

# Quantifying Workplace Dynamics: A Mathematical Model Examining the Interplay of Work Culture, Employee Engagement and Job Satisfaction

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Received: 3 Nov. 2023, Revised: 26 Nov. 2023, Accepted: 1 Dec. 2023

Published online: 1 Mar. 2024

**Abstract:** This research endeavors to quantify workplace dynamics through the lens of a comprehensive mathematical model, meticulously examining the intricate interplay among work culture, employee engagement, and job satisfaction. The mathematical model employed in this analysis goes beyond traditional approaches, incorporating advanced quantitative methodologies to capture the dynamic and interconnected nature of workplace dynamics. By leveraging mathematical precision, this study seeks to quantify the impact of work culture on employee engagement and, subsequently, its influence on job satisfaction, offering valuable insights into the mechanisms that contribute to overall workplace well-being. The research employs a quantitative approach, utilizing surveys and questionnaires distributed among a diverse sample of 308 employees across various industries in Riyadh region. The findings stated that work culture and employee engagement practices produce a direct impact on employee job satisfaction among international employees with  $\beta = 0.383$  and  $\beta = 0.339$  respectively at  $p < 0.001$ . The employee engagement showed a significant mediating role between work culture and job satisfaction  $\beta = 0.233$ ;  $p = 0.016$ . Initial findings reveal a strong correlation between a positive work culture and heightened employee engagement. The study also unveils that employee engagement serves as a mediator in the connection between work culture and job satisfaction. This implies that a supportive work culture cultivates increased engagement, positively impacting overall job satisfaction. Additionally, the absence of adequate employee engagement measures and policies for fostering a positive work culture may adversely affect job satisfaction among international employees. The human resource department holds responsibility for implementing HR practices that facilitate a positive work culture and effective employee engagement, particularly for international employees in Saudi Arabia, promising improved well-being and performance.

**Keywords:** Mathematical Model, applied analysis, workplace dynamics, job satisfaction, work culture, employee engagement.

## 1 Introduction

In an era where optimizing workplace dynamics is crucial, this study introduces a novel perspective through a mathematical lens. It delves into the intricate interplay of work culture, employee engagement, and job satisfaction, employing a comprehensive mathematical model. By quantifying these relationships, our research aims to offer a precise understanding of how work culture influences employee engagement and, consequently, job satisfaction. This exploration not only enhances theoretical insights but also provides a practical framework for organizations to strategically enhance workplace dynamics and foster a more satisfying and engaged workforce.

Kurdi et al., [1] research has emphasised on job satisfaction or employee satisfaction which is directly associated with the work culture. Employees having a sufficient level of job satisfaction results significantly for the

organisations because the employees are motivated and they determine new areas that could be used to enhance the overall efficacy of the organisation. However, Kawiana et al., [2], Khan, S. & Mohiya [3] and Khan, S. [4] has further outlined that satisfied employees play their role in streamlining their business processes and different means of brainstorming are used to enhance the product or service portfolio of the firms resulting in high business revenue. On the other hand, Meng & Berger [5] defines the impact of work culture on job satisfaction. The work culture or organisational culture is segregated in different sorts that mainly include growth, fairness, organisational reputation and opportunities that are being given to the employees. It has been further analysed that work culture or organisational culture refers to the perceptions and beliefs of the firm based on the different sorts, which defines various growth opportunities for the employees [6].

However, a noticeable increase in globalisation has been observed by which organisations urge to integrate a diversified workforce by which different individuals having

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diversified experiences can be indulged and an increase in the overall organisational efficacy can be observed [7]. Employee motivation has been recognised as one of the vital factors and the most researched in the field of human resource management. Organisations strive to integrate different approaches to reinforce employee motivation to enhance organisational productivity and vital results can be obtained in terms of increasing business revenue. Organisations who are successful in providing sufficient means for motivation result significantly because it allows the firms to address the challenges and vulnerable areas that are present within the organisation and several means can be induced accordingly by which different growth opportunities can be identified and business revenue can be generated in the desired manner [8,9]. However, in the context of international employees, organisations have to integrate effective measures because they have to cater for their diversified needs by which a sufficient level of job satisfaction can be obtained and a positive organisational engagement can be obtained. This approach provides sufficient means to the firm to achieve high results and strategic objectives of the firm and obtain the desired manner [10,11]. Likewise, the factors associated with employee motivation and work culture also produces an impact on the international employees, which produces a direct impact on their levels of job satisfaction. It has been determined that the factors of employee motivation and work culture have been studied separately in the context of international employees. However, this paper has addressed the relationship between employee motivation and work culture that produces a direct impact on the job satisfaction level of international employees.

