“The role of data analytics and business intelligence in enhancing the relationship between e-HRM practices and job satisfaction”

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THE ROLE OF DATA ANALYTICS AND BUSINESS INTELLIGENCE IN ENHANCING THE RELATIONSHIP BETWEEN E-HRM PRACTICES AND JOB SATISFACTION

Abstract

This study investigates the mediating and moderating roles of data analytics and business intelligence in the relationship between e-HRM practices and job satisfaction in Jordanian SMEs. The data were obtained from a survey of 368 employees through questionnaires; the data were analyzed via SPSS and PROCESS Macro v3.5. The results show that e-HRM practices, such as e-recruiting, e-training, e-compensation, and e-performance, have a high and significant positive impact on job satisfaction ($R^2 = 0.93$, $F = 1221.14$, $\beta = 0.613$, $p = 0.01$). More precisely, concerning the dimensions of e-HRM, both e-training ($\beta = 0.356$, $p < 0.001$) and e-performance ($\beta = 0.072$, $p = 0.02$) were positively related to job satisfaction, while e-compensation had no statistical effect. Data analytics mediated this relationship positively by increasing its impact by 0.33 and contributing to an R^2 of 0.875 ($p < 0.01$). Furthermore, data analytics had a direct influence on job satisfaction ($R^2 = 0.48$, $F = 333.93$, $\beta = 0.691$, $p < 0.001$). Business intelligence moderated e-HRM-job satisfaction relationships through the amplification of its effect by 0.40 and had an indirect R^2 of 0.875 ($p < 0.01$). These results have presented the critical roles that data analytics and business intelligence play in the optimization of HR practices and employee satisfaction. The study has shown the need for Jordanian SMEs to adopt these technologies to enhance their HR capabilities and workforce engagement.

Keywords e-human resource management practices, job satisfaction, data analytics, business intelligence, PROCESS Macro v3.5, small and medium enterprises, Jordan

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INTRODUCTION

In the modern business environment, characterized by increasing environmental and technological uncertainties, innovation becomes a key determinant of long-term sustainability in the organization (Khammadee, 2023). E-HRM practices can improve organizational performance and increase employee satisfaction (Alamgir et al., 2024). However, the bulk of the literature in this regard refers to large organizations, which is a considerable gap in knowledge about the effect that e-HRM practices have on SMEs – the backbone of the global economy (Awad & Mahmoud, 2024). SMEs, especially in developing countries, face unique challenges in the form of limited technological infrastructure and difficulties in adopting data-driven practices such as e-HRM and data analytics (Awad & Mahmoud, 2024; Awamleh et al., 2024; Hunitie et al., 2023).

While some studies have focused on the relation of e-HRM practices to job satisfaction in large organizations, only a few have investigated

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how advances in technology, such as data analytics and business intelligence, strengthen e-HRM practices – particularly in SMEs (Awamleh et al., 2024). This paper thus fills a significant gap in the literature, especially in developing economies where the integration of data analytics and business intelligence could significantly raise the efficiency and effectiveness of HR practices. There is a growing call for further research on how SMEs in these regions can leverage such technological tools in the enhancement of employee satisfaction and overall organizational performance (Azam et al., 2024; Bharadiya, 2023; Masum et al., 2020; Zehir et al., 2020).

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Integration of advanced technologies into e-HRM has been a widely discussed topic in recent years since organizations are trying to enhance employee satisfaction and organizational effectiveness. E-HRM is defined as the application of information technology to offer HR services, enhance HR processes, and improve communication within an organization (Zehir et al., 2020). With the digitization of HR practices, e-HRM has been one of the most important enablers in optimizing recruitment, training, performance, and employee engagement processes to develop cost-effective, transparent, and efficient HR functions (Khammadee, 2023). This is because e-HRM uses data-driven technologies such as artificial intelligence, machine learning, and analytics to increase its ability to offer better decision-making, increased organizational performance, and enhanced employee experiences (Zehir et al., 2020). However, there are several challenges impeding the adoption of e-HRM systems in SMEs. In reality, it is quite challenging for SMEs to implement e-HRM systems since both resources and finances are scarce (Azam et al., 2024). Examples of such barriers include inadequate technical infrastructure, unavailability of trained HR personnel, and resistance to change by both employees and management.

Job satisfaction is the level of contentment or satisfaction that employees hold toward their jobs, and it has often been viewed as a critical determinant for organizational success (Shamaileh et al., 2023). A plethora of research has shown that job satisfaction is directly or indirectly related to the most vital organizational outcomes, such as employee retention and motivation (Masum et al., 2020). The presence of satisfied employees is crucial for the maintenance of both commitment and productivity, especially in firms where employees hold more than one job and are not separated from management. Therefore, satisfied workers are going to be more engaged, productive, and loyal to the organization, which will contribute toward its sustainability and growth in the long run (Khan & Talib, 2023). It thus becomes apparent that HR technologies, through the relation between e-HRM practices and job satisfaction, may nurture job satisfaction by streamlining HR functions and by being capable of delivering tailored, time-sensitive responses to the needs of employees (Shamaileh et al., 2023). Some studies found that e-HRM systems create a more transparent and accountable HR environment; hence, an increase in the level of trust that employees have toward an organization also brings increases in job satisfaction (Masum et al., 2020). In other words, through e-HRM, an organization can easily access information dealing with HR matters regarding the employee, including performance appraisals, career advancement prospects, and training schemes. All these increase the level of experience for the employees. Though some benefits might be expected from introducing e-HRM, its effect on job satisfaction would depend upon various arguments of SMEs. Effective e-HRM implementation in SMEs faces very high barriers linked with resource constraints and poor technological infrastructure, as Khan and Talib (2023) and Shah et al. (2020) reported.

