Resource Analytics (HRA), with reference to the Kuwait government sector. Employing examination facts composed from 332 employees and executives in both public and private sector organizations, covariance-based structural equation modelling (CB-SEM) was carried out to verify the measurement and structural models. The consequences display that AI-enabled appraisal schemes significantly enhance employee performance systems ($\beta = 0.608$, $p < .001$) and strongly predict the apparent benefits of HR analytics ($\beta = 0.930$, $p < .001$). These results show the role played by performance appraisal systems based on AI technology in the enabling of operative performance systems and the achievement of the advantages of Human Resource Analytics (HRA). This research brands a involvement to the field of HR analytics by providing empirical support for the role played by performance appraisal systems based on Artificial Intelligence technology in the enabling of employee performance systems and the achievement of the advantages of Human Resource Analytics (HRA), with reference to the Kuwait government sector. It is also practically important as it provides illegal visions for policymakers and leaders in Kuwait to achieve the requirements set in Kuwait Vision 2035.

Keywords

Artificial Intelligence (AI); Performance Appraisal Systems; Human Resource Analytics (HRA); Digital HR Transformation; Employee Performance Systems.

Introduction

The quick evolution of ordinal expertise has significantly impacted how modern organizations manage their Human Resource Management (HRM) activities. Artificial intelligence technology, data analytics, and digital HR technology have become a crucial factor in transforming how modern organizations manage employee performance assessment, employee development programs, and strategic decision-making processes. As part of these significant transformations in modern HRM activities, there has been significant attention paid to the role of Human Resource Analytics (HRA) in using employee data to enhance productivity and align employee performance with organizational objectives (Huselid, 2018; Arora, Prakash, Mittal, & Singh, 2021). The role of data analytics in HR activities has enabled modern organizations to shift from conventional HR activities towards a more strategic method in managing their workforce.

Human Resource Analytics has enabled modern administrations to systematically collect employee statistics and examine these data to make better decisions in various HR activities, including employee recruitment, employee training programs, employee performance assessment, and employee planning (Kimura, 2023). With modern data analytics technology, modern organizations can develop better strategies in improving structural

presentation. As a result, HRA has develop a crucial part of digital skill in modern organizations in both the secluded and community areas.

One of the most significant factors contributing to the implementation of HRA is the modernization of employee performance. The traditional method of performance appraisal involves using subjective, inconsistent, and limited manual employee performance evaluation techniques, which provide structured performance data (Pulakos, Hanson, & Arad, 2019). Such techniques result in a reduction in the level of transparency and the possibility of obtaining performance insights. On the other hand, the implementation of AI-based show assessment techniques provide a much more objective and systematic method of evaluating employee performance, taking into consideration various sources of performance data and using complex algorithms to evaluate employee productivity, behaviour, and performance. By providing constant structured performance data, the execution of AI-based performance appraisal techniques helps in enhancing the level of reliability and consistency in performance evaluations while avoiding any potential biases (Arora &Upadhyay, 2024). Most importantly, this helps in laying the data foundation for the implementation of HRA, which transforms raw workforce data into performance insights (Abellán-Sevilla & Ortiz-de-Urbina-Criado, 2023).

This notwithstanding, there has been a mixed response in the implementation of digital HR technology in different institutions globally. For instance, in public institutions, there have been challenges such as bureaucratic hurdles, legal hurdles, and slow rates of organizational change, which have often hindered the implementation of digital HR technology in such institutions (Achoui, 2009; Shayah& Sun, 2019). Such challenges have often been witnessed in the Gulf Cooperation Council (GCC) countries, where there has been a need to modernize the public sector and develop human resources. Kuwait has a labour market in which the public sector plays a major role. Moreover, there has been a need to increase the productivity of the workforce in Kuwait. The country has relied on expatriate workers (Al-Enezi, 2002; Shayah & Sun, 2019).

It is in this context that the role of AI-enabled HR technology can have a major impact on improving presentation organization performs in government institutions. However, despite the significant interest in the use of HR analytics and AI-enabled HR technology, there has been limited research on the technological aspects of how data infrastructures for HRA can be developed by organizations, particularly in the context of public sector institutions and the expansion of digital governance. Thus, sympathetic the role of AI-enabled performance appraisal systems in the development of employee performance systems and HR analytics benefits is essential for improving digital transformation in HRM, particularly in countries such as Kuwait, where national development initiatives have emphasized the need for data-driven governance.

This current research focuses on investigating the role of AI-based presentation assessment schemes in indorsing worker performance and realizing the benefits of HRA in the government sector of Kuwait, with an emphasis on the private sector as a comparative case. This research hopes to donate to a improved sympathetic of AI-based HR technologies as a tool for embracing analytics, provide empirical support from a public sector in a GCC country, and provide policy implications for those seeking to transform traditional performance management in line with Kuwait Vision 2035. The rest of this article is structured as follows: The literature is reviewed in Section 2, the methodology is explained in Section 3, the outcomes of the experiment are presented in Section 4, these findings are discussed in Section 5, and Section 6 closes with consequences, constraints, and future study directions.

Literature Review

The phenomenon of the numerical alteration of human resource management (HRM) has become a key characteristic of modern organizational practices, which have significant implications for the overall dynamics of organizational practices and strategies for managing human capital. With the increasing use of modern and highly developed digital technologies by organizations, Human Resource Analytics (HRA) and AI technology-based systems have become key mechanisms for transforming HRM practices from perception-founded executive to knowledge-driven executive. In this context, a number of studies have also discussed the challenges and opportunities of HR digitalization, and Zehir et al. (2019) have emphasized the significance of HR digitalization and its debate in modern academic literature. Following this context and literature, the following review aims to discuss the overall literature on HRA and AI-based performance appraisal systems and its implications for employee performance systems and organizational effectiveness, particularly in the context of public sector modernization programs such as those in Kuwait.

2.1 Human Resource Analytics (HRA)

HRA has appeared as a vital means of enhancing the efficiency of HRM, thus improving organizational performance. Traditionally, human resource departments have focused on managing human resources, such as recruitment, payment of salaries, and managing human resources (Alhajri, Al-Sharhan, Al-Hunaiyyan, & Al-Othman, 2011). However, in the last decade, these activities have been supported by information technology, thus improving human resource management (Alzayed& Al-Hunaiyyan, 2021; Francis, et al., 2023). This has been a significant development in human resource management, where data is used to inform decisions that were formerly made on the basis of intuition by management.

