The Impact of Human Resource (HR) Analytics on Employee Retention: The Mediated Moderated Role of Employee Engagement and the Organisational Culture in Egypt

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Abstract

The current study investigates HR analytics on employee retention within Egyptian firms through an examination of the mediating role of employee

engagement and the moderating role of organizational culture. A quantitative inquiry methodology using survey data from human resource (HR) practitioners in various industries in Egypt was employed. The study used structural equation modeling to analyse the relationships between HR analytics, culture, and retention with mediation through engagement. Results of the study show that HR analytics indeed improves employee retention. Employee engagement emerges as a significant mediator. On the other hand, the moderating effect of organisational culture is not statistically significant. Such results lead to recommendations that combine HR analytics with engagement-based strategies for achieving more sustainable workforces. The paper is set up for strategic use by HR managers and business leaders whose mindful long-term commitments can be further cultivated through data-driven decisions.

1. Introduction

HR analytics is increasingly recognised in Egypt as a pivotal tool for addressing the prevalent challenges of employee retention faced by local businesses. This study explores the strategic application of HR analytics within the Egyptian context, aiming to elucidate its potential to enhance retention through the active mediation of employee engagement and the moderation provided by organisational culture. The research builds on the premise that understanding and effectively managing workforce dynamics through data can lead to significant competitive advantages in Egypt's diverse and dynamic market (Marler & Boudreau, 2017).

In the recent past, HR analytics has gained substantial attention in modern business, driving considerable academic research into using employee data to address critical issues, including retention (Marler & Boudreau, 2017; Levenson, 2018). As the concept of HR analytics gains acceptance, this data-driven decision-making process holds a strategic opportunity for optimising workforce management and competitive advantage (Angrave et al., 2016; Rasmussen, 2015). High employee turnover continues to be a problem for organisations in most sectors, not least because it causes financial losses and disrupts team performance (Hancock et al., 2013). With its increasing use, organisations are now applying HR analytics not just to understand why employees leave but also to predict who might be next (Prabhakar et al., 2023).

Another key area is person retention, defined as the ability of an organisation to hold those employees it considers its best performers

over a substantial period (Hausknecht et al., 2009). It has attracted an increasing body of research because it affects productivity, cost management, and general efficiency within an organisation (Kossivi et al., 2016). High turnover can destabilise a company because it disrupts efficiency and raises costs, often leading to low morale among remaining staff members (Mitchell et al., 2001). Despite the increasing body of research, less has been done to understand how HR analytics influence the retention of employees directly and indirectly. Specifically, the current study explores the role of the mediation process of employee engagement in this relationship. Strong, effectively committed employees would create a favourable climate by aligning personal and organisational goals; therefore, they are good for the future and present health of the company. Hence, it is crucial that HR analytics impact retention through engagement.

Studying how employee engagement acts as a bridge and organisational culture as a strengthener in the HR analytics-retention relationship becomes important because making companies create productive environments that also consider their employees' long-term loyalty is important (Gruman & Saks, 2011). As businesses face more dynamic conditions, the issue of retaining skilled employees has turned from being desirable to imperative (Deery & Jago, 2015). By using HR analytics to study and predict behavioural trends, organisations can place the understanding of employee retention at the core of their data-driven knowledge. For instance, without understanding how engagement and culture impact this relationship, organisations might miss out on improving retention practices and long-term survival (Guenole et al., 2017).

This study will fill major gaps that exist in literature on HR analytics and employee retention. The gaps are mostly in regard to Egyptian organizations because there is little to no empirical research conducted there. Most other studies have only examined the direct effects of HR analytics on retention, without considering engagement as a mediator (Saks, 2019; Bakker et al., 2023). Since engagement forms an integral part of organisational stability, its mediating role is not sufficiently understood. While certain research recommends organizational culture to enhance the effectiveness of HR analytics, the findings remain inconclusive. No empirical evidence has been found supporting the assumption that culture moderates the relationship between HR analytics and retention. This should also be a point of interest for further study (A Keir, M Youssif (2016)

The existing body of research, therefore, is little more than a theory of HR analytics eliciting a psychological mechanism that leads to greater retention. The study advances the application of Social Exchange Theory (Blau, 2017) and Psychological Contract Theory (Rousseau, 1995) in that HR analytics increase employee commitment through increased involvement and the adjustment of organisational expectations to meet employee needs (Aylmer & Dias, 2024). It adds that most HR analytics studies are also based on generalisations across industries without addressing the sometimes-unique challenges facing specific sectors.