The role of data analytics in HR practices has taken considerable attention in recent years, mainly because it can transform raw data into meaningful insights to drive better decision-making and improve organizational performance (Yang et al., 2022; Shamout et al., 2022). Data analytics in HR involves the collection, analysis, and interpretation of data related to employees' performance, behavior, and satisfaction. Data analytics allows organizations to identify patterns and trends, make informed decisions, and conduct interventions targeting the improvement of employee outcomes (Shamaileh et al., 2023). For instance, data analytics could help identify training gaps, optimize recruitment strategies, and improve performance management processes. All these insights would go a long way in improving the general work climate, thus fostering greater satisfaction among employees (P.C. Mishra & P.K. Mishra, 2023). Data analytics can also be used to improve employee engagement by providing insights into what motivates employees and how organizations can better meet their needs (Yang et al., 2022). Analyzing employee feedback, along with performance data and other relevant information, allows organizations to develop more effective HR strategies that are aligned with both the expectations of the employees and the organizational goals. Nonetheless, in spite of the numerous advantages associated with using data analytics in HR, various challenges arise in the exploitation of these technologies by SMEs. The shortage of skilled employees and the limitations regarding financial resources and technological infrastructure mean that SMEs are usually hard-pressed to use data analytics completely (Subekti & Shaddiq, 2024). As a result, most SMEs fail to effectively integrate data analytics in their HR practices and thereby forgo the ability to enhance employee satisfaction using data-driven insights.

Business intelligence is defined as the use of technology and analytics in support of an organization's decision-making processes (Bharadiya, 2023). Such systems could provide pertinent details on various aspects of organizational performance, including employee satisfaction, by analyzing large volumes of data and recognizing trends and patterns. Business intelligence systems can be of great support to organizations in making informed decisions about HR strategies with regard to areas for improvement, job satisfaction trends, and employee retention. The integration of business intelligence with e-HRM systems, therefore, gives a holistic view of employee performance, engagement, and satisfaction, allowing HR professionals to develop targeted interventions to improve employee experience. While business intelligence has the potential to bring improved HR practices, there is a lack of empirical studies on its consequences in terms of job satisfaction, especially in SMEs (Al-Okaily et al., 2023). Few studies have examined how business intelligence could complement e-HRM practices to improve employee satisfaction, and the few available focus on large organizations rather than SMEs. It has been argued, however, that over-reliance on quantitative data – usually the focus of business intelligence – may cause the neglect of important qualitative factors, such as emotional and social needs, in the well-being of employees (Škudienė et al., 2020; Siradhana & Arora, 2024). This signals the need for a holistic approach toward equilibrium between quantitative and qualitative features in employee satisfaction.

While previous studies form the necessary groundwork to understand how e-HRM, data analytics, and business intelligence contribute to increased job satisfaction, one of the greatest constraints on the literature is the non-existence of a holistic, integrated framework of these elements under the specific lens of SMEs. This paper tries to fill this gap by exploring the relationship between e-HRM practices and job satisfaction with a special emphasis on the mediating role of data analytics and the moderating effect of business intelligence.

Integrating e-HRM, data analytics, and business intelligence into HR practices has the potential to improve employee satisfaction, engagement, and organizational performance, especially in SMEs. However, resource constraints, poor infrastructure, and resistance to change present significant challenges, limiting the full adoption and effectiveness of these technologies in smaller firms. Further research is needed to create a comprehensive framework that addresses these barriers and leverages the benefits of these technologies to enhance job satisfaction.

The purpose is to explore the relationship between e-HRM practices and job satisfaction in Jordanian SMEs considering the mediating role of data analytics and the moderating influence of business intelligence in providing an integrated framework that would improve HR practices, hence increasing job satisfaction in SMEs.

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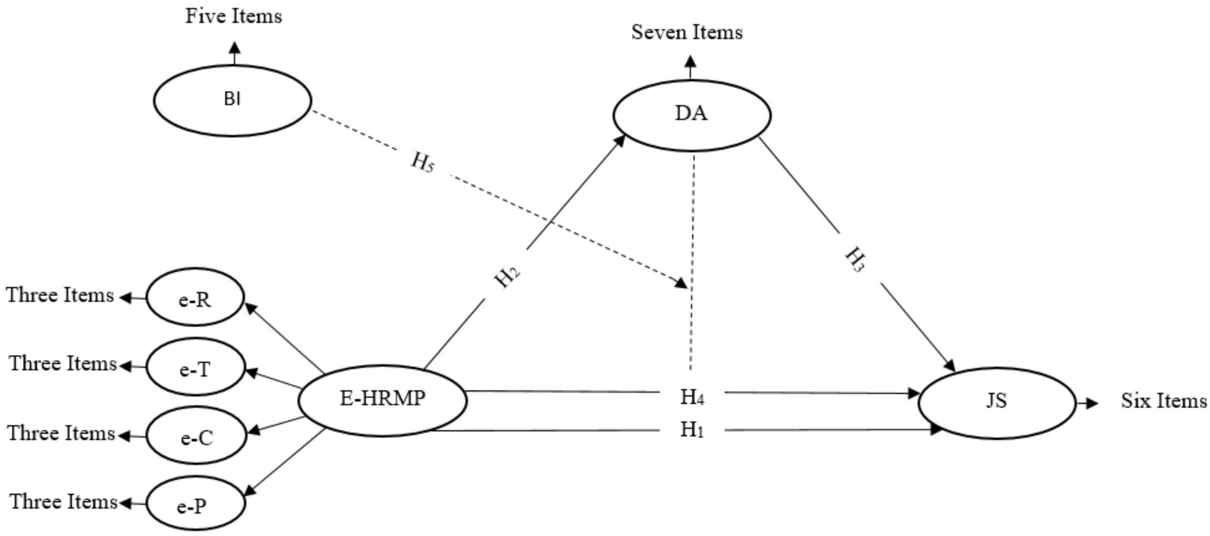