HRA can be broadly defined as the orderly group, measurement, and analysis of data on human resources for the improvement of employee productivity and efficiency in organizations (Huselid, 2018; Alzayed& Al-Hunaiyyan, 2021). The use of statistical techniques, data mining, and predictive modelling has been employed in human resource analytics to come up with insights that inform decisions on human resources (Kimura, 2023). Thus, the more data available on human resources, the more advanced the analytics capabilities of the organization, thus enabling the custom of predictive modelling in HRM.

The literature has emphasized several advantages of using HRA. First and foremost, decision-making is enhanced by using evidence-based HR practices (Arora, Prakash, Mittal, & Singh, 2021). Secondly, cost reduction and competency development are two significant advantages of using HRA, as emphasized by the Society for Human Resource Management (SHRM). Thirdly, the effectiveness of HRM practices is enhanced across various employee lifecycle stages by using HRA (Bandi, Rao, & Ali, 2021). Empirical research has shown that by using HRA in their organizations, firms can better assess the effectiveness of HR investments and enhance performance by identifying gaps in performance and intervening accordingly (Arora &Upadhyay, 2024).

The global adoption trends of HR analytics emphasize the importance of using HRA in various firms across the world. HR analytics is expected to grow by 71% during 2013-2017. During this period, firms in the UAE showed maturity in terms of analytics adoption (Mahmood, Ahmed, &Philbin, 2022). As analytics evolves in firms, more advanced metrics can be used to enhance decision-making by increasing the accuracy of predictions in HR analytics (Jyoti, Sharma, & Rani, 2020).

Other studies have also absorbed on the part of HRA in the broader context of human capital strategies. Kiran et al. (2022) carried out a systematic review on the association among Human Capital Management (HCM), HRA, and administrative act. The results of the study revealed that HRA plays a role of mediation between HCM and organizational performance. This indicates the strategic role of HRA in an organization. This is reinforced by additional training by Islam et al. (2022), which argues that HR analytics shows a significant role in enhancing workforce performance by optimizing workforce allocation and development. Another study by Kimura (2023) argues that the effectiveness of analytics-based HRM relies on the quality of workforce data. This indicates the significance of digital HR systems in the implementation of HR analytics.

In addition to these conceptual and empirical developments, Anand et al. (2023) provide an extensive bibliometric review on HRM research on the topic of artificial intelligence from 2012 to 2023. This study employed the methods of trend, thematic, performance, cluster, co-citation, and co-occurrence analyses to illustrate the intellectual structure of the subject domain, yielding important findings on the progress of research themes, important researchers, and international connections among scholars. In the bibliometric landscape, the Green Cluster is particularly noteworthy, emphasizing the applied value of the work by Greasley and Thomas (2020) and Gurusinghe, Arachchige, and Dayarathna (2021). The research investigates the influence of analytics on professional practice and the advancement of predictive HR analytics. The recency of the publications underscores the active exploration on the submission of analytics-based HRM.

In conclusion, the concept of HRA represents an important change from outdated HR practices towards a more strategic approach to HRM, where decisions on human capital are aligned with structural objectives. This underscores the role of analytics as an essential aspect of contemporary HRM and places the basis for understanding the role of AI-based systems in furthering the effectiveness of HR decision-making.

2.2 AI in Performance Appraisal

Performance Appraisal Systems (PAS) form an integral part of HRM, as they lay the groundwork for judging employee performance, employee growth, and performance in line with organizational objectives. However, traditional performance appraisal systems have always been criticized on grounds of dependence on managerial biases, inconsistent evaluation practices, and scarce availability of data (Pulakos, Hanson, & Arad,

2019). The digitalization of HRM has led to an increase in the prominence of AI in Human Resource Management Systems (HRMS) and Human Resource Information Systems (HRIS)(Votto, Valecha, Najafirad, & Rao, 2021; Alduaij, Alterkait, & Alainati , 2024; Al-Sharhan & Al-Hunaiyyan, 2012; Al-Sharhan, Al-Hunaiyyan, & Gueaieb, 2006).The limitations of these performance appraisal systems are addressed by AI-based systems due to their use of progressive procedures and ML approaches along with data processing capabilities. These systems use various data sources like productivity, behavioural patterns, and employee feedback to measure employee performance based on objective parameters and data processing techniques (Arora & Upadhyay, 2024; Al-Huwail, Al-Hunaiyyan, Alainati, & Alhabshi, 2025; Al-Hunaiyyan, Alhajri, Al-Sharhan, & Bimba, 2021B). This increases the fairness and transparency of performance appraisal systems.

One significant aspect of AI-based PAS is its capacity to produce high-quality performance data in a structured form. This is a crucial aspect in the implementation of HRA, as performance data can offer in-depth insights into employee productivity and performance trends (Abellán-Sevilla& Ortiz-de-Urbina-Criado, 2023). As a result, when firms implement digital performance appraisal systems capable of generating performance data, they can establish a data foundation for predictive analytics.

However, there are certain limitations in the adoption of digital HR systems across different organizational environments. For instance, in public sector firms, there might exist certain limitations in the adoption of digital HR systems due to various bureaucratic and institutional limitations (Achoui, 2009; Al-Hunaiyyan& Al-Sharhan, 2009). The pattern of AI adoption in Kuwait has shown similar limitations in different organizational environments, as organizational readiness and institutional support play a crucial part in the efficiency of AI-based systems (Alainati, Al-Hunaiyyan, Al-Duiaji, & Al-Hammad, 2024). On the contrary, in private sector firms, there might exist a certain level of competitiveness in the organizational environment, which can encourage innovation in technology. Recent research has shown certain limitations in the adoption of digital systems in Kuwait during a period of rapid technological transition (Al-Hunaiyyan, Alhajri, Al-Sharhan, & Al-Ghannam, 2021).

However, apart from the improvement of appraisal systems' accuracy, another important role of AI-enabled systems is the overall shift towards personalized human resource management. Huang et al. (2023) discuss the overall concept of personalized HRM (PHRM), which utilizes the capabilities of analytics and AI to provide personalized solutions for human resource management. The article by Huang et al. discusses PHRM as a new form of HRM and highlights its overall potential for improving employee experience, organizational flexibility, and overall effectiveness of HRM systems.