Conceptual Framework

Figure 1 shows the conceptual Framework.
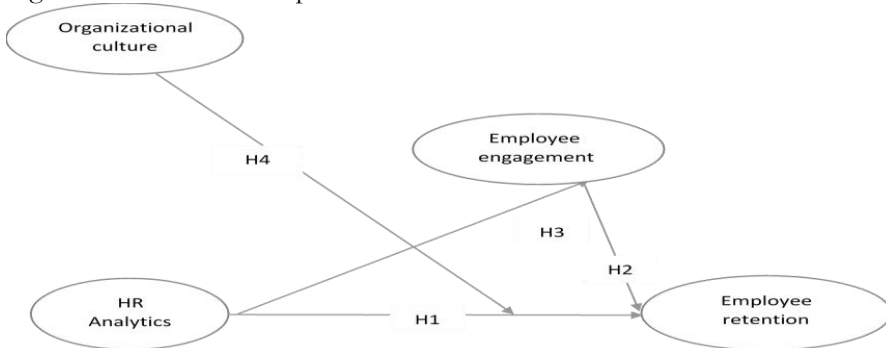
HRA: HR Analytics, ER: Employee Retention, EE: Employee Engagement, OC: Organization Culture.
The figure has been created by the author. 2025

2. Review of Prior Studies and Theoretical Framework

2.1 Human Capital Theory

Becker kicked off an idea back in 1964—investing in people's skills and know-how not only ups their output but also boosts their worth in economic terms. Companies that spend on training, education, and helping employees build their careers often end up with staff who stick around longer (Becker, 1993). He later broke it down by saying there are two kinds of skills: the ones that work just for one company, and the general ones that can take you almost anywhere (Becker, 1975). Generally speaking, employers who nurture those unique talents tend to see less turnover; workers, after all, recognise the perks of staying put (Gross, 2015). Newer studies also point out a clear link between spending on

employee growth and retention. In most cases, firms that encourage professional development see fewer people leaving because workers start to feel their future looks brighter (Wuttaphan, 2017). Plus, when employees sense a genuine investment in them, it naturally bumps up job satisfaction and loyalty (Strober, 1990).

2.2 Herzberg's Two-Factor Theory

Herzberg's Two-Factor Theory, the Motivation-Hygiene Theory, explains what motivates employees to work. It distinguishes between factors that create job satisfaction and those that prevent it. According to Herzberg, satisfaction comes from motivators like achievement and recognition, which connect employees to their jobs and work. These motivators enhance and link the factors of engagement and achievement to improve an individual's job performance and retention (Rehorn, 2024).

Salient "hygiene factors" such as salary, job security, and working conditions are important but do not make the person satisfied on a large scale by themselves. In their absence, they cause dissatisfaction. In contrast, in their presence, they denote a zero point of satisfaction and no motivation (Liang et al., 2023). According to Herzberg's theory, eliminating hygiene factors does not enhance motivators; they must be considered separately to create opportunities for enriching work experiences (Bakker & Demerouti, 2018).

Herzberg's theory has practical implications for today's HR practices. It must accommodate a balance between the fundamental needs met and what can be done to promote factors that motivate employees. In this way, firms can elicit increased commitment and excitement from their employees, enhancing their performance and reducing the number of those who will quit (Sanjeev et al., 2016). In many studies conducted in the modern age, Herzberg's ideas are still one of the central parts when comparing and relating different factors to how people feel and act (Zhu, 2022).

2.3 Equity Theory

Proposed by John Stacey Adams in 1963, the theory stands as follows: this article will look into how fairness in the workplace impacts motivation, satisfaction, and retention, amongst other elements. According to the theory, employees determine fairness by comparing their input-output ratio to others' input-output ratio (effort and skills put

in against rewards such as pay and recognition). If people see that ratio as fair, they will be satisfied and motivated. However, if they perceive any imbalance, whether under-rewarded or over-rewarded, the perceived fairness will be disrupted, leading to feelings of unfairness in the workplace. According to Murphy et al. (2022), low motivation because of pay disparities leads to less motivation, dissatisfaction, and even quitting.

Recent research deems it applicable in several workplace settings since perceptions of fairness have an impact on satisfaction with one's job, commitment to the organization, and engagement. For example, employees who believe things are unfair will likely deliver less work, have minimal support, or show withdrawal behaviors. On the other hand, perceiving things to be fair results in enhanced engagement, higher commitment, and willingness. Less motivation, dissatisfaction, and even quitting (Murphy et al., 2022). Recent research shows this theory applies in various work settings, where fairness perceptions influence job satisfaction, organizational commitment, and engagement (Deepalakshmi et al., 2024). For example, if employees feel things are unfair, they might work less or withdraw from the workplace to restore balance (Miner, 2015). On the other hand, feeling things are fair leads to better engagement, stronger commitment, and more willingness to attain organizational goals (Alabi et al., 2022).