Note: E-HRMP = electronic human resource management practices (e-R = e-Recruitment, e-T = e-Training, e-C = e-Compensation, e-P = e-Performance); JS = job satisfaction; DA = data analytics; and BI = business intelligence.

Figure 1. Conceptual research model

From this basis, the following hypotheses are set forth:

H1: *E-HRM practices positively affect job satisfaction in Jordanian SMEs.*

H2: *E-HRM practices positively affect data analytics in Jordanian SMEs.*

H3: *Data analytics positively affects job satisfaction in Jordanian SMEs.*

H4: *E-HRM practices with data analytics as a mediator positively affect job satisfaction in Jordanian SMEs.*

H5: *The moderating variable of business intelligence between e-HRM practices and data analytics positively affects job satisfaction in Jordanian SMEs.*

2. METHODOLOGY

This study adopts a cross-sectional quantitative design to research e-HRM practices and their relation to job satisfaction, data analytics, and business intelligence in SMEs in Jordan. Stratified random sampling is applied to sufficiently represent the sub-samples for analysis in each of the six sectors: technology, manufacturing, health, financial services, retail, and education. A survey was sent to a sample of 368 administrative personnel from 33 companies listed by the Ministry of Industry and Trade in Amman.

The survey questionnaire (Appendix A) was first pilot-tested on 36 employees, ensuring the clarity and reliability of the research instrument. A five-point Likert scale was used to measure e-HRM practices, which included e-recruitment, e-training, e-compensation, and e-performance management, together with job satisfaction, data analytics, and business intelligence. These dimensions are adopted from previous studies about the core function of e-HRM (Azam et al., 2024; Khammadee, 2023). Job satisfaction is measured through a six-item scale that includes indicators of the work environment, growth opportunities, remuneration packages, and work-life balance adapted from the literature (Azam et al., 2024; Masum et al., 2020).

These seven indicators have been used in measuring the role of data analytics in improving HR decision-making, identification of performance indicators, and optimization of HR practices based on predictive capabilities (Azam et al., 2024; Nasar et al., 2021). Business intelligence is measured through five items: its usage in decision-making, analyzing performance, and strategic forecasting about contribution toward HR effectiveness and organizational adaptability (Awamleh & Bustami, 2022; Bharadiya, 2023). This study used SPSS software with the help of PROCESS Macro v3.5 to validate the preliminary procedures and test the research hypotheses.

Table 1 shows the sample distribution by sector: IT, manufacturing, renewable energy, financial services, education, and healthcare, among others. This diversity reflects the digitization in HRM and its impact on both the employee experience and organizational performance.

As shown in Table 2, male respondents outnumbered female respondents, with a response rate of 62% for males and 38% for females. The majority of participants held a diploma or bachelor's degree (95%), while only a small percentage had postgraduate qualifications (5%). This suggests a preference for lower educational qualifications within Jordanian SMEs, as well as a lack of focus on hiring individuals with advanced degrees. Additionally, the majority of the companies surveyed had less than 10 years of experience, indicating a degree of instability within the institutions. Furthermore, data analytics and business intelligence systems were relatively new to most companies, with the majority having used these technologies for less than two years. The study emphasizes the importance of focusing on the SME sector, highlighting the need for increased research, development, and investment to strengthen this vital part of the Jordanian economy.

3. RESULTS

Table 3 shows twelve items for the independent variable (e-HRMP) with high reliability (α = 0.92); six items for the dependent variable (job

Table 1. Detailed sample distribution by company size

Company	Industry	Sample	Company	Industry	Sample
ABC Solutions	IT	20	EcoStyle Fashion	Fashion	12
Jordan Textiles	Manufacturing	19	AutoMotive Express	Automotive	10
Smart Logistics	Transportation	18	PrintWell Press	Printing	10
Future Finance	Financial Services	18	Digital Marketing Hub	Marketing	10
Green Energy	Renewable Energy	17	SmartPay FinTech	FinTech	9
Tech Innovate	Technology	17	SafeDrive Transport	Transportation	8
Amman Retail	Retail	17	Furniture Makers	Manufacturing	8
HealthFirst Clinics	Healthcare	15	Handicrafts	Artisan Products	7
FastServe Catering	Hospitality	15	BlueSky Airlines	Aviation	6
EduProgress	Education	14	GrandStay Hotels	Hospitality	5
SecureTech	Cybersecurity	14	Edutec Smart Learning	Education	5
Medilife	Healthcare	14	HomeCare Medical	Healthcare	4
AgroSolutions	Agriculture	13	Software Solutions	IT	4
HealthyLiving Organic	Food & Beverage	13	Prestige Legal Services	Legal	3
BuildSmart	Construction	13	Alkarmel Fresh	Supermarket	3
TravelEase Tourism	Tourism	12	Firefly Burger	Fast Food	3
SolarTech Innovations	Renewable Energy	12			
Total		368			368