In the case of the Gulf Cooperation Council (GCC) countries, modernization of public sectors is considered a national priority for these countries due to the need for economic diversification and development of human capital. In Kuwait, where public sector employment is dominant, improvement of public sector efficiency and productivity is considered a key factor in national development strategies such as Kuwait Vision 2035 (Al-Enezi, 2002; Shayah& Sun, 2019). Therefore, an overall appraisal system is considered a key factor for modernizing public sectors in Kuwait.

2.3. Conceptual Framework and Hypotheses Development

2.3.1 AI Based Performance Appraisal Systems in Modern HRM

In this context, the digital transformation of HRM has altered the way performance is assessed. Employee performance systems, which are traditionally based on periodic assessments and judgments, are not transparent and lack sufficient analysis (Huselid, 2018). AI-based PAS provides an alternative with greater analysis and objectivity using the combined data and algorithmic evaluation. In addition to the improvement in the accuracy of the assessment, these appraisal systems can also support strategic HR functions with the availability of big quantities of information on employee performance. This can be used to improve workforce planning, training, and performance, which can be directly related to organizational performance (Kimura, 2023). As such, these appraisal systems using AI technology are now considered to be integral to the development and implementation of HRA and HRM.

In this context, it is significant to comprehend the challenges to the acceptance of these appraisal systems, particularly in the public sector, where the adoption of technology is hindered by regulatory and cultural factors (Achoui, 2009; Shayah& Sun, 2019). Sympathetic the impact of AI-based PAS on employee presentation systems is important to the digital transformation of HRM in the public sector.

2.3.2 AI Based Performance Appraisal Systems and Employee Performance Systems

Employee performance systems (EPS) refer to the means by which the performance of the organization is monitored, assessed, and enhanced. Traditionally, these systems have been found to have subjective tendencies, varying standards, and inadequate analytical capabilities (Pulakos, Hanson, & Arad, 2019). The operation of performance appraisal systems (PAS) through artificial intelligence can greatly boost the performance of employee performance systems.

The use of AI in performance appraisal systems has helped organizations to monitor performance continuously, address skill gaps, and align individual performance with organizational objectives. All these have contributed to the development of more dynamic performance systems, which have enhanced performance management in organizations (Jyoti, Sharma, & Rani, 2020; Alainati, Alsaber, Alkandari, Alreshaid, &Alaslawi, 2025). If the performance appraisal system is found to be fair by the employees, it can boost the performance management system, thus improving employee performance systems (Erro-Garcés & Aramendia-Muneta, 2023). Considering the potential of performance appraisal systems to provide accurate, consistent, and reliable information on performance, it can be argued that the implementation of performance appraisal systems can greatly boost the performance of employee performance systems. Thus, the following theory can be industrialized:
H1: AI based performance appraisal systems positively influence employee performance systems.

2.3.3 AI Based Performance Appraisal Systems and HR Analytics Benefits

The success of the operation of HRA is heavily dependent on the availability of high-quality structured data. Performance Appraisal Systems (PAS) developed through the use of Artificial Intelligence have a important part to show in the generation of such data (Huselid, 2018). By automating data collection and applying algorithmic evaluation methods, AI enabled appraisal systems enhance transparency and accountability by providing objective evidence to support HR decisions (Abellán-Sevilla & Ortiz-de-Urbina-Criado, 2023). These systems also facilitate prognostic analytics that help governments forestall staff needs, classify productivity drivers, and implement proactive interventions (Kimura, 2023).

These capabilities are particularly important in the public sector, where the improvement of institutional efficiency is one of the primary policy objectives. Public organizations often experience structural barriers such as bureaucratic processes, strict hierarchies, as well as the lack of performance data, which can hinder the adoption of evidence-based HRM. AI-based PAS can help overcome such barriers by offering continuous standardized performance data to support workforce planning. The state of Kuwait, as well as the rest of the Gulf countries, faces serious workforce development challenges in the process of building a knowledge-based budget. The education system is an important part of the workforce that significantly influences the formation of the Kuwaiti workforce in terms of its alignment with the changing supplies of the labor market (Khalil, et al., 2023).

In this respect, the use of AI-enabled PAS systems is closely in line with the national aspirations for modernization of the community subdivision and the growth of human capital in Kuwait, as outlined in Kuwait Vision 2035. The data production capacity of AI-enabled appraisal systems for HRA purposes puts public sector organizations in an advantageous position to leverage the benefits of analytics-based HRM. In opinion of the significant part of AI-enabled PAS systems in providing the data infrastructure for HRA, it is logical to assume that organizations will realize greater benefits from HR analytics. Accordingly, the subsequent hypothesis is projected:
H2: AI based recital appraisal systems absolutely impact the perceived benefits of Human Resource Analytics.

2.3.4 Conceptual Model

Based on the theoretical arguments outlined above, this research introduces a conceptual model that explores the influence of AI-based performance appraisal systems on employee performance administration and HR analytics benefits. The study's conceptual basis is shown in Figure 1.

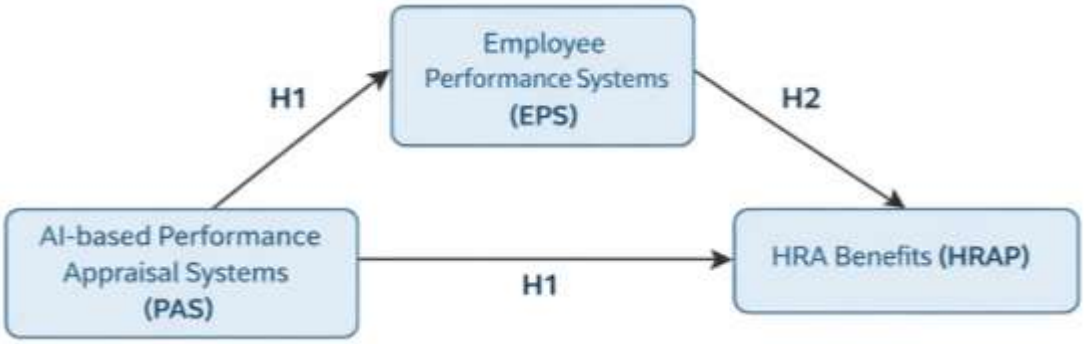

Figure 1. Conceptual Model

The model presents AI-based performance appraisal systems as the main technological factor shaping both the effectiveness of employee performance systems and the achievement of HR analytics benefits within organizations.