A sophisticated mathematical model, informed by fractional calculus and statistical techniques, develops a quantitative analysis and the relationships among variables. Mathematical model accounts for the dynamic and interdependent nature of workplace dynamics. Developing specific equations for a mathematical model involves a detailed understanding of the variables, their relationships, and the context of the study. In the absence of specific details about the variables and their interdependencies in workplace dynamics model, can provide a general conceptual framework using fractional calculus. If three variables are considered namely, Work Culture (WC), Employee Engagement (EE), and Job Satisfaction (JS).

The Fractional Differential Equations can be explained as below.

$$\begin{aligned}\frac{d^\alpha WC}{dt^\alpha} &= f_1(WC, EE, JS) \\ \frac{d^\beta EE}{dt^\beta} &= f_2(WC, EE, JS) \\ \frac{d^\gamma JS}{dt^\gamma} &= f_3(WC, EE, JS)\end{aligned}$$

Here,  $\alpha, \beta, \gamma$  are non-integer orders representing the fractional differentiation. The functions  $f_1, f_2, f_3$  denotes the relationships between the variables. The interdependence equations are developed as:

$$WC = g_1(EE, JS)$$

$$EE = g_2(WC, JS)$$

$$JS = g_3(WC, EE)$$

These equations express the interdependencies between the variables. The functions  $g_1, g_2, g_3$  capture how changes in one variable influence others. There stastical analysis equation is written as:

$$Y = \beta_0 + \beta_1 WC + \beta_2 EE + \beta_3 JS + \epsilon$$

This represents a regression equation where Y is an outcome variable (e.g., overall workplace satisfaction),  $\beta_0, \beta_1, \beta_2, \beta_3$  are coefficients, and  $\epsilon$  is the error term. This equation helps quantify the impact of each variable on the overall outcome. These equations offer a basic structure; however, the specific forms and parameters would need to be tailored to the unique characteristics of workplace dynamics and the relationships to investigate. This conceptual framework can serve as a starting point for developing a more detailed and customized mathematical model based on the specific dynamics of the study.

It has been determined that significant aspects are essential to be studied regarding job satisfaction. However, this study is crucial because work culture and employee engagement are the two core factors in the field of human resource management that produces a direct impact on the elements associated with job satisfaction. However, this paper has evaluated these aspects from the international employee perspective and addressed those concerns that could be used to enhance the level of employee job satisfaction among the international employees of Saudi Arabia.

## 2 Literature Review and Hypothesis Formulation

### 2.1 Employee Engagement

Employee engagement, as defined by Saks [12], refers to the involvement of individuals inside a firm in relation to their job responsibilities. This involvement encompasses the manner in which individuals utilize and manifest their reactions, psychologically as well as physically, while carrying out their tasks. According to the perspective presented in a view [13], employee engagement refers to a favorable and gratifying work condition that is associated with a mental state characterized by enthusiasm, commitment, and loyalty. Furthermore, employee engagement can be understood as a manifestation of actions, specifically in terms of how it is perceived by individuals external to the organization. The manifestation of employee engagement is observable to external observers through outwardly expressed behaviors. According to the findings of Sekaran and Bougie [14], employee engagement indicators encompass three distinct dimensions. The preliminary dimension, referred to as vigor or enthusiasm, is indicated by elevated levels of physical and mental energy in the workplace. It entails a strong willingness to exert effort and persist in the face of challenges. Furthermore, commitment