Equitable compensation, transparent performance appraisals, and recognition are how Equity Theory proves relevant to today's jobs. Firms interested in raising motivation levels and retaining employees will take care to structure, in a fair manner, the rewards that create a happy workplace where long-term loyalty is encouraged (Colquitt et al., 2018; Miner, 2015).

3. Hypotheses development

3.1 HR Analytics and Employee Retention

An interesting relationship that has gained considerable attention is the relationship between HR analytics and employee retention. This is something that has become important in organisations. They want to ensure they have the right data to help them manage and make decisions to help keep their workforce issues. Human Resource (HR) analytics involves gathering, analysing, and interpreting information about people in the organisation to make informed decisions to retain employees (Marler & Boudreau, 2017). With the help of HR analytics, organizations

can forecast potential leavers, offer what employees need, and take action to improve retention rates. In one of many examples, HR analytics might pinpoint trends in engagement, performance, and satisfaction that would allow management to take action on specific retention issues such as work-life balance, satisfaction with pay levels, or opportunities for career development Kossivi, B., 2016).

The following hypothesis is inevitable:
Hypothesis 1 (H1): There is a positive relationship between using HR analytics and employee retention.

3.2 Employee Engagement and Retention

Employee engagement, the emotional and mental investment in work by employees, is essential in maintaining the workforce. Truly involved employees are more satisfied, work harder, and feel more attached to their company and, therefore, are less likely to leave it (Albrecht et al., 2015). These employees feel that their work has a greater impact and is important, thus leading to lower turnover rates. Employee personal values are in line with what the company hopes to achieve.
This creates that sense of purpose and happiness and forms why they want to stay with the company long-term (Bakker et al., 2023). When employees enjoy their work and find it meaningful, they do not actively seek alternative employment, reducing turnover (Saks, 2006).
Research conducted by Harter A. et al. in 2020 found that high levels of employee engagement could relate to a 24% lower turnover rate than their less engaged counterparts. Typically, engaged employees can deal with challenges within their work responsibilities and general workplace changes, which contribute positively to their likelihood of staying (Jin, M. H., & McDonald, B. (2017).The Job Demands Resources model posts this retort by stating that it can be related to the fact that organisations, in their provision of needs and resources, additionally boost engagement and decrease turnover (Bakker & Demerouti, 2018), Which brings us to the next hypothesis to be analysed:

Hypothesis (H2): Employee engagement positively impacts employee retention.

3.3 Employee Engagement as a Mediator

Employee engagement is now a crucial link between HR analytics and employee retention. HR analytics helps companies understand and respond to what employees need and expect. This makes employees feel important and connected to their work. By using HR analytics, companies can adapt their management styles to encourage employee engagement, which helps with retention (Marler & Boudreau, 2017; Levenson, 2018). Engagement, defined as an employee's emotional and mental involvement in their role, directly impacts their commitment and loyalty, making it a key factor in reducing turnover (Kulikowski, 2020; Bakker & Demerouti, 2018).

HR analytics gives companies insights into things affecting engagement, like job satisfaction, chances to grow, and recognition. For example, looking at engagement survey data can identify what drives engagement and where improvements can be made (Angrave et al., 2016). By addressing these areas, companies can improve employees' work experiences. According to the Job Demands Resources (JDR) model, this leads to higher engagement levels (Bakker & Demerouti, 2018). Engaged employees are usually more resilient, committed, and satisfied, which helps with retention (Neuber et al., 2022).

Hypothesis (H3): Employee engagement mediates the relationship between HR analytics and employee retention.

3.4 Organisational Culture as a Moderator

Organisational culture significantly affects how well HR analytics works in improving employee retention. It shapes how data-driven HR practices are applied and received. Culture, which means the shared values, beliefs, and practices within a company, can either help or hinder the effectiveness of HR analytics (Schein, 2010). In supportive and adaptable cultures, HR analytics is more likely to succeed because managers act on data insights in ways that resonate with employees. This match between company culture and HR analytics boosts employee engagement and lowers turnover. Employees feel their needs are prioritised (Albrecht et al., 2015).

For example, a culture that values continuous improvement and open communication can use HR analytics more effectively because it creates a sense of trust and understanding among employees and management

(Zebua et al., 2024). This flexibility allows the company to implement retention strategies based on HR analytics, like customised employee development plans, which are likely to be well-received by staff. Research shows that employees in supportive environments are more likely to respond positively to efforts that aim to improve their well-being, making data-driven retention strategies more effective (Naz et al., 2020).

On the other hand, in rigid or authoritarian cultures, HR analytics might not be as effective in improving retention. If employees feel their needs are not listened to or think HR data is only used for the company's benefit, the trust needed for retention efforts may break down (Naz et al., 2020). Such cultures often resist data-driven changes, limiting the potential of HR analytics. As a result, valuable insights might not lead to meaningful actions due to a lack of alignment between culture and data-driven practices. (Okon, 2024).