Research Methodology

3.1 Research Design

To enable to investigate how AI-based evaluation systems affect staff satisfaction and the perceived benefits of HRA within Kuwait's organizational structure, this study working a cross-sectional quantitative research approach. A cross-sectional approach was suitable because the research aimed to gather employees' and managers' perceptions at a solitary opinion in time, aligning with previous HRM and analytics studies. Although cross-sectional data do not determine causality, covariance-based structural equation modelling (CB-SEM) allows challenging of theoretically based directional associations, making it appropriate for examining the proposed conceptual framework. The focus was on the government sector, and private sector respondents were also included to gain aim proved empathetic of the adoption patterns of several types of organizations.

3.2 Research Context and Setting

The research for this study was conducted in Kuwait and involved government ministries and private sector organizations. The context of Kuwait is relevant and understudied for the purpose of exploring the phenomenon of AI-based HRM due to the national drive for modernizing public sector governance and enhancing the overall efficiency of community subdivision governments and the expansion of human capital. The public sector organizations in Kuwait are confronted with a number of challenges that are structural and regulatory in nature and are a barrier to the adoption of HR technology. The secluded segment organizations are confronted with a amount of competitive challenges that are driving the use of technology for organizational innovation. The private sector is also a relevant context for exploring the role of AI-based performance appraisal systems and their use for HR analytics.

3.3 Population and Sampling

The target population included full-time workers and directors in Kuwait's public and private sectors. The stratified non-probability specimen method was used. The stratification variables included the sector of the organization, whether public or private, and job positions, whether employee or manager/supervisor. The use of non-probability sample was due to the difficulties in accessing the population. The total quantity of defendants in the final sample was 332. Out of these, 111 (33.4%) were from the government sector, while 221 (66.6%) were from the private sector. Of these, 144 (43.4%) were employees, while 188 (56.6%) were managers/supervisors.

3.4 Sample Size Adequacy

The total number of respondents in the final sample was 332. This exceeded the minimum required for conducting CB SEM. According to Hair et al. (2019), a lowest of two hundred cases is required for SEM estimation. Moreover, the ratio of the taster extent to the amount of strictures to be valued was satisfactory. The adequacy of the sample size for the estimation of structural path models, confirmatory factor analysis (CFA), SEM, and bootstrapping procedures can also be concluded.

3.5 Data Collection Procedure

The data collection procedure involved an online-based questionnaire that was sent to employees and managers of public and private sector organizations in Kuwait. The questionnaire was sent electronically via professional networks and organizational contacts to ensure a wider reach of the population. A total of 332 replies were composed for the last examination.

3.6 Measurement Instrument

The survey instrument measured three latent constructs:

- AI-based Performance Appraisal Systems (PAS)
- Employee Performance Systems (EPS)
- HR Analytics Benefits (HRAP)

The data collection instrument consisted of a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement items were based on existing literature on HRM and analytics to ensure content validity. The PAS construct consisted of six items measuring perceptions of AI-based appraisal tools such as clarity, fairness, usefulness, and accuracy of the appraisal tools. The EPS construct consisted of six items measuring the effectiveness, responsiveness, and developmental focus of the performance systems. The HRAP construct consisted of eight items measuring the benefits of the HRAP systems, such as decision-making, transparency, and workforce planning. The final measurement model consisted of twenty observed indicators of the three constructs.

3.7 Validity and Reliability Assessment

Construct cogency and dependability were checked by performing CFA. The measurement model showed a good fit to the data on the basis of different fit indices such as χ^2/df, CFI, TLI, IFI, RMSEA, SRMR, and GFI. All these indices are recommended in structural equation modelling by Hair, Black, Babin, & Anderson (2019). Indicator reliability is supported by significant standardized factor loadings of 0.602 to 0.883. All these factor loadings are well above the minimum required level of 0.30 for establishing the reliability of each item. Moreover, composite reliability (CR) values are also above 0.70, and average variance extracted (AVE) values are more than 0.50, which confirms the internal consistency reliability of the scale (Fornell & Larcker, 1981). Discriminant validity has been checked by applying both the Fornell-Larcker criterion and the HTMT ratio. Although EPS and HRAP are strongly correlated, the HTMT ratio is well within the acceptable limits, which confirms the empirical distinctiveness of these two constructs (Henseler, Ringle, &Sarstedt, 2015).

3.8 Data Analysis Technique

CB-SEM has been employed for data analysis because it is most appropriate for theory testing, reflective measurement modelling, and testing measurement models in combination with structural models. Before applying SEM, data screening has been carried out for testing the assumption of normality, outliers, multicollinearity, and other data-related issues. The data analysis procedure consists of two steps: confirmatory factor analysis for testing the measurement model, and structural modelling for testing the structural relationships (Kline, 2016; Khalil, et al., 2023). The two direct relationships have been tested: PAS → EPS and PAS → HRAP. The data analysis has been carried out by bootstrapping with 5,000 sub-samples for assessing the robustness of the results (Kline, 2016). The results have shown that the classical elucidated 37.0% of the alteration in EPS and 86.6% of the modification in HRAP.

3.9 Common Method Bias

Given the fact that only one self-report scale was used, both procedural and statistical steps were taken to mitigate CMB. Procedurally, anonymity, randomized order, and psychological separation were used to ensure that respondents were not able to base their responses on previous answers (MacKenzie & Podsakoff, 2012). Statistically, Harman's single factor test exposed that no solitary factor accounted for most of the variance in the data (48.3%). Additionally, Common Latent Factor testing showed that there were only trivial differences in standardized loadings. All these results suggest that CMB was not a major concern in this study.

3.10 Ethical Considerations

The study adheres to standard ethical procedures in survey-based research. The study was shown in an ethical manner, and informed consent was given. The study was accepted by the relevant ethical group in the authors' home institution. No personally identifiable information was collected.

Results

4.1 Sample Characteristics

Demographic information about the example, containing of 332 contributors, is provided in Table 1. The mainstream of the accused were from the private sector, with 66.6%, while 33.4% were from government organizations. The mainstream of the accused were between 18-29 years old, i.e., 37.0%, while 33.4% were between 30-39 years old. The majority of the defendants were female, i.e., 57.5%. The majority of the defendants had completed a bachelor's degree, i.e., 56.9%, while more than half had managerial or supervisory roles, i.e., 56.6%. The majority of the respondents had 1-5 years of experience, i.e., 53.0%. The respondents also showed high technical skill, with 48.8% reporting intermediate skill and 45.8% reporting advanced skill in the use of digital technologies.