can be defined as a profound sentiment imbued with significance, excitement, motivation, a sense of accomplishment, and a willingness to confront challenges within the realm of one's professional endeavors. Individuals with elevated devotion scores have a profound sense of identification with their professional endeavors, as they perceive them to be meaningful, motivating, and intellectually demanding. In addition to this, individuals often experience a sense of enthusiasm and pride in relation to their profession. Individuals who exhibit low scores on devotion tend to lack a sense of identification with their work due to a dearth of important, inspirational, or difficult experiences. Additionally, they often encounter feelings of apathy and a lack of pride in their work. Furthermore, personnel consistently demonstrate a high level of absorption and dedication towards their profession, exhibiting a strong sense of commitment. During the work period, individuals often see time as passing quickly and have challenges when attempting to disengage from work-related activities. It has been analyzed from the research of Eliyana & Ma'arifHowev [15], which defines that leadership style produces a direct impact on employee job satisfaction. Several studies have further highlighted that employees with a sufficient level of job satisfaction resulted positively in performing the firm's strategic operations and objectives in the desired manner [5,16]. The findings of various studies also suggest that motivated employees play a vital role in the organization in challenging times. If the firm is suffering from various challenges, motivated employees play their role in brainstorming different notions to address the identified issues and explore several growth opportunities to determine these challenges and ensure to mitigate them in the desired manner. [17,18]. Sahni J. [19] examined the role of employee engagement among millennial workforce and found a satisfactory level of involvement among Saudi youth and a significant partial mediation with job satisfaction. Similarly, Sahni J. [20] research focuses on investigating the quality of work life within the telecom industry and its correlation with employee engagement and organizational commitment. The study revealed a notable connection between the quality of work life and organizational commitment. However, the association between the quality of work life and employee engagement was found to be relatively weak. Khahro et al., [21] developed a job satisfaction model utilizing Smart PLS and SPSS to evaluate worker satisfaction within the construction industry. The research findings indicated that the satisfaction level among workers in the construction sector is notably influenced by the compensation packages they receive, emphasizing its pivotal role. Abdullahi, M. S. [22] investigated how employee engagement acts as a mediator between talent management practices and employee performance. The study uncovered that talent management practices, encompassing talent recruitment, training and development, and compensation, significantly impact employee performance. Additionally, the research revealed that employee engagement partially mediates the relationship between training and development practices, compensation practices, and employee performance.

However, in Malaysian private universities, employee engagement was not found to mediate the relationship between training and development practices and employee performance.

Moreover, Pawirosumarto et al., [23] in their study has examined the influence of work environment along with leadership style and organizational culture on employee job satisfaction. This study was conducted with the provisions of the primary research method and the employees of the Indonesian hotel industry were employed. However, the study findings illustrated that leadership style, work environment and organizational culture are significant for employee job satisfaction. On the other hand, Soomro & Shah [24] has also examined different factors of organizational culture on employee job satisfaction. This study was conducted with the implications of the secondary research method in which 326 cases were examined accordingly. However, the findings of the study described that the measures implemented for organizational commitment and organizational cultures produces a significant impact on employee job satisfaction. It has been observed from several studies, that employee performance is directly influenced by organizational commitment [25,26]. These studies suggest that employees improve their performance when organizations fulfil their commitments and they provide the promised benefits to their employees. All these aspects provide vital means to the firm to have high employee commitment and achieve the organizational goals in the desired manner [27]. On the other hand, several researchers investigated the influence of organizational culture on employee job satisfaction. These studies define that most of the employees work on the subjective perception towards the organization based on several objective factors in which the organizational culture is the most underlined because it produces a direct impact on the steadiness of the organization [28,29,30].

## 2.2 Work Culture

The organizational work culture frequently serves as a mediator in enhancing employee performance, as evidenced by their individual conduct, values, and standards inside the workplace, as well as their collaborative efforts within groups. Triguno [31] posits that work culture can be understood as a philosophical framework that encompasses the values, habits, and motivating factors embedded within a community, team, or company. These elements are subsequently expressed in individuals' attitudes, conduct, convictions, principles, viewpoints, and behavior, which are manifested in the context of work. The driving forces behind the significant causes of human labor are the essential needs that must be fulfilled. The nature of labor encompasses various aspects, including social engagement, productivity, and the fulfillment of organizational and personal demands. Schein [32] posits that certain qualities of work culture can be identified by examining elements of organizational culture, such as observed behavioral regularities, norms, dominant values, philosophy, rules, and organizational environment. According to Ndraha [33], there are several

indicators that can be used to assess the work culture of employees within a company these factors comprise a genuine passion for the work, a keen desire to acquire knowledge and fulfill responsibilities, an intention to assist colleagues, and a readiness to comply with administration directives. Apriyanti [34] conducted a study in which six aspects were identified as influential in shaping work culture. These factors include: (1) innovation, (2) responsibility, (3) outcomes oriented, (4) competence, (5) work system, and (6) inspiration.