(H4): Organisational culture moderates the relationship between HR analytics and employee retention.

4. Methods

The methodology involved a quantitative survey targeting HR professionals across various industries in Egypt. We used a survey to collect data on how HR analytics, company culture, and employee staying power are linked. The survey was designed on Google Forms, making it easy to share and track responses. The questions covered backgrounds, views on HR analytics, thoughts on company culture, and plans to stay or leave. This method helped us gather all important information for our study (Fowler, 2013).

To get a broad group of people to complete the survey, we sent it through email and social media like WhatsApp and LinkedIn. We targeted the right audience by contacting HR departments directly and using professional networks. Using multiple ways to distribute the survey helped us get more responses since it reached active people talking about HR topics (Kaplowitz et al., 2004).

The researcher used purposive sampling for this study because it represents a commonly used non-probability method in HR research to boost study relevance and validity (Robinson, 2014). The study targeted people whose occupation includes implementing HR analytics and employee retention strategies because the estimated number of HR professionals in Egypt is 5,000, according to Leat & El-Kot (2007).

The research data collection involved distributing 550 survey invitations by using emails and social media networks (such as WhatsApp and LinkedIn) and direct professional network outreach to HR departments. The survey method used multiple distribution channels to reach specialised participants in keeping with survey-based HR research principles and increasing response participation (Gouda, 2021). The research achieved a 66.5% response rate, through which 366 employees responded to the survey. The researchers screened the data, which led to removing 20 incomplete responses, leaving 346 valid responses for further analysis

Structural equation modeling requirements served as the basis to determine the adequate sample size through AMOS (Analysis of Moment Structures) implementation. According to Byrne (2016), the statistical robustness of SEM depends on the number of observations per estimated parameter. according to Byrne, B. M. (2016). The researchers found the final sample suitable for understanding the direct and indirect effects between HR analytics, organizsational culture and employee retention methods (Rowland & Kifordu, 2024).

AMOS (Analysis of Moment Structures) was used for the data analysis due to its advanced structural equation modelling (SEM) capabilities. AMOS allows researchers to test complex relationships among variables and is particularly effective for studies that involve multiple mediating or moderating variables, as is the case with our study (Byrne et al., 2001). SEM in AMOS enabled us to assess HR analytics' direct and indirect effects on retention, considering organisational culture as a moderator. The graphical interface of AMOS also facilitated the visualisation of model relationships, enhancing interpretability and accuracy in testing hypotheses. Consequently, AMOS was chosen for its compatibility with SEM requirements and robustness in dealing with complex data structures.

4.1 Measures

HR Analytics Scale: Adapted from the HR Analytics Maturity Scale by Marler and Boudreau (2017), this scale evaluates how proficient an organisation is at actually using data-driven insights to make decisions about managing the workforce. Sample items might include the extent to which HR decisions are based upon analysis of employee data plus planned analyses and the extent to which HR tools support the integrated analysis of such HR tools. Responses are measured on a Likert

scale from 1 (Strongly Disagree) to 5 (Strongly Agree) with higher scores indicating greater capability for HR analytics.

Employee Retention Scale: This scale was developed by Allen and Meyer (1990) to measure organizational commitment due to positive emotions, a psychological state that goes along with staying in an organisation. Items may include feelings of membership contribution willingness, and inspiration by organisational values. The scale is again based on the Likert format to capture the intensity of the individual commitment and satisfaction feelings.

Employee Engagement Scale: It was adapted for this study from Saks (2006), and it emphasises the employee's psychological and emotional attachment to his or her job and the organisation. The items gauge interest in the job, a feeling of belonging, the desire to contribute, commitment, and active job participation. High scores on this measure will pick the argued-upon mediation between HR analytics and retention through engagement.

Organisational Culture Scale: The O'Reilly, Chatman, and Caldwell Organisational Culture Profile, developed in 1991, assessed the degree of fit between employees' personal values and support for group values, teamwork, and encouragement of learning. The measure items are indicative of the presence of shared values, a collaborative environment, and support. The third factor significantly moderated the impact of HR analytics and engagement on the retention of employees.