Table 2. Respondent characteristics

Demographic	Category	Frequency	Percentage
Gender	Male	228	62.0%
	Female	140	38.0%
Educational Level	Diploma/Bachelor's	350	95.0%
	Postgraduate	18	5.0%
Years of Experience	Less than 10 years	290	78.8%
	More than 10 years	78	21.2%
Data Analytics Adoption	Less than 2 years	350	95.0%
	More than 2 years	18	5.0%
Sample Size		368	100%

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Table 3. Validity and reliability of the study items

Variable	IV					DV	M	W	∑
Items	**e-R**	**e-T**	**e-C**	**e-P**	**e-HRMP**	**JS**	**DA**	**BI**	**Total**
N. of item	3	3	3	3	12	6	7	5	30
Alpha (α)	0.90	0.79	0.81	0.72	0.92	0.91	0.89	0.91	0.96
Skewness	–0.84	–0.86	–0.70	–1.15	–0.93	–0.92	–0.82	–1.19	–0.93
Kurtosis	0.74	1.14	0.51	2.30	1.78	1.03	1.26	2.36	1.40
VIF	3.74	4.42	2.40	1.88	3.11	–	–	–	–
Tolerance	0.27	0.19	0.42	0.54	0.36	–	–	–	–
Mean	3.61	3.71	3.57	3.94	3.71	3.65	3.66	4.04	3.74
SD	0.86	0.77	0.82	0.73	0.69	0.79	0.73	0.72	0.76

Note: Alpha (α) ≥ 70, Skewness-Kurtosis ±2.58, VIF < 5, Mean "High 5 ≥ 3.67; medium 366 ≥ 2.34". E-HRMP = electronic human resource management practices (e-R = e-Recruitment, e-T = e-Training, e-C = e-Compensation, e-P = e-Performance); JS = job satisfaction; DA = data analytics; and BI = business intelligence.

satisfaction) with reliability of α = 0.91; seven items for the mediating variable (data analytics) with reliability of α = 0.89; and five items for the moderator variable (business intelligence) with reliability of α = 0.91; with a reliability score of α = 0.96 for all variables (Hair et al., 2014). The study also met the condition of normal distribution in the Skewness-Kurtosis test for normal distribution, which achieved a variance of degrees between ±2.58. In addition, the VIF test proved the independence of the independent variables to a degree (VIF < 5). Finally, descriptive analyses proved the degree of response of the study sample with high scores for both e-HRMP (3.71) and business intelligence (4.04). Medium scores for both job satisfaction (3.65) and data analysis (3.66) according to the viewpoints of the study community members and according to the five-point Likert scale (Hair et al., 2014; Sekaran, 2016).

Table 4 shows the internal validity of the Bivariate Pearson Correlation Test, which was proven by the independence of the study variables. Furthermore, the correlation ($R > 20$) indicated the absence of a weak correlation, as well as $R < 90$, which confirms the absence of data interference in the study variables (Hair et al., 2014).

Table 5 examines the direct effects. For Hypothesis 1, the R-square showed that job satisfaction is explained by e-HRM practices (0.93). The study proved the positive effects of the direct relationship between e-HRMP (e-recruitment, e-training, and e-performance) on job satisfaction in Jordanian SMEs at $p \leq 0.05$, except for e-compensation at $p \leq 0.05$ (Hair et al., 2014). For Hypothesis 2, the R-square showed that job satisfaction is explained by e-HRM practices (0.93). The study proved the positive effects of the direct relationship between e-HRMP (e-recruitment, e-training, e-compensation, and e-performance) on the mediator variable of data analytics in Jordanian SMEs ($p \leq 0.01$) (Hair et al., 2014). For Hypothesis 3, the R-square showed that job satisfaction is explained by data analytics (0.48). The study results also showed that the mediating variable of data analytics has a positive impact on job satisfaction in Jordanian SMEs ($p \leq 0.01$) (Hair et al., 2014).

Table 4. Internal validity of Pearson correlation

Items	e-R	e-T	e-C	e-P	e-HRMP	JS	DA	BI
e-R	1.00							
e-T	0.855**	1.00						
e-C	0.593**	0.728**	1.00					
e-P	0.529**	0.633**	0.636**	1.00				
e-HRMP	0.870**	0.833**	0.856**	0.797**	1.00			
JS	0.842**	0.809**	0.646**	0.608**	0.804**	1.00		
DA	0.603**	0.762**	0.842**	0.771**	0.887**	0.691**	1.00	
BI	0.490**	0.590**	0.565**	0.831**	0.706**	0.611**	0.678**	1.00

Note: ** Correlation at 0.01, sample = 368. E-HRMP = electronic human resource management practices (e-R = e-Recruitment, e-T = e-Training, e-C = e-Compensation, e-P = e-Performance); JS = job satisfaction; DA = data analytics; and BI = business intelligence.

Table 5. Direct effects using multiple leaner regression

Effect	R-sq.	F	Beta	t	Sig.
e-R and JS	0.93	1221.14	.613	22.964	.010
e-T and JS			.356	11.075	.000
e-C and JS			–.022	–1.025	.306
e-P and JS			.072	3.796	.020
Hypothesis 1: E-HRM practices positively affect job satisfaction in Jordanian SMEs.					
Effect	**R-sq.**	**F**	**Beta**	**t**	**Sig.**
e-R and DA	0.94	1451.13	–.090	–3.649	.000
e-T and DA			.145	4.905	.000
e-C and DA			.717	36.326	.000
e-P and DA			.271	15.557	.000
Hypothesis 2: E-HRM practices positively affect data analytics in Jordanian SMEs.					
Effect	R-sq.	F	Beta	t	Sig.
DA and JS	0.48	333.93	.691	18.274	.000
Hypothesis 3: Data analytics positively affects job satisfaction in Jordanian SMEs.					