### 2.3 Job Satisfaction

Job satisfaction is frequently utilized by organizations as a means of evaluating the performance of individuals in relation to the objectives of the company. In circumstances pertaining to the preference or aversion towards the activity itself. Job satisfaction is a subjective phenomenon that varies among individuals, as it is influenced by the current opinions held by each individual. As the alignment between various areas of job and personal preferences increases, there is a corresponding rise in the level of satisfaction experienced. According to Noe et al., [35], job satisfaction refers to a positive emotional state that arises from an individual's judgment that their job fulfils important work-related values. According to Mangkunegara [36], job satisfaction refers to the subjective evaluation of oneself and fellow workers on their work and accompanying conditions. Additionally, Nelson and Quick [37], shown that job satisfaction is impacted by five distinct characteristics of the employment, including income, the nature of the work, prospects for advancement, leadership, and relationships with peers. According to Luthans [38], there exist six aspects of assessment that pertain to job satisfaction, including parameters such as pay, the nature of the work, opportunities for advancement, leadership, the team's composition, and the workplace environment.

Furthermore, Pandita & Ray [39] in their research has described the association between talent management and employee engagement. It has been determined that talent management starts from the employee recruitment process and different development means are induced accordingly to provide several growth opportunities to the employees. However, Sopiah et al., [40] has further asserted that the human resource department plays a crucial role in the process of talent management because they are liable to integrate the individuals accordingly as per their area of expertise by which maximum resource optimization can be performed and the crucial tasks can be handled in the desired manner. On the other hand, various studies also emphasized the relationship between talent management and employee engagement. The studies described that talent management is essential because it allows the employees to accomplish their long-term career planning by various means of organizational support [41, 42]. Goestjahjanti et al., [43] investigated the impact of talent management, authentic leadership and employee Engagement on job satisfaction and found that the implications of authentic leadership do not

produce a significant impact on job satisfaction but talent management produces a positive impact to have a sufficient level of employee job satisfaction. Eliyana & Ma'arif [15] considered job satisfaction and organizational commitment affect in the transformational leadership towards employee performance and illustrated that a positive impact of transformational leadership style on employee job satisfaction is obtained. This could significantly enhance the overall work performance of the organization. Similarly, Vorina et al., [44] analyzed the relationship between job satisfaction and employee engagement and demonstrated employee engagement and organizational culture produce a direct impact on employee job satisfaction. Djoemadi et al., [45] stated that clear communication results positively in developing a sustainable work environment that results in high employee engagement, indicating employees who are engaged with their organization show a high level of devotion and dedication that results in the continuous growth of the firm.

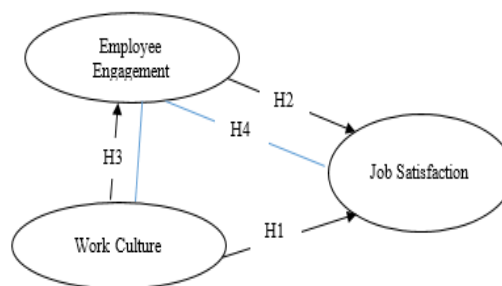
Drawing upon relevant theoretical frameworks and building upon earlier empirical research, the present study aims to formulate below hypothesis. Based on the aforementioned rationale, this research appears essential due to its significance and the need for further investigation. Hence, the underlying principle of this study can be outlined as follows.

Hypothesis 1: Work culture has a positive influence on job satisfaction.

Hypothesis 2: Employee engagement has a positive influence on job satisfaction.

Hypothesis 3: Work culture have a positive significant relationship with employee engagement.