5. Results

Confirmatory Factor Analysis (CFA)

To assess the reliability and validity of the study scales, we employed AMOS v.24 software to conduct a confirmatory factor analysis (CFA), see Figure 1. The results of the four-factor (HRA, EE, OC & ER) model are presented in Table 1. The model was re-specified to improve its fitness (Byrne, 2016), through the covariance of the error terms with a modification index value greater than 4.0 (Hair et al., 2019). Results showed a very good fit with the collected data, $X2$ (299) / df (157) = 1.90, RMR = .030, GFI = .920, NFI = .922, TLI = .952, CFI = .961 and RMSEA = .051.
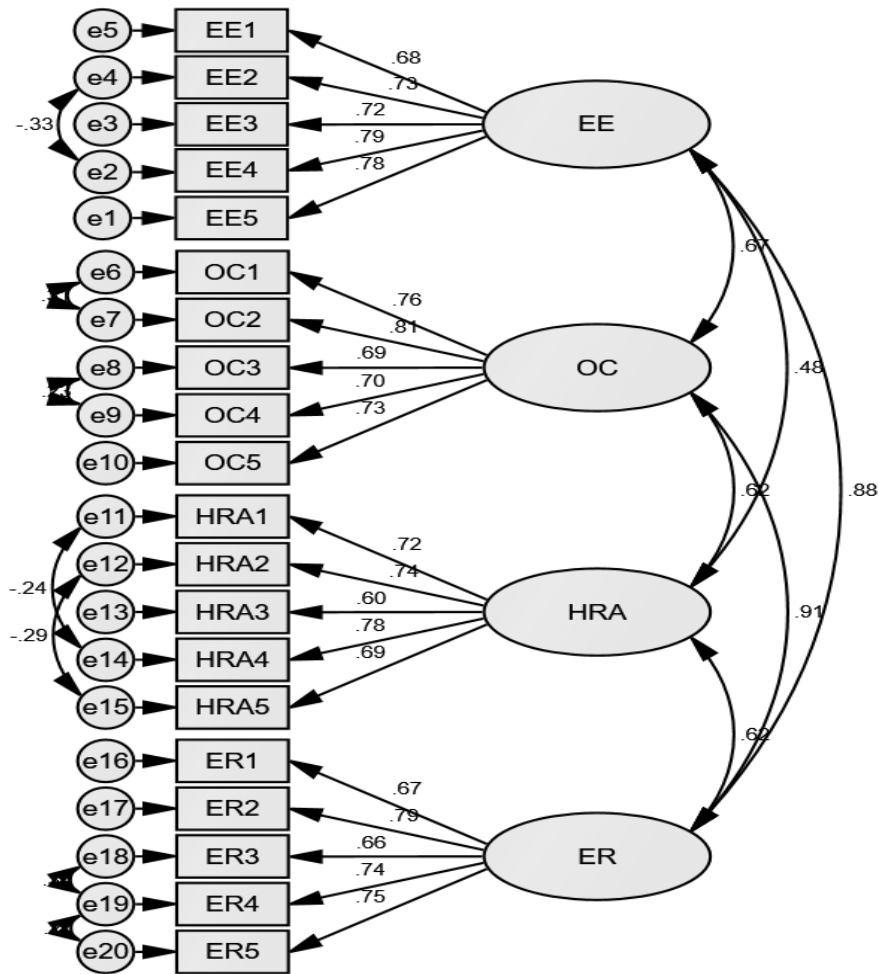
Table 1
CFA Model Fitness

Index	Criteria	Result	Literature
Chi² / df	< 3.00	299 / 157 = 1.90	Hair et al., (2019)
RMR	< .08	0.030	Hair et al., (2019, pp. 638)
GFI	> .90	0.920	Hair et al., (2019)
NFI	> .90	0.922	Hair et al., (2019)
TLI	> .90	0.953	Hair et al., (2019, pp. 640)
CFI	> .90	0.961	Hair et al., (2019, pp. 640)
RMSEA	< .08	0.051	Hair et al., (2019)

Factor Loadings: A measure is considered to be reliable when the associated factor loadings (FL) are above 0.50 (Hair et al., 2019),The basis for the reliability of study scales was established as all items FL were greater than 0.5, thus meeting the minimal level for interpretation (Hair et al., 2019, p. 151), see Figure 2.

Internal Reliability / Consistency: The threshold for reliability of the measure is > 0.7 scores of the Cronbach's alpha (CA) for each of the measure (Hair et al., 2019; Khan & Nazeer, 2021), our estimations met the criteria very well (see Table 2).

Composite Reliability (CR): Owing to the underestimation problem with Cronbach's α there is a need for greater estimation of true reliability (Garson, 2012). As shown in Table 2, our model adequately met the acceptable values of CR i.e., > 0.7 for confirmatory purposes (Hair et al., 2019).

Figure 2
CFA Diagram

Convergent Validity: For convergent validity, the AVE (average variance extracted) should be greater than 0.5 (Hair et al., 2019). The AVE values for all variables in Table 2 were well above the criteria to prove the convergent validity of the constructs.

Discriminant Validity: A robust and reliable way to ensure the discriminant validity is to measure it through HTMT ratios, which are preferred to be < 0.85 or < 0.90 (Hair et al., 2019). As shown in Table 2 all the constructs had HTMT < 0.90, confirming the discriminant validity of the model.