Table 1. Sample characteristics.

	Overall (N=332)	**Percent %**
Sector		
Government Sector	111	33.4%
Private Sector	221	66.6%
Age		
18–29	123	37.0%
30–39	111	33.4%
40–49	61	18.4%
Fifty and above	37	11.1%
Gender		
Male	141	42.5%
Female	191	57.5%)
Education		
High School	29	8.7%
Diploma	27	8.1%
Bachelor's Degree	189	56.9%)
Higher Education	87	26.2%
Role		
Employee	144	43.4%
Manager/Supervisor	188	56.6%
Experience		
1-5 years	176	53.0%
6-15 years	130	39.2%
16+ years	26	7.8%
Tech Experience		
Beginner	18	5.4%
Intermediate	162	48.8%
Advanced	152	45.8%

4.2 Measurement Model Assessment

In this context, a CFA model was carried out to assess the quality and appropriateness of the dimension prototypical, which comprises three latent variables. These variables are the performance appraisal systems (AI-based PAS), employee performance systems (EPS), and HRA benefits (HRAP). As presented in Table 2, the model had a satisfactory fit to the data. It is important to note that the chi-square to degrees of freedom ratio is 2.58, which is less than the recommended 3.00. This indicates that the model is simple. Moreover, the incremental fit indices proved the model to be highly fit to the data. As such, the relative fit directory is 0.943, which is greater than the minimum recommended level of 0.90. Furthermore, the Tucker–Lewis Index is 0.935, and the incremental appropriate directory is 0.943. As such, the model is highly fit to the data. Finally, the absolute fit indices proved to be highly adequate. As such, the root mean square error of estimate is 0.069, which is less than the suggested 0.08. Moreover, the root mean square remaining is 0.045, which is less than the endorsed 0.08. Finally, the goodness of fit index is 0.883, which is greater than the recommended level.

Table 2. Model Fit Indices

Fit Index	**Recommended Threshold**	**Model Value**
χ^2/df	< 3.00	2.58

CFI	> 0.90	0.943
TLI	> 0.90	0.935
IFI	> 0.90	0.943
RMSEA	< 0.08	0.069
RMR	< 0.08	0.045
GFI	> 0.85	0.883

4.3 Reliability and Factor Loadings

In terms of the reliability of the indicator, this can be established by analyzing the consistent factor loadings of all the dimension substances. As depicted in Table 3, it is evident that all the indicators loaded well on their respective latent constructs. Moreover, the loadings were significant at $p < .001$. The loadings ranged between 0.602 and 0.883. As can be seen, the loadings met the minimum threshold requirement of 0.60. In terms of the PAS construct, the loadings ranged between 0.602 and 0.814. This specifies that the items loaded well on the construct, which slow the AI-based performance appraisal systems. Furthermore, the loadings for the EPS construct were high, ranging between 0.768 and 0.883. These loadings designate high reliability and representation of employee performance systems. Additionally, the loadings for the HRAP concept ranged between 0.750 and 0.818. This specifies that the items loaded well on the concept, which dignified the perceived benefits of HR analytics. As depicted in Table 3, the loadings support the argument that the observed items loaded well on their respective latent constructs.

Table 3. Standardized Factor Loadings.

Construct	***Item***	***Loading***
PAS	PAS1	0.67
PAS	PAS2	0.69
PAS	PAS3	0.76
PAS	PAS4	0.60
PAS	PAS5	0.82
PAS	PAS6	0.78
EPS	EPS1	0.77
EPS	EPS2	0.80
EPS	EPS3	0.85
EPS	EPS4	0.78
EPS	EPS5	0.77
EPS	EPS6	0.88
HRAP	HRAP1	0.75
HRAP	HRAP2	0.82
HRAP	HRAP3	0.78
HRAP	HRAP4	0.81
HRAP	HRAP5	0.76
HRAP	HRAP6	0.80
HRAP	HRAP7	0.75
HRAP	HRAP8	0.78

4.4 Reliability and Convergent Validity

Construct reliability was assessed using Composite Reliability (CR) and Average Variance Extracted (AVE). As presented in Table 4, all constructs were found to have CR values higher than 0.70, which is the required level, with a range of 0.89 to 0.94. On the other hand, all constructs were found to have AVE higher than 0.50, which is the required level, with a range of 0.57 to 0.67. The consequences indicate that the constructs have high internal consistency and convergent validity.

Table 4. Reliability and Convergent Validity

Construct	**CR**	**AVE**
PAS	0.89	0.57
EPS	0.92	0.65

HRAP	0.94	0.67

4.5 Discriminant Validity

The construct dependability and convergent validity were measured using CR and AVE. As presented in Table 5, high internal consistency was observed in all constructs, with a CR of 0.89 to 0.94, which is meaningfully advanced than the least requirement of 0.70. All constructs were found to have high convergent validity, with a high AVE value of 0.57 to 0.67, which is significantly higher than the minimum requirement of 0.50. The high value of construct dependability and validity further validates that the latent hypotheses are reliable and valid, as they are captured through their respective dimensions in a consistent manner.

Table 5. Discriminant Validity (Fornell–Larcker Criterion)

CONSTRUCT	EPS	PAS	HRAP
EPS	0.81		
PAS	0.57	0.75	
HRAP	0.84	0.49	0.82

Note: Diagonal values represent √AVE.

4.6 Structural Model and Hypothesis Testing

Subsequent validation of the dimension model, the mechanical approach was estimated to scrutinize the hypothesized associations among the cover hypotheses. The standardized structural model is presented in Figure 2, and the unstandardized path constants are reported in Table 6. The consequences expression that PAS has a important optimistic effect on EPS (β = 0.608, p < .001), subsidiary**H1**. PAS also demonstrated a strong and note worthy optimistic effect on HRAP (β = 0.930, p < .001), supporting **H2**.

The strength of the PAS → HRAP relationship is conceptually significant. AI-enabled appraisal systems produce structured, high-quality performance data that can be directly used for HR analytics, performance monitoring, and strategic workforce decision-making. Therefore, the strong coefficient seen in this study indicates a close connection between AI-supported appraisal practices and the value organizations gain from improved HR analytics capabilities.