Note: E-HRMP = electronic human resource management practices (e-R = e-Recruitment, e-T = e-Training, e-C = e-Compensation, and e-P = e-Performance); JS = job satisfaction; DA = data analytics; and BI = business intelligence.

Table 6 examines the indirect effects. For Hypothesis 4, the direct relationship was characterized by an impact reach of 0.21. The *R*-square was interpreted as 0.787, statistically significant at $p \leq 0.05$. In addition, the relationship between LLCI and ULCI did not meet at zero. In contrast, the indirect relationship was characterized by an impact reach of 0.54, which increased by 0.33. The *R*-square was interpreted as 0.875, statistically significant at $p \leq 0.01$. In addition, the relationship between LLCI and ULCI did not meet at zero (Hayes, 2018).

For Hypothesis 5, the direct relationship was characterized by an impact reach of 0.21. The *R*-square was interpreted as 0.787, statistically significant at $p \leq 0.05$. In addition, the relationship between LLCI and ULCI did not meet zero. In contrast, the indirect relationship was characterized by an impact reach of 0.61, which increased by 0.40. The *R*-square was interpreted as 0.875, statistically significant at $p \leq 0.01$. In addition, the relationship between LLCI and ULCI did not meet zero (Hayes, 2018).

4. DISCUSSION

This paper examined the impact of e-HRM practices, data analytics, and business intelligence on job satisfaction in SMEs (Figure 2). The findings confirm the hypothesis that e-HRM practices are linked with higher levels of job satisfaction, which concurs with studies showing how efficient e-HRM is in improving administrative practices (Azam et al., 2024). However, some studies suggest that automation may diminish the human element in organizations, affecting job satisfaction (Noor et al., 2024; Shamaileh et al., 2023). The lack of infrastructure in SMEs further limits the effective-

Table 6. Indirect effects using PROCESS Macro v3.5

Mediator effect	Effect	R-sq.	F	t	p	LLCI	ULCI
Direct effect	0.21	0.787	1355.55	34.03	0.03*	0.482	0.664
Indirect effect	0.54	0.875	1274.18	36.82	0.00**	0.731	0.316
Hypothesis 4: E-HRM practices with data analytics as a mediator positively affect job satisfaction in Jordanian SMEs.							
Moderation effect	Effect	R-sq.	F	t	p	LLCI	ULCI
Direct effect	0.21	0.787	1355.55	34.03	0.03*	0.482	0.664
Indirect effect	0.61	0.875	634.51	32.31	0.00**	0.727	0.324
Hypothesis 5: The moderating variable of business intelligence between e-HRM practices and data analytics positively affects job satisfaction in Jordanian SMEs.							

Note: E-HRMP = electronic human resource management practices; JS = job satisfaction; DA = data analytics; and BI = business intelligence. ** Correlation at 0.01; * Correlation at 0.05.

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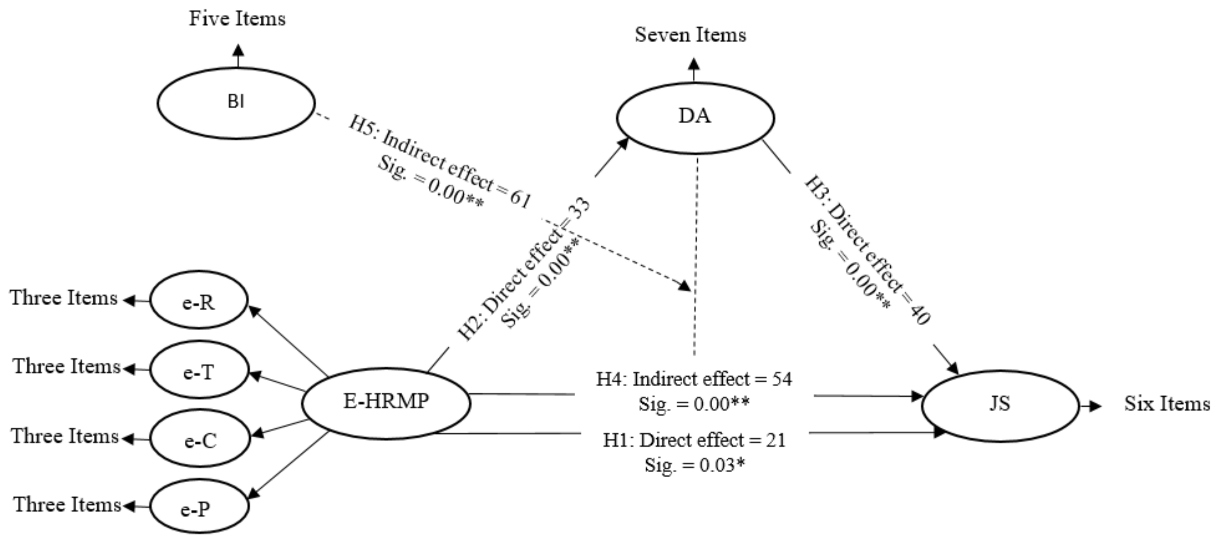

Note: E-HRMP = electronic human resource management practices (e-R = e-Recruitment, e-T = e-Training, e-C = e-Compensation, e-P = e-Performance); JS = job satisfaction; DA = data analytics; and BI = business intelligence. ** Correlation at 0.01; * Correlation at 0.05.