Table 2

Reliability and Validity Analysis of the Measurement Model

| Variable | CA | CR | AVE | H² | HTMT | | | |
					CSR	DI	EWB	HRM
HRA	0.818	0.836	0.507	0.617	-			
EE	0.850	0.860	0.551	0.473	0.650	-		
OC	0.870	0.857	0.547	0.659	0.488	0.612	-	
ER	0.861	0.846	0.524	0.641	0.857	0.851	0.613	-

Structural Equation Modelling (SEM)

SEM was employed using AMOS to test the hypothesised relationships between study variables (namely HRA, EE, OC, and ER) in the form of direct, indirect, mediating and moderation effects. This study utilised 2000 subsamples of bootstrapping with 95% confidence intervals as upper bound (UB) and lower bound (LB) to test the hypotheses with $p <$ .05 for the threshold of significance of the outcomes (Byrne, 2016; Zhu, Khan, Nazeer, Li, Fu, Badulescu & Badulescu, 2022).

Direct Effect Hypothesis: This is kind of a causal relationship which only involves the predictor and outcome variable, see Figure 3.

H1: *HR Analytics (HRA) positively influences the Employee Retention (ER).*
As shown in Table 3 the impact of HRA on EE was positive and significant (B = .121, p = .032), therefore H1 was supported, so any change in ER due to a change in HRA was substantial.

H2: *Employee Engagement (EE) has appositive impact on ER.*
Similarly results showed that the EE had a positive impact on ER (B = .480, p = .002), which was statistically significant as well, thus H2 was also supported, so any change in EE would also cause a substantial change in the ER, this relationship is also depicted in Figure 3.

Mediation Hypothesis: This is kind of a causal relationship which involves the predictor, and outcome variable along with an enabler variable which tend to increase or decrease the impact of predictor on outcome variable, see Figure 3.

H3: *Employee Engagement (EE) mediates the relationship between HRA and ER.*

As shown in Table 3 HRA had a positive impact on ER through EE (B = .183, p = .001), as this impact was statistically significant thus mediation of EE occurred, hence H3 was supported. EE was able to increase the HRA effect from B = .112 to B = .183, considering the total effect (B = .295) EE mediated 62.03% of the HRA impact on ER. Since the direct effect of HRA on ER remained significant (B = .112, p = .031) after the introduction of EE as mediator in the SEM model, this was a case of partial mediation (Baron & Kenny, 1986). Sobel's (1982) test revealed that the indirect effect of HRA on ER via EE was significant (z = 7.182, p < .001), thus H3 received further support.

Table 3
Hypothesis Results

| Path	Estimate	LB	UB	P	Status
Direct Effects					
HRA → ER	.121	.011	.249	.032	H1: Supported
EE → ER	.480	.279	.660	.002	H2: Supported
Mediation					
HRA → EE → ER	.183	.090	.294	.001	H3: Supported
Direct Effect	.112	.011	.228	.031	Significant
Total Effect	.295	.150	.428	.001	Significant
Sobel Test	7.182	-	-	.000	Significant
Moderation					
HRA x OC → ER	.053	-.041	.145	.290	H4: Not Supported

Moderation Hypotheses: This is kind of a causal relationship which involves the predictor, outcome variable along with an influencer variable which tend to strengthen or weaken the relationship between the predictor and outcome variable, see Figure 3.

H4: *Organisational Culture (OC) moderates the relationship between HRA and ER.*

Results showed that the interaction between HRA and OC had a positive impact on ER (b = .053, p = .290), which was not significant, thus H4 was not supported, and no moderation of OC occurred, see Table 3.

Figure 3

Path Model
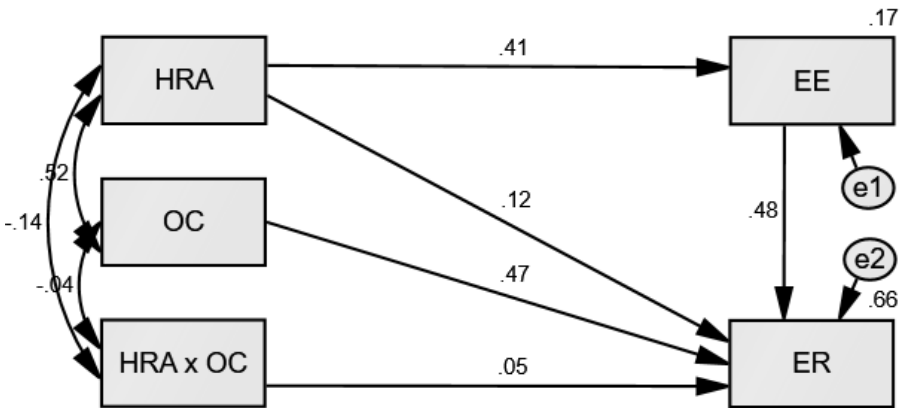
Coefficient of Determination or R²: To assess the predictive accuracy of the structural model, the coefficient of determination (R^2) was evaluated, which measures the squared correlation between the predicted and actual values of the endogenous constructs by providing an estimation of the proportion of variance that can be explained by the exogenous variables, in the structural model it indicates the degree to which the exogenous variables collectively cause the variation in the endogenous variables (Cohen, 1988). Higher R^2 values suggest a stronger influence of the exogenous on the endogenous variables (Hair et al., 2019). As shown in Table 4 that HRA explained 16.9% variance in EE, similarly HRA, EE, and the interaction between HRA and OC jointly explained 66.4% variance in ER in in the mediation and moderation model.