Figure 2: Structural Model with Standardized Path Coefficients

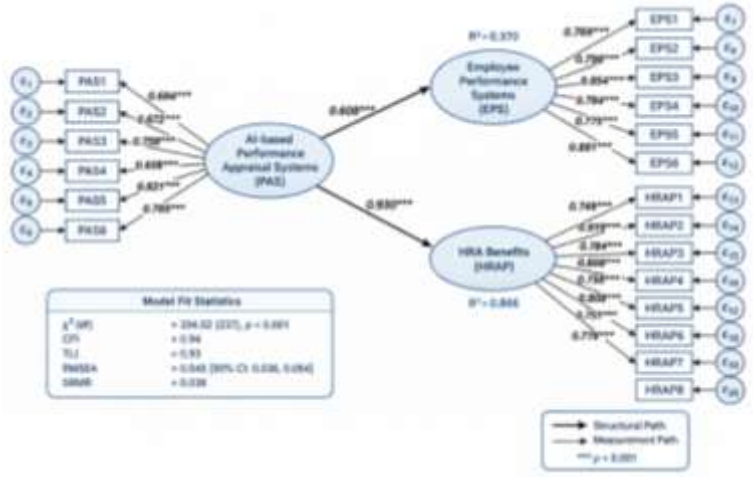

Table 6. SEM Results

HYPOTHESIS	PATH	B	SE	C.R.	P	RESULT
H1	PAS → EPS	0.507	0.052	9.779	< .001	Supported
H2	PAS → HRAP	0.801	0.056	14.324	< .001	Supported

4.7 Bootstrap Robustness Test

In order to establish the asset of the consequences obtained in the structural model, a bootstrap method of 5,000 resamples was carried out. The consequences are exposed in Table 7 below. The bootstrap constants closely resembled the original coefficients obtained in the structural model. This indicates that the results are

stable and not influenced by sampling error. The outcomes obtained from the bootstrap examination showed that the consistent coefficients for PAS – EPS were β = 0.53 and for PAS – HRAP were β = 0.86. The results showed significance at p < .001. This specifies that the relationships obtained in the structural model are robust and confirm the reliability of the relationships.

Table 7. Bootstrap Robustness Test

PATH	B	SE (BOOTSTRAP)	C.R.	P
PAS → EPS	0.53	0.053	9.996	< .001
PAS → HRAP	0.86	0.066	13.075	< .001

4.8 Explanatory Power of the Model

The descriptive control of the structural model was measuredbyR^2. As shown in Table 8, AI-based performance appraisal systems (PAS) explain 37.0% of the variance in employee performance systems (EPS), indicating a moderate level of explanatory power. PAS also accounts for 86.6% of the variance in HR analytics benefits (HRAP), reflecting substantial explanatory power. The strong level of explanatory power exhibited in HRAP also emphasizes the importance of AI-enabled appraisal systems in achieving HR analytics results. This is because, with AI-enabled appraisal systems, performance data is structured, continuous, and of high quality, thus offering a strong information base for analytics, monitoring, and decision-making in HR. This close relationship between digital appraisal systems and HR analytics capabilities also forms part of the rationale for the strong predictive power of PAS on HRAP.

Table 8. Coefficient of Determination (R^2)

CONSTRUCT	R^2	INTERPRETATION
EPS	0.370	Moderate
HRAP	0.866	Substantial

4.9 Effect Size

Effect size (f^2) was evaluated to control the significant influence of AI-based performance appraisal systems (PAS) to the endogenous constructs. As shown in Table 9, PAS exhibited a large effect on employee performance systems (EPS) (f^2 = 0.39) and an extremely large effect on HR analytics benefits (HRAP) (f^2 = 2.85), conferring to Cohen's (1988) guidelines. These findings suggest that PAS is a strong predictor within the structural model.

The large ES for HRAP underscores the significant impact of AI-enabled appraisal systems in achieving the benefits of HR analytics. The large ES for HRAP also underscores the significant information base that is provided by structured, continuous, and high-quality performance data from AI-enabled appraisal systems. The close conceptual relationship between HR analytics benefits and AI-enabled appraisal systems underscores the large ES for HRAP and the significant impact of PAS, a key technological driver in the model.

Table 9: Effect Size (f^2)

PATH	R^2	F^2	INTERPRETATION
PAS → EPS	0.28	0.39	Large
PAS → HRAP	0.74	2.85	Very large

4.10 Common Method Bias

Considering that all variables were measured through a single data collection method, the possibility of common method bias (CMB) in the data was assessed through two different procedures. First, Harman's single-factor test was active. The consequences revealed that the first factor, which was unrotated, explained 48.3% of the entire alteration. Since the explained variance by the first influence is less than 50%, it can be concluded that shared technique bias is not a main concern in the data. Secondly, the Common Latent Factor (CLF) method in the setting of the AMOS program was employed to further investigate the possibility of shared technique bias in the data. Comparing the standardized factor loadings of the original measurement model with those of the CLF-adjusted model revealed that the differences were less than 0.20. Since this is the recommended level for assessing common method bias, it can be concluded that mutual process prejudice

does not influence the measurement model in any significant manner. Thus, common method bias does not seem to have any impact on the results of the study.

Discussion

The purpose of this research is to inspect the role of AI-based PAS schemes in the development of employee performance systems (EPS) and the achievement of the perceived benefits of Human Resource Analytics (HRAP) in the setting of Kuwaiti organizations. The results of this research will offer empirical support for the role of performance appraisal systems as a key technological mediator of the association among presentation evaluation schemes and the strategic use of workforce data. The proposed structural model indicates that AI-based PAS systems have a significant influence on employee performance systems and HR analytics benefits.

5.1 Interpretation of the Results

5.1.1 AI-Based Appraisal Systems and Employee Performance Systems

The important and optimistic influence of PAS on EPS (β = 0.608) suggests that the application of AI-based appraisal technologies enhances the effectiveness of structural performance organization systems. This is also in line with the findings from prior research indicating that traditional appraisal systems often fail to provide effective performance management as the process is often subjective, criteria-based, and less frequent in nature (Pulakos, Hanson, & Arad, 2019). In contrast, the application of AI-based PAS ensures algorithm-based performance evaluations, continuous monitoring, and performance metrics, which enhance the accuracy, consistency, and transparency of performance management.