Figure 2. Structural model

ness of e-HRM practices in improving job satisfaction (Shah et al., 2020).

The study confirms that e-HRM practices enhance the ability to collect and analyze work-related data, supporting findings that e-HRM can provide valuable data for strategic HR practices (Shamout et al., 2022). However, the lack of expertise and resources in many organizations hampers the effective use of data analytics, limiting its strategic potential (Škudienė et al., 2020; Verma et al., 2021; Yadav et al., 2024). The study, therefore, advocates that SMEs have to invest in such resources to maximize the full potential of e-HRM coupled with data analytics.

This also concerns the positive impact of data analytics on job satisfaction, whereby the findings confirm the argument by Yadav et al. (2024) and Yang et al. (2022) on how data analytics facilitates improvements in HR practices and, subsequently, increases job satisfaction. By contrast, factors such as the main emphasis on quantitative data and the exclusion of human elements from HR planning processes are negatively linked to job satisfaction. Data incompleteness decreases data analytics performance, according to Khammadee (2023) and Verma et al. (2021).

The study also found that the integration of e-HRM and data analytics enhances job satisfaction, supporting the literature on the value of combined systems in improving organizational performance (Al-Okaily et al., 2023; Bharadiya, 2023). SMEs, however, face challenges in using the integrated systems effectively since there are limitations in resources and expertise (Awad & Mahmoud, 2024; Almasradi et al., 2022; Alarabiat et al., 2025). Future research could investigate how SMEs can address these challenges.

Finally, business intelligence has been proven to mediate data analytics and strengthen the relationship between e-HRM practice and job satisfaction. It confirms the finding of other studies that business intelligence plays an essential role in developing better capabilities of HR decision-making in an organization (Al-Okaily et al., 2023; Huang et al., 2023). On the other hand, some of the issues in the absence of support for HR professionals to utilize this tool hinder its effectiveness (Bharadiya, 2023). Further research is needed to show how best organizations can support HR personnel in making use of such business intelligence tools.

Academically, the study provides a comprehensive understanding of e-administrative practices in the HR department and the nature of data analytics and business intelligence in supporting job satisfaction in SMEs (Waheed et al., 2020; Yadav et al., 2024). The study also emphasized the importance of taking into account the indirect effects of data analytics and business intelligence in supporting HR management practices in improving institutional performance, which draws the direction of future studies to focus on the subject of study in different directions (Yang et al., 2022; Yona & Meilani, 2024). From a practical perspective, the study showed how to improve SMEs' operations in terms of job satisfaction by using e-HRM practices and supporting management with expertise that enables them to effectively employ data analytics and business intelligence techniques in their operations (Škudienė et al., 2020; Verma et al., 2021). This study also offers firms valuable information on how they can adopt effective practices in e-HRM, contributing to the reduction of costs and enhancement of productivity (Yadav et al., 2024; Huang et al., 2023). Lastly, recommendations on how to apply smart business intelligence systems in the analysis of data emanating from e-practices are addressed, which come out in the form of information and visualization formed in the form of reports contributing toward effective and accurate future strategies (Subekti & Shaddiq, 2024; Zehir et al., 2020).

CONCLUSION

This study sought to explore the relationship between e-human resource management practices and job satisfaction, including the mediating and moderating roles of data analytics and business intelligence in Jordanian SMEs. The results indicated that e-HRM practices are positively related to job satisfaction; data analytics also played a significant mediating role in enhancing this relation. Additionally, business intelligence was found to moderate the relationship between e-HRM practices and job satisfaction, thereby enhancing decision-making and performance management.

These findings indicate that when integrated with e-HRM practices, data analytics and business intelligence increase job satisfaction and contribute to the general effectiveness of HR functions within SMEs. This paper calls for the exploration of ways through which advancements in technology will yield benefits accruing both in the enhanced performance of the HR processes and the well-being of the employees themselves. Hence, the use of data-driven HR practices in organizations should be focused on to help achieve higher job satisfaction and organizational performance.

Some of the limitations identified in this study are a lack of appropriate infrastructure, expertise, and resources in SMEs. These deficiencies point to the need for further investigation into how SMEs could overcome such barriers. Further studies should dwell on specific challenges SMEs face in adopting e-HRM and data analytics, exploring the role of human factors in optimizing these technologies, and proposing strategies for support so that HR professionals may use these tools effectively. Furthermore, future research might address the long-term consequences of these technologies on organizational culture and employee well-being and thus provide a holistic understanding of the benefits and limitations of such technologies.