Table 4

Predictive Quality of the Structural Model

Outcome Variable	R square (R²)	Remarks
EE	.169	Small Effect Size (Cohen, 1988)
ER	.664	Large Effect Size (Cohen, 1988)

6. Discussion

This study's results indeed prove that HR analytics has a tangible effect on employee retention since its influence is channelled primarily through employee engagement. From the SEM results, HR analytics and employee retention were found to have a strong positive relationship mediated by engagement. Consistent with prior research, the relationship enables organisations to spot early signs of unhappiness among employees, predict risks of turnover, and appropriately intervene in retention issues (Kossivi, B.,2016). To settle the debate, the author, like Albrecht et al. (2022), finds that engaged employees have a significantly higher commitment and job satisfaction and, therefore, are much less likely to leave.

The validation of employee engagement as a key contribution in this study therefore reinforces studies such as Lv, Z., & Xu, T. (2018). who posited that HR analytics enables organisations to assess levels of engagement and identify areas that need attention, and then design specific initiatives for example, career development opportunities and programmes on work-life balance aimed at the enhancement of employee satisfaction? Data-driven insights enable HR managers to come up with retention strategies that respond to what employees really need, hence lessening the probability of moving from one employer to another. (Abdelhay, S. 2024)

Organisational culture does not significantly affect the relationship between HR analytics and employee retention; this stands contrary to most claims (b = .053, p = .290). Ferdiana, S., (2023) found that strong organisational culture can enhance the effectiveness of HR analytics in workforce management. The existence of firm subcultures can be taken as proof that broader corporate culture does not directly influence employee engagement and retention, as these subcultures have a more direct. Timsina, S. (2024). Employees perceive HR analytics as a technical tool; it does not look at the individual performance of an employee but as a tool born from its organisational culture (Lee & Chen, 2024).

7. Theoretical, Practical Implication and Limitation of the Study

7.1 Theoretical Implication

It contributes to Social Exchange Theory in the study and, therefore, informs that HR analytics positively affects employee retention by

positively influencing employee engagement. Employees develop reciprocity in loyalty and commitment when they feel that the company uses HR data to make their careers more satisfying and growing. This, as seen in the literature, has steered more similar thinking in the past. This study reiterates the same principle of creating trust-based psychological contracts with employee retention positively inflating effect through engagement-triggered HR interventions (Chernyak-Hai & Rabenu, 2018). It also contributes to Psychological Contract Theory (PCT) how HR analytics will facilitate reducing the distinction between management and employee expectations. Such efforts may be worthwhile since through workforce data, HR can realign its strategy with the needs of the career development of employees, thereby increasing commitment and job satisfaction (Warfa, 2020). Drawing from earlier validations, fulfilled psychological contracts have been associated with low turnover and high employee engagement (Lv & Xu, 2018). This study emphasises HR analytics that could be applied to pre-empt dissatisfaction and make evidence-based adjustments that further solidify the employer-employee relationship postulated by (Dulac et al., 2008).

Furthermore, this study questions the moderating role of organizational Culture theory because there is no significant impact of culture on the relationship between HR analytics and retention. Earlier findings which said strong organisational cultures enhance HR interventions are contradicted by this study because employees consider HR analytics a technical tool rather than a cultural initiative (Keir, A., &Youssif, M. (2016).). This further confirms studies that suggest workplace subcultures and individual team dynamics play a stronger role in engagement and retention than overall corporate culture (Mishra & Kumar, 2017).

The study further reinforces the Expectancy Theory (Vroom, 1964), by confirming that employees are more likely to stay when HR analytics, driven by their expectations regarding growth in their career and satisfaction with the job, aligns with their career growth expectations and job satisfaction needs (Khan & Ray, 2023). Employees feel that the use of HR analytics enhances their job experiences, recognition, and professional development, so positivity has been committed to the organisation (Bordia et al., 2017).