After reviewing different aspects from the literature, it has been understood that the employee engagement and work culture produces a direct impact on employee job satisfaction. It can be summarized that if organizations fail to develop different aspects of employee engagement and work culture, it could result the firm adversely with low employee job satisfaction. Based on the above extant literature review the below conceptual frame work as shown in figure 1 was proposed for the study.



**Fig. 1:** Proposed Conceptual Framework.

### 3 Research Methodology

This section examines the process of developing a research instrument, adapting the survey questionnaire to align with the specific study environment, employing a sampling technique, and implementing a data collection procedure for the purpose of conducting the study. The present study aimed to investigate the predicted model that explores the impact of employee engagement and its mediating effect on work culture and job satisfaction respectively within Saudi Arabian SMEs. To achieve this objective, data was collected from respondents employed in diverse firms in Riyadh region. The research conducted utilized a standardized survey questionnaire consisting of twenty one items. The data was examined using statistical software packages, specifically SPSS and Smart PLS. In particular, the PLS-SEM regression algorithms were employed for analysis. Regression analyses were performed in order to ascertain the potential impacts of employee engagement, work culture, and job satisfaction. The regression analysis considers the below stastical analysis equation which was derived from the basic fractional differential equations and interdependence equations as mentioned in previous sections.

$$Y = \beta_0 + \beta_1 WC + \beta_2 EE + \beta_3 JS + \epsilon$$

#### 3.1 Sample Size, Sampling Technique, Data Collection Procedure

Furthermore, the primary data collection method has been adopted for this paper. It has been analyzed from the research of Nayak & Narayan [46], which defines that primary data collection is significant because it provides vital means to have the specific nature of data and latest information is collected to conduct the study. On the other hand, the information obtained from the respondent's experience also provides vital means to have reliable data by which the findings can be presented in the desired manner. However, in this study, the use of primary data collection is significant because the data was collected through online surveys using a survey questionnaire. According to the research of Paul [47], the research instrument is significant because it provides vital and sufficient means to the data collection and analyses within the study. Furthermore, the researcher has adopted a convenience sampling technique to conduct this study. The use of convenience sampling was significant because it provides easy source to recruit participants that are close to hand [48]. Moreover, the researcher has recruited a sample of 308 respondents to perform the survey. All of the respondents were working in different organizations in KSA and different questions were asked to them that are developed for the study.

#### 3.2 Development of Measurement Items

The measurement items for the study constructs were adopted from previous research studies. The items of work culture are adopted from Apriyanti [34] and consists of six items, and for employee engagement from Schaufeli, et al.,

[13] and consists of eight items. For job satisfaction the items from both the Nelson and Quick [37] and Luthans [38] were considered and consists of seven sub-factors namely income, the work, promotion, supervision, opportunities, working environment and conditions, work group. Based on the adapted measurement items the study has developed a total of 21 questions on the scale of 1-7 Likert scale where 1 indicates extreme disagreement, 3 indicates neutrality, 5 indicates agreement, and 7 indicates solid agreement.

### 4 Results and Discussion

This section of the paper represents the survey results that were obtained with the use of the primary data collection under quantitative method.

#### 4.1 Respondents Profile

The participants of this study consist of individuals employed by small and medium-sized enterprises (SMEs) located in Riyadh, the capital city of Saudi Arabia. According to the data provided in Table 1, the majority of individuals were male, accounting for around 66.9% of the sample. The age group with the highest representation was 31 to 35 years, comprising 26.9% of the participants. Following closely behind was the age group of 26 to 30 years, which accounted for 22.0% of the sample. The majority of respondents in this study own a master's degree (54.5%), while 37.9% hold a bachelor's degree.

**Table 1.** Respondents Profile (n=308).

Variable	Categories	Frequency
Age	20 - 25 years	57
	26 - 30 years	68
	31 - 35 years	83
	36 - 40 years	46
	More than 40 years	54
Gender	Male	206
	Female	102
Education	Bachelors	117
	Masters	168
	Ph.D.	23
Experience	Less than 2 years	37
	2 to 5 years	97
	5 to 10 years	105
	10 to 15 years	69

*Source:* Data Analysis.