AUTHOR CONTRIBUTIONS

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REFERENCES

1. Alamgir, M., Ali, M., & Ahmed, Z. (2024). Examining the impact of organizational culture and e-human resource practices on employee commitment and satisfaction. *Annals of Human and Social Sciences, 5*(3), 63-74. Retrieved from https://ojs.ahss.org.pk/journal/article/view/733
2. Almasradi, R. B., Al-Otaibi, S. A., Akram, M. W., Farheen, N., & Mahar, S. (2022). Mediating role of information and communication technology between e-HRM and organizational performance in Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 16*(4), 660-681. Retrieved from https://hdl.handle.net/10419/268840
3. Al-Okaily, A., Teoh, A. P., & Al-Okaily, M. (2023). Evaluation of data analytics-oriented business intelligence technology effectiveness: An enterprise-level analysis. *Business Process Management Journal, 29*(3), 777-800. https://doi.org/10.1108/BPMJ-10-2022-0546
4. Awad, H. A., & Mahmoud, Y. (2024). Impact of business intelligence (BI) on e-HRM practices within NGOs in Jordan. *Quality: Access to Success, 25*(200), 10-20. https://doi.org/10.47750/qas/25.200.02
5. Awamleh, F. T., & Bustami, A. N. (2022). Investigate the mediating role of business a intelligence on the relationship between critical success factors for business intelligence and strategic intelligence. *Journal of Intelligence Studies in Business, 12*(2), 66-79. https://doi.org/10.37380/jisib.v12i2
6. Awamleh, F. T., Alarabiat, Y. A., & Bustami, A. N. (2024). Enhancing sustainable development through international performance indicators: The role of business intelligence techniques. *Challenges in Sustainability, 12*(3), 203-218. https://doi.org/10.56578/cis120304
7. Awamleh, F. T., Bustami, A. N., Alarabiat, Y. A., & Sultan, A. (2024). Data-driven decision-making under uncertainty: Investigating OLAP's mediating role to leverage business intelligence analytics for entrepreneurship. *Journal of System and Management Sciences, 14*(8). https://doi.org/10.33168/JSMS.2024.0822
8. Azam, S., Thevanes, N., & Arulrajah, A. (2024). How do E-HRM practices affect environmental performance? The role of E-HRM performance and job satisfaction. *Proceedings of 20th International Conference on Business Management (ICBM)*. Retrieved from http://dr.lib.sjp.ac.lk/handle/123456789/13019
9. Alarabiat, Y. A., Alayed, H. M., & Awamleh, F. T. (2025). Green Innovation Strategies in Achieving Corporate Sustainable Performance Through Big Data Analytics. *Planning, 20*(2), 751-759. https://doi.org/10.18280/ijsdp.200224
10. Bharadiya, J. P. (2023). A comparative study of business intelligence and artificial intelligence with big data analytics. *American Journal of Artificial Intelligence, 7*(1), 24-30. http://doi.org/10.11648/j.ajai.20230701.14
11. Hair, Jr F. J., Sarstedt, M., Hopkins, L., & Kuppelwieser, G. V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review, 26*(2), 106-121. https://doi.org/10.1108/EBR-10-2013-0128
12. Hayes, A. F. (2018). Partial, conditional, and moderated moderated mediation: Quantification, inference, and interpretation. *Communication Monographs, 85*(1), 4-40. https://doi.org/10.1080/03637751.2017.1352100
13. Huang, X., Yang, F., Zheng, J., Feng, C., & Zhang, L. (2023). Personalized human resource management via HR analytics and artificial intelligence: Theory and implications. *Asia Pacific Management Review, 28*(4), 598-610. https://doi.org/10.1016/j.apmrv.2023.04.004
14. Hunitie, M. F. A., Hamadneh, S., Al-kharabsheh, S. A., Alzoubi, A. B., Abufares, M. O. M., & Al-Hawary, S. I. S. (2023). The mediating role of employee engagement on the relationship between electronic human resource management and organizational effectiveness. *Information Science Letters, 12*(3), 1307-1318. http://dx.doi.org/10.18576/isl/120321
15. Khammadee, P. (2023). The relationship between E-HRM practices and organizational performance: The mediating role of organizational agility and sustainable competitive advantage. *Asian Administration & Management Review, 6*(1). http://dx.doi.org/10.2139/ssrn.4546511
16. Khan, K. A., & Talib, N. (2023). Relating e-HRM practices with transformational e-HRM outcomes: The mediating role of proximal outcomes. *Journal of Workplace Behavior, 4*(2), 1-25. https://doi.org/10.70580/jwb.04.02.0196
17. Masum, A. K., Mamun, A. M. A., Islam, M. S., & Beh, L.-S. (2020). The impact of eHRM practice on organizational performance: Investigating the effect of job satisfaction of HRM professionals. *Journal of Computer Science, 16*(7), 983-1000. https://doi.org/10.3844/jcssp.2020.983.1000