The present study's findings support the rising form of research indicating the potential welfares of applying HR technologies, including digital technologies and AI-based technologies, on the quality of performance management systems in organizations (Arora, Prakash, Mittal, & Singh, 2021; Arora &Upadhyay, 2024). The application of AI-based performance management systems helps organizations to systematically collect performance data, which is then used to provide effective performance evaluations. This is also in line with the broader HR analytics literature indicating the potential benefits of high-quality workforce data in decision-making processes within organizations (Huselid, 2018; Kimura, 2023). In addition to technical aspects, the present study's findings also provide important perceptual and behavioral implications. When performance evaluations are based on objective data and criteria, employees perceive the performance management system as transparent, credible, and just. As prior research has indicated, such perceptions help build trust in performance management processes, resulting in greater engagement and motivation levels as well (Erro-Garcés & Aramendia-Muneta, 2023). In this way, the implementation of AI-based PAS not only improves the technical functioning of performance management systems but also enhances the legitimacy of such performance management systems, which is an important aspect for effective performance management in both public and private sector organizations.

Overall, the aforementioned research highlights the role that AI-enabled appraisal systems play in the performance management process. The above research indicates that such systems play a two-fold role in the performance management process, improving the technical foundations as well as the psychological foundations of performance management systems. This is important as the implementation of AI-based PAS is vital for effective performance management systems.

5.1.2 AI-Based Appraisal Systems and HR Analytics Benefits

The results reveal a strong positive relationship between AI-based performance appraisal systems and HR analytics benefits (β = 0.930), underscoring the pivotal role of digital appraisal technologies in enabling analytics-driven HRM. This finding aligns with the broader literature emphasizing that the efficiency of HRAbe contingent fundamentally on the availability of high quality, structured, and continuous workforce data (Huselid, 2018; Kimura, 2023). The ability of AI-based PAS systems to deliver a incessant movement of standardized performance data is also significant for analytics tools, allowing organizations to identify patterns of performance and engage in predictive analysis. This is a function of the changing role of HRM systems, which is emphasized in recent research into the field. Here, HR systems are seen as a key infrastructure for decision-making based on evidence (Abellán-Sevilla& Ortiz-de-Urbina-Criado, 2023). The use of data collection and algorithmic evaluation tools by AI-based PAS systems provides greater transparency and accountability, which is a key function of the data analytics process.

The asset of the relationship between PAS and HRAP systems indicates that organizations utilizing AI-based appraisal systems have a greater capacity for achieving the strategic benefits of HR analytics. This includes better decision-making, a greater ability to align organizational outcomes and performance metrics, and a greater capacity for workforce planning and identifying key drivers of productivity throughout the employee lifecycle. This is a function of research into the role of analytics-based HRM systems for enhancing organizational outcomes and decision-making (Islam, Mamun, Afrin, Ali Quaosar, & Uddin, 2022; Kiran, Shanmugam, Raju, & Kanagasabapathy, 2022). Importantly, the significant explanatory power found in this study supports the idea that AI-based PAS are not just operational tools but form a foundational technological layer that enables the shift from traditional HR management to strategic, data-driven workforce management. This aligns with the expanding literature on digital HRM, which views AI-enabled systems as catalysts for turning HR functions into strategic decision-support mechanisms (Anand, Tyagi, Singh, Bansal, & Ankita, 2023; Arora & Upadhyay, 2024). In this context, AI-based appraisal systems act as both a source of high-quality workforce data and a catalyst for organizational readiness to adopt advanced analytics. Overall, the results confirm that AI-enabled appraisal schemes play an energetic part in unlocking the value of HR analytics by providing the structured data, transparency, and analytical capability required for evidence-based HRM. This positions AI-based PAS as a critical technological enabler for organizations seeking to leverage analytics for improved workforce performance and strategic decision-making.

5.2 Theoretical Implications

5.2.1 Public Sector Transformation in Kuwait

The research results offer significant theoretical implications for the process of digitalization in HRM in Kuwait's community subdivision. The public sector in the Gulf Cooperation Council (GCC) countries is generally known for its hierarchical organizational culture, bureaucratic practices, and organizational inflexibility—factors which have always limited the adoption of digital HR technologies (Achoui, 2009; Shayah& Sun, 2019). In such organizational contexts, the integration of AI-based HR systems is not only a matter of technological innovation but also a process of organizational and cultural transformation. The significant influence of AI-based performance appraisal systems revealed in this study implies that digital appraisal systems could be an important vehicle for the development of Kuwait's national modernization process. The Kuwait Vision 2035 highlights the implication of public sector efficiency, transparency, and human capital development in the national development process. The use of AI-based appraisal systems is a significant vehicle for the development of these ideals in Kuwait's public sector. The examination results of this study confirm the significance of digital HR systems in modern governance and public sector development (Abellán-Sevilla & Ortiz-de-Urbina-Criado, 2023). Furthermore, including private sector respondents provides more valuable insights. Private organizations in Kuwait and the wider GCC region tend to adopt digital technologies more quickly because of competitive pressures, organizational flexibility, and stronger incentives for innovation. The difference between sectors highlights the opportunity for cross-sector learning, where public institutions can learn from private-sector practices to accelerate the adoption of AI-enabled HR technologies. This supports broader digital transformation research, which shows that institutional benchmarking and knowledge transfer are key to overcoming public sector inertia and improving technological readiness (Alainati, Al-Hunaiyyan, Al-Duiaji, & Al-Hammad, 2024). Taken together, these findings enhance the theoretical sympathy of digital HRM in the community segment by showing that AI-based appraisal systems can serve as catalysts for institutional modernization. They not only improve performance management processes but also help reshape organizational norms around transparency, accountability, and data-driven decision-making.

5.2.2 Contributions to HR Analytics and Digital HRM Research

This research donates to the current form of information in the domain of HR analytics and digital HRM in a number of important ways. For one, it offers an empirical confirmation that AI-based performance appraisal systems represent an essential technological antecedent to the benefits of HR analytics. Although prior studies have established the strategic role of HR analytics in facilitating improved decision, workforce, and organizational performance (Huselid, 2018; Kimura, 2023), there has been less examination of the technological process that underlies the creation of high-quality workforce data that can support analytics. By demonstrating that AI-based performance appraisal systems significantly predict HR analytics benefits, this study identifies an essential infrastructural route to the development of analytics capabilities.