#### 4.2 Assessment of Measurement Model

The measurement and structural model of the study were examined utilizing Smart PLS-SEM version 4. The software possesses the capability to accommodate non-normality assumptions commonly encountered in survey research within domains such as social science [49]. As recommended by Agbonifoh et al., [50] and Hair et al., [51],

the researchers initially conducted an analysis to assess the potential presence of Common Method Bias. This analysis involved analyzing the overall interdependence of the variables under consideration, with the aim of addressing concerns related to interdependence or collinearity arising from the use of data from a single source. In this methodology, every variable is subjected to regression analysis against a predetermined variable. Consequently, if the Variance Inflation Factor (VIF) value is below 3.3, it indicates the absence of bias arising from relying solely on a single data source. Based on the computed variance inflation factor (VIF) of less than 3.3, it can be concluded that the presence of single-source bias in the data, as presented in Table 2, is not a substantial concern. In order to assess the presence of common method variance, a comprehensive collinearity test was performed utilizing the partial least squares structural equation modeling (PLS-SEM) approach, which has been acknowledged as superior to the Harmon Single Factor method. Furthermore, the computation of Multivariate Kurtosis or Univariate and Multivariate skewness and kurtosis was conducted on the data normality, using the methodology proposed by Kock and Lynn [52].

The findings indicate that all variables exhibited univariate normality, as evidenced by their skewness and kurtosis values falling within the range of 1 to 7 [53]. Additionally, the application of Kock's rule of thumb revealed that the data displayed multivariate normality, with a multivariate skewness exceeding 3 and a multivariate kurtosis surpassing 20. Furthermore, statistical analysis using Mardia's multivariate skewness ( $\beta = 70.241$ ,  $p < 0.01$ ) and Mardia's multivariate kurtosis ( $\beta = 126.238$ ,  $p < 0.01$ ) confirmed the presence of significant departures from multivariate normality. The abnormality of the data is therefore assessed, thereby providing justification for employing the PLS bootstrapping procedure.

**Table 2:** Testing for Full Collinearity.

WC	EE	JS
3.525	2.526	3.232

**Source:** Data Analysis.

### 4.3 Validity and Reliability

In light of the lack of evident method bias in the data, additional analyses were performed to assess the validity and reliability of the utilized instruments. The loadings of each item for the research variables were examined in accordance with the conditions outlined in reference [49] to ensure that the items have loadings above the acceptable threshold of 0.5. The researchers also examined the reliability of the variables by calculating the composite reliability (CR) value, which ranged from 0.935 to 0.867. These values above the minimum threshold of 0.70, as recommended by reference [49]. The examination also assessed the convergent validity of the measuring items, which is characterized by an average

variance extracted (AVE) value exceeding 0.50, as indicated in Table 3. As evidenced by the data presented in Table 3, the AVE values range from 0.685 to 0.754. These values imply that the construct under consideration explains more than fifty percent of the variability observed among its indicators, thereby suggesting a high level of construct validity. The present study demonstrated a high level of success in establishing reliability, validity, and convergent validity.

**Table 3.** Reliabilities of Study Variables.

Construct	Items	Factor Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Work Culture	WC1	0.861	0.928	0.826
	WC2	0.782		
	WC3	0.827		
	WC4	0.809		
	WC5	0.797		
	WC6	0.808		
Employee Engagement	EE1	0.781	0.867	0.753
	EE2	0.728		
	EE3	0.876		
	EE4	0.784		
	EE5	0.852		
	EE6	0.861		
	EE7	0.764		
	EE8	0.772		
Job Satisfaction	JS1	0.723	0.935	0.834
	JS2	0.823		
	JS3	0.837		
	JS4	0.795		
	JS5	0.746		
	JS6	0.803		
	JS7	0.843		

**Source:** Data Analysis.

### 4.4 Discriminant Validity

The discriminant validity of the assessment items was examined to establish the validity and reliability of the study variables. The Heterotrait-Monotrait (HTMT) criterion was utilized to assess the discriminant validity values of the research variables. The results, presented in Table 4, indicate that these values were deemed reasonable. The reliability criterion proposed by Cain et al., [54] has faced criticism, leading to the adoption of the HTMT matrix approach for assessing discriminant validity through the utilization of the HTMT ratio of correlations [55]. Based on the findings of the study, it has been observed that there exists a challenge pertaining to discriminant validity when the HTMT value exceeds the threshold of 0.85 or 0.90, as indicated by previous research [55, 56]. Hence, as illustrated in Table 2, all the observed values successfully met the threshold of 0.90 for the Heterotrait-Monotrait Ratio of Correlations (HTMT), and none of the variables exhibited an HTMT value of 1.