18. Mishra, P. C., & Mishra, P. K. (2023). Challenges and opportunities of big data analytics for human resource management in mining and metal industries. *Journal of Mines, Metals & Fuels, 71*(10), 1747-1753. https://doi.org/10.18311/jmmf/2023/35858
19. Nasar, N., Ray, S., Umer, S., & Mohan Pandey, H. (2021). Design and data analytics of electronic human resource management activities through Internet of Things in an organization. *Software: Practice and Experience, 51*(12), 2411-2427. https://doi.org/10.1002/spe.2817
20. Noor, N., Rehman, S., Shah, M. A., & Altaf, R. (2024). E-HRM practices and organizational success in IT sector: Mediating role of perceived usefulness. *Review in Business and Economics, 4*(1), 223-236. Retrieved from https://rbe.uskt.edu.pk/papers/RBE-4-1-0016.pdf
21. Sekaran, U. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
22. Shah, N., Michael, F., & Chalu, H. (2020). Conceptualizing challenges to electronic human resource management (e-HRM) adoption: A case of small and medium enterprises (SMEs) in Tanzania. *Asian Journal of Business and Management, 8*(4). https://doi.org/10.24203/ajbm.v8i4.6066
23. Shamaileh, N., Eldahamsheh, M., Alneimat, S., Istaiteyeh, R., Azzam, I., & Al-Hawary, S. (2023). The effects of smart human resources 4.0 on employee job effectiveness: The mediating role of employee job satisfaction. *International Journal of Data and Network Science, 7*(2), 801-808. https://doi.org/10.5267/j.ijdns.2023.1.009
24. Shamout, M., Elayan, M., Rawashdeh, A., Kurdi, B., & Alshurideh, M. (2022). E-HRM practices and sustainable competitive advantage from HR practitioner's perspective: A mediated moderation analysis. *International Journal of Data and Network Science, 6*(1), 165-178. https://doi.org/10.5267/j.ijdns.2021.9.011
25. Siradhana, N. K., & Arora, R. G. (2024). Examining the influence of artificial intelligence implementation in HRM practices using TOE model. *Vision*. https://doi.org/10.1177/09722629241231458
26. Škudienė, V., Vezeliene, G., & Stangej, O. (2020). Transforming human resource management: Innovative e-HRM value creation for multinational companies. In V. Škudienė, J. Li-Ying, & F. Bernhard (Eds.), *Innovation Management* (pp. 140-166). Edward Elgar Publishing. https://doi.org/10.4337/9781789909814.00021
27. Subekti, W., & Shaddiq, S. (2024). Increasing employee work effectiveness through the implementation of E-HRM in companies. *Journal of Management Branding, 1*(1), 59-69. https://doi.org/10.71326/jmb.v1i1.20
28. Verma, S., Singh, V., & Bhattacharyya, S. S. (2021). Do big data-driven HR practices improve HR service quality and innovation competency of SMEs. *International Journal of Organizational Analysis, 29*(4), 950-973. https://doi.org/10.1108/IJOA-04-2020-2128
29. Waheed, A., Xiaoming, M., Waheed, S., Ahmad, N., & Tian-tian, S. (2020). E-HRM implementation, adoption and its predictors: A case of small and medium enterprises of Pakistan. *International Journal of Information Technology and Management, 19*(2-3), 162-180. https://doi.org/10.1504/IJITM.2020.106217
30. Yadav, R. S., Balasubramanian, G., & Dash, S. S. (2024). Role of e-HRM strength and job stress on turnover intention among employees: Mediating effect of concern for information privacy. *Global Knowledge, Memory and Communication*. https://doi.org/10.1108/GKMC-09-2023-0338
31. Yang, J., Xiu, P., Sun, L., Ying, L., & Muthu, B. (2022). Social media data analytics for business decision making system to competitive analysis. *Information Processing & Management, 59*(1), Article 102751. https://doi.org/10.1016/j.ipm.2021.102751
32. Yona, F., & Meilani, Y. C. F. P. (2024). The impact of the HRIS usage in human resource management practice, employee innovation, and job satisfaction to increase employee performance. *Quantitative Economics and Management Studies, 5*(4), 815-831. https://doi.org/10.35877/454RI.qems2716
33. Zehir, C., Karaboğa, T., & Başar, D. (2020). The transformation of human resource management and its impact on overall business performance: Big data analytics and AI technologies in strategic HRM. In U. Hacioglu (Ed.), *Digital Business Strategies in Blockchain Ecosystems: Transformational Design and Future of Global Business* (pp. 265-279). Cham: Springer. https://doi.org/10.1007/978-3-030-29739-8_12

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APPENDIX A

Table A1. Questionnaire

Variable		Indicator	References
E-Recruitment	E-HRM Practices	E-R1: Our organization uses digital media for recruitment.	Azam et al. (2024), Khammadee (2023)
		E-R2: E-recruitment attracts a larger pool of qualified candidates.	
		E-R3: The process of e-recruitment is faster and more efficient compared to traditional methods.	
E-Training		E-T1: Our organization offers e-learning opportunities.	
		E-T2: Employees can easily access e-training programs online.	
E-Compensation		E-T3: E-training has enhanced learning.	
		E-C1: Compensation and benefits are offered digitally.	
E-Performance		E-T2: E-compensation enhances the accuracy of salary administration.	
		E-T3: The e-compensation system is user-friendly and accessible.	
		E-P1: Performance is evaluated through an electronic channel.	
		E-P2: E-performance facilitates setting measurable performance targets.	
		E-P3: E-performance feedback is timely and constructive.	
Job Satisfaction		JS1: I am satisfied with my work environment.	Azam et al. (2024), Masum et al. (2020)
		JS2: I feel valued and appreciated at work	
		JS3: My job offers growth opportunities	
		JS4: My compensation is fair and adequate	
		JS5: I am satisfied with my work-life balance	
		JS6: I find my job rewarding and fulfilling	
Data Analytics		DA1: Data analytics supports decision making	Azam et al. (2024), Nasar et al. (2021)
		DA2: Data analytics helps to identify key performance indicators.	
		DA3: Data analytics optimizes employee performance.	
		DA4: Data analytics guides strategic planning.	
		DA5: We analyze the data of our employees to come up with ways through which HR can be improved.	
		DA6: Data analytics identifies skills gaps.	
		DA7: Predictive analytics forecast future HR needs.	
Business Intelligence		BI1: Business intelligence tools enhance HR decision-making.	Awamleh and Bustami (2022), Bharadiya (2023)
		BI2: Business intelligence provides insight to enhance employee engagement.	
		BI3: Business intelligence analyzes performance and identifies areas of improvement.	
		BI4: Business intelligence aids in predicting future trends in HR.	
		BI5: Business intelligence allows us to respond better against changes.	