7.2 Practical Implications

HR analytics is a powerful tool in combatting turnover by helping organisations analyse workforce trends and turnover risks which can further optimise engagement strategies. Using data-driven insights, organizations can identify and troubleshoot causes of dissatisfaction, improve employee job satisfaction, and introduce targeted retention initiatives (Margherita, 2021). The effective use of HR analytics by firms may improve employee commitment and lessen voluntary turnover, leading to stability in the workforce in competitive labour markets Madhani, P. M. (2023).

A key use of HR analytic influence is employee engagement which, directly, in turn, influences retention. Employee engagement is the affective and cognitive bond between employees and their jobs; it serves as the connecting link between HR analytics and workforce stability (Albrecht et al., 2022). HR analytics can detect changes in engagement trends, identifying employees at risk of leaving so that specific interventions, professional development, flexible working conditions, and recognition systems are deployed (Ramakrishna, K., 2024). By aligning engagement efforts with what the workforce expects, long-term commitment to the organization is bolstered, and turnover risks are minimised.

While HR analytics-driven retention strategies may be more effective in those contexts, open and collaborative workplace cultures support the notion that analytics provide a resource to increase job satisfaction and promote employee development (Schein & Schein, 2019). In some situations—such as within cultures characterised by high formalisation or hierarchy—it would be tricky to see the analytics as anything more than a means of surveillance, which could compromise trust and engagement (Denison et al., 2003). Hence, it is crucial for organisations to incorporate analytics-based strategies that align with cultural values to achieve the maximum effect (Schneider et al., 2021).

HR analytics does cater to the tenets of Self-Determination Theory and captures the importance of autonomy, competence, and relatedness as key aspects of intrinsic motivation. By developing retention programmes designed around HR analytics that address these psychological needs, such as tailored career paths, employee recognition programmes, and flexible work policies, organisations can actually deliver increased satisfaction by reducing attrition (Ulrich & Dulebohn, 2015). HR analytics also enables companies to gain competitive advantages

beyond resisting turnover and keeping the workforce highly engaged. Where companies have deliberately implemented analytics-driven strategies to engage and retain employees, they have cut down on recruiting and training costs and retained institutional knowledge (Madhani, P. M. 2023).

7.3 Limitations of the Study

A principal limitation of this study arises from the difficulty in adequately capturing qualitative dimensions of employee engagement and organizational culture through quantitative data. Although HR analytics offer verifiable insights regarding turnover rates, performance, and scores of engagement, the emotional and cognitive dimensions underlying employee engagement may not be easily captured (Byrne, 2016). Culture is difficult to quantify because its complex contextual values, norms, and shared beliefs cannot be adequately represented by simple numerical data. (Schein & Schein, 2019).

The other key limitation in this paper is the generalisability of the results achieved in different cultural and industrial settings, besides just Egypt. Business environment-specific factors, like labour market dynamics, regulations and technology diffusion, constrain the effectiveness of HR analytics (Margherita 2021). For example, analytics-based strategies on retention will be quite different between a tech-driven industry and labour-intensive conventional sectors like manufacturing or healthcare (Madhani 2023). The same applies to very disparate labour laws, economic situations, and cultural values found in other regions (Albrecht et al. 2015). In a collectivist culture, the strategy of stability may pay off better than individualistic performance-based incentives (Naz et al. 2020). Future research should consider variation between industries and across cultures in order to refine the application of HR analytics at the global level.

8. Conclusion

To push HR analytics to its maximum potential and increase retention among employees in Egypt, organisations need to pursue not just data-driven insight but an engagement strategy informed by cultural dynamics. By this, HR practitioners in Egypt can determine the risks associated with the possible leavers and then personalise employees' experiences with targeted interventions, such as career development programmes or

flexi-work arrangements. This raises employee engagement and thus the retention level in companies with open and supportive cultures. The critique comes to the fore when the organisation has a top-down and bureaucratic approach to the management of the organisation. First, there has to be a change of culture and inclusion of information based on data in all decision-making processes, backed by a strategy that brings out the best in the human capital that feels respected.

To ensure effective implementation of HR analytics across varied organisational cultures, there has to be a build-up of a capability in the HR function to interpret and apply informed insights on patterns of retention. Real-time engagement surveys are therefore used so that the mood and feelings of employees are captured, and appropriate programmes are rolled out in response. The implementation of HR analytics should also be humanized according to the expectations of ever-evolving cultures so that it is accepted by employees, with predictive analytics also allowing for the early detection of turnover risks that can be intervened with premeditated retention strategies. Second, organisations need to promote HR analytics as an empowering tool for employee development rather than control, and that reinforces a trust-based environment. With the adoption of these strategies, organisations will consolidate the HR analytics dimension with the retention dimension, which will increase long-term workforce stability while maintaining a competitive edge for the organisation.

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