This outcome signifies the existence of discriminant validity among the constructs [56]. Consequently, the values in the row and column exceed those of AVE in both vertical and horizontal comparisons, so demonstrating the statistical significance of the assessments conducted in the study.

**Table 4:** Discriminant Validity using HTMT ratio.

Constructs	WC	EE	JS
Work Culture (WC)	0.837		
Employee Engagement (EE)	0.732	0.885	
Job Satisfaction (JS)	0.718	0.795	0.864

Source: Data Analysis.

#### 4.5 Structural Model of the Tested Hypotheses

After conducting the measurement process, which included assessing the validity and reliability of the constructs and addressing issues related to data normalcy, the study model was deemed satisfactory. The findings generated by the model were deemed suitable, enabling the evaluation of the structural model on a sample of 308 respondents using a bootstrapping approach. The direct and indirect hypotheses that were examined are presented in Tables 5 and 6, respectively. Additionally, the study's structural model may be observed in Figure 2.

In order to provide additional evidence, a 5,000 resample PLS bootstrapping technique was employed, following the guidelines proposed by Leclercq et al., [49] and other relevant researchers in the field. The provided hypotheses have been evaluated through the utilization of path coefficients, p-values, t-values, and standard errors for the structural model. This comprehensive approach not only provides support for the hypotheses but also addresses previous critiques [57,58]. Furthermore, it is widely believed that enhancing the reliability of testing research outcomes can be achieved by considering factors outside the significant t-values and p-values associated with the presented hypotheses. Table 5 illustrates the direct hypothesis that was examined in the study, in accordance with the recommended approach for formulating hypotheses in contemporary research.

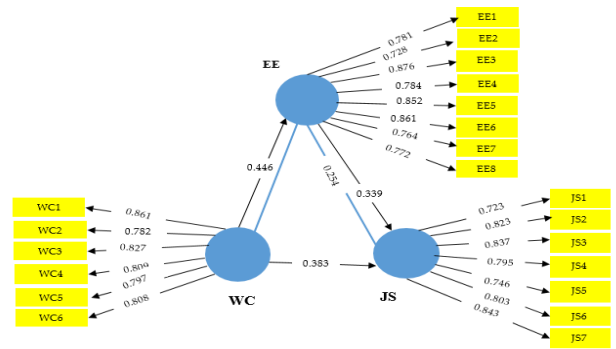
**Table 5:** Direct Effect of Tested Relationships.

Hypotheses	Effect	$\beta$	SE	T-Stat	P Value	Decision
H1	WC → JS	0.383	0.025	7.245	0.000	Supported
H2	EE → JS	0.339	0.048	3.109	0.001	Supported
H3	WC → EE	0.446	0.017	8.243	0.000	Supported

Source: Data Analysis.

The hypotheses that were tested have been documented, providing information on their path coefficients, standard errors, t-values, and p-values. The

results presented in Table 5 indicate that there was a statistically significant relationship between WC and both JS and EE. The correlation coefficient (r) between WC and JS is 0.383, indicating a moderate positive relationship. The p-value is significant at 0.000, suggesting that the relationship is statistically significant. The t-value for this correlation is 7.245. Similarly, the correlation coefficient between EE and JS is 0.339, indicating a moderate positive relationship. The p-value associated with this correlation is less than 0.001, indicating statistical significance. The t-value for this correlation is 3.109. Lastly, the correlation coefficient between WC and EE is 0.446, indicating a strong positive relationship among other. The p-value associated with this correlation is less than 0.000, indicating high statistical significance. The t-value for this correlation is 8.243. In summary, the statistical analysis shown in Table 5 indicates that there were significant relationships between WC and JS, EE and JS, and WC and EE.