Second, the results extend the existing body of HR analytics literature by indicating that AI-based PAS not only facilitates the adoption of analytics but can also improve employee performance systems. This two-fold extension of existing knowledge reinforces the argument that digital technologies in HRM can have a optimistic influence on both operational and strategic decision-making (Arora &Upadhyay, 2024; Abellán-Sevilla& Ortiz-de-Urbina-Criado, 2023). The robust relationship between PAS and EPS revealed in this research is in line with other educations that highlight the part of digital technologies in achieving higher accuracy, equity, and developmental potential in performance management (Pulakos, Hanson, & Arad, 2019; Jyoti, Sharma, & Rani, 2020). The study links two bodies of performance management and HR analytics literatures by showing that AI-based appraisal systems provide a technological base for both areas.

Thirdly, the study also contributes to the limited body of investigation on the emphasis of HR analytics in the public sector and particularly in the GCC countries. The limited research that exists in this area has acknowledged the bureaucratic challenges and cultural barriers that public sector organizations may experience in implementing a digital transformation (Achoui, 2009; Shayah& Sun, 2019). The research on Kuwait's public sector is also important because of the dominance of the public sector in the national labor market and the modernization drive in the nation. The study is also important because of the limited research on HR analytics in the Middle East public sector environment.

Consequently, the research supports the argument that an AI-based appraisal system is not only an organizational tool but a digital infrastructure that facilitates the use of HR analytics. Indeed, the use of evidence-based HRM will become even more important in the near future, and the role of AI-based systems will become even more important in providing structured and continuous data for workforce management. This study considered an AI-based PAS an important part of the digital HRM framework and a key driver of organizational change based on analytics.

5.3 Practical Implications

The implications of the present research can be summarized in the following key practical implications for policymakers, HR professionals, and management in general for the advancement of digital transformation initiatives and the development of workforce management capabilities. Firstly, the present research findings highlight the need for the development of performance appraisal systems as a first step in the application of HR analytics. Since HR analytics is dependent on the availability of reliable workforce data, there is a need for performance evaluation systems to have the capacity to provide reliable performance information. Performance appraisal systems involving AI have this capacity by eliminating the need for subjective evaluation criteria. Secondly, these findings underscore the fact that, in order to successfully implement HR analytics, it is not just a technological challenge, but a challenge in terms of data quality as well. There are many organizations that implement analytics technologies, but they fail to address issues in their HR data systems. By using AI-based PAS, organizations can enhance the quality of their workforce data, which in turn helps in identifying trends in workforce performance, predicting upcoming staff wants, and aligning their HR plans with structural boxes. This argument is in line with other studies on digital HRM, which suggest that analytics capabilities are only as good as the data systems supporting them (Abellán-Sevilla& Ortiz-de-Urbina-Criado, 2023).

Third, the results have specific implications for public sector organizations in Kuwait. For instance, Kuwait has set development strategies like Kuwait Vision 2035, which focuses on modernizing institutions, enhancing transparency, and developing human capital. The use of AI in appraisal systems can support these strategies by enhancing the fairness and credibility of performance appraisals. This can be important in the community subdivision, considering the bureaucratic nature of human resource management in these institutions. Therefore, the emphasis of AI-based PAS can provide an opportunity to accelerate the modernization of public institutions. The inclusion of private sector participants in the study can provide important implications for public sector institutions in Kuwait. This is because private sector institutions in Kuwait can more easily adopt digital technologies in HRA compared to public sector institutions. This is because private sector institutions in Kuwait have more flexibility and face more pressure to compete with other institutions. Therefore, public sector institutions in Kuwait can learn from the private sector and adopt successful digital human resource management strategies. This can help them to avoid the tests related with the acceptance of HRA.

Boundaries and Future Research

This research provides interesting understandings on the facilitating influence of AI-based performance appraisal systems on employee performance systems and HR analytics benefits. However, some limitations of this study need to be considered. First, being a cross-sectional survey, some limitations exist on inferring causality. Although structural equation modelling was employed to validate associations, future educations can be showed to explore the evolution of AI-based HR technologies on employee performance systems. Second, survey-based data collection methods are prone to biases, such as social desirability bias and respondent biases. Although statistical controls were applied to address biases, future studies should incorporate organizational data to validate survey-based findings.

Third, a higher number of staffs from the secluded subdivision were surveyed, limiting the generalizability of findings to government organizations. Although a higher amount of workers from the private subdivision was plotted, future studies should be conducted exclusively on government employees to explore HR analytics adoption in bureaucratic settings. Lastly, a limited set of constructs was surveyed. Structural issues, such as management, structural readiness, organizational values, and employee technological competencies, also affect HR analytics benefits. Future studies can be conducted to expand the model to include a broader set of organizational factors to improvement a more holistic sympathetic of HR analytics adoption. Lastly, the context in which the research is set in Kuwait limits the generalizability of the results. As discussed earlier, institutional frameworks, the labour market, and governance styles differ from one country to another. Replicating the current research in other GCC states and different global environments would help determine the generalizability of the current findings. Further research can also be done to expand the model by including these variables. Moreover, the perceptions of users towards trust and privacy in AI-driven technologies have been seen to affect behaviour in similar domains (Al-Huwail, Al-Hunaiyyan, & Alameeri, 2025).

Conclusion

This research examined the role of AI-based performance appraisal systems in influencing employee performance management and attaining the welfares of HRA in the Kuwait organizational environment. The analysis of the information composed over an examination of employees and managers in both public and private sector organizations offers clear evidence of the importance of AI-based performance appraisal systems in achieving data-driven HR administration. The conclusions of this research revealed that AI-based assessment schemes play a significant role in improving both employee performance management systems and achieving the benefits of HR Analytics. Apart from this, this research gave the position of a digital HR transformation strategy in modernizing public sector organizations in general, and in the Kuwait organizational environment in particular. In this respect, this research tourist attractions the position of AI-based HR technologies in achieving evidence-based governance in public sector organizations in general, and in achieving national objectives in Kuwait in particular, where government agencies have traditionally relied on compliance-based HR management, with national objectives such as Kuwait Vision 2035 emphasizing the importance of improving institutional and human resource productivity in the country. Overall, the research kinds an important influence to the body of information in HR analytics by demonstrating the importance of AI-based appraisal systems in developing data infrastructure in analytics adoption. To policymakers and organizational leaders, investment in digital HR systems is essential in improving productivity in the workforce, organizational effectiveness, and economic growth in general. Although there are some avenues for future research as presented in the Limitations section, one thing is certain: exploration of AI-based HR systems is vital in determining the future of HR management in numerous shares of the world.

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