**Fig 2:** Structural Model.

**Table 6:** Indirect Effect of Tested Relationships.

Hypothesis	Effect	$\beta$	SE	T Stat	P Value	Decision
H4	WC → EE → JS	0.254	0.034	3.144	0.016	Supported

Table 6 denotes the tested indirect or mediating effect of employee engagement on the relationship between work culture and job satisfaction. As illustrated, there exists a mediating effect of employee engagement (EE) between WC and JS. The outcome suggests a significant mediating effect of the fourth hypothesis; H4, WC->EE->JS ( $\beta=0.254$ ,  $t=3.144$ ,  $p=0.016$ ).

The data gathered from our research suggest that employee engagement plays a significant role in mediating the relationship between work culture and employee engagement among SME employees in Saudi Arabia. A significant positive correlation was observed between employee engagement, work culture and job satisfaction. Employees who have good work culture found to be more contented at job. This may be because of the employee engagement they are more committed and achieve their goals at job.

Notably, the research highlights the critical role of leadership and management practices in shaping work culture and, subsequently, influencing job satisfaction

among international employees in SMEs. It emphasizes the significance of addressing these factors to create a positive and inclusive work environment that fosters satisfaction. Furthermore, the study identifies compensation packages, nature of work, and leadership role as pivotal elements influencing job satisfaction among international employees in SMEs. The findings call attention to the need for targeted strategies in this area to enhance overall satisfaction levels. The research not only contributes to the existing literature by revealing these crucial insights but also underscores the practical implications for SMEs looking to optimize their work culture and engagement practices for the diverse international workforce. The discussion paves the way for future research avenues and suggests actionable recommendations for SMEs seeking to enhance job satisfaction among their international employees.

## 5 Practical Implications

According to the research of Parent & Lovelace [59], employee engagement has been recognized as one of the vital aspects that produces a direct impact on employee job satisfaction. This factor has been evaluated in the context of international employees where organizations make different efforts to keep their employees engaged by which a high level of job satisfaction can be attained. Specifically, the organizations are required to value the efforts of the international employees, and timely acknowledgement of efforts should be performed by which maximum level of job satisfaction among international employees can be obtained. These factors are also presented in the quantitative findings in which respondents have shown a positive impact on employee engagement by which high job satisfaction can be attained. On the other hand, the quantitative findings also define that various leadership practices have been determined that produces a direct impact on the job satisfaction among international employees where different opportunities should be provided to them and their efforts should be acknowledged within minimum time.

Further the study addressed the provisions of work culture producing a direct impact on job satisfaction among international employees. This study has evaluated that the firms are required to develop different human resources policies like flexible working, performance and much more by which a positive work culture can be devised and high employee satisfaction among international employees can be obtained. This factor can be evaluated from the quantitative findings where all the respondents have shown positive results by which work culture and job satisfaction are directly proportional to each other. Moreover, the respondents were also asked regarding the provisions of work culture and its impact on job satisfaction. The findings define that organizational culture produces a direct impact on employee job satisfaction among international employees and if organizations fail to develop a sufficient level of organizational culture, it could result adversely on the job satisfaction among international employees. It has been evaluated that strong work culture produces a direct impact

because it drives the forces by which improvised employee performance is obtained. Work culture is also significant because it enhances commitment and self-confidence among the international employees and the stress is reduced by which a high level of job satisfaction is obtained among international employees. Furthermore, it has been evaluated that the human resource management is liable by which different policies should be devised accordingly by which a sufficient organizational culture should be developed and different practices should be integrated accordingly that could result positively on employee job satisfaction and high employee performance.

## 6 Conclusion

Work culture and employee engagement practices have been recognized as the vital factors that produce a direct impact on employee job satisfaction. This paper has evaluated the mediating role of employee engagement between work culture and job satisfaction among international employees in KSA. The research findings concluded that work culture and employee engagement strategies produce a direct impact on employee job satisfaction. It has been further deduced that the human resource department has been recognized in a crucial position because the HR department is liable by which different policies should be devised accordingly by which a sufficient work culture and different employee engagement practices should be integrated within the organizations operating in Saudi Arabia, which will result into having high job satisfaction among international employees.

## Conflicts of Interest Statement:

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

## Acknowledgment:

The authors of this article would like to thank Prince Sultan University for its financial and academic support for this publication.

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