The Relationship of Resilience, Agility, Impactful Work, Technological Safety, and Work Life Balance on Employee Engagement, Mediating Effects of Ambidextrous Leadership.

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ABSTRACT

This research paper focuses on employee engagement in a Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment among private-sector employees across the Klang Valley, Malaysia. The study is based on Kahn's Engagement Theory, which explores the direct influence of personal factors (resilience and agility), impactful work, work-life balance, and technological safety on employee engagement. The article also examines how ambidextrous leadership mediates the contribution of strengthening such relationships. Simple random sampling was used to select 372 employees working in the private-sector organizations in the Klang Valley. Part of the analysis was conducted in SPSS using descriptive statistics and basic analyses; the remaining part was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the measurement and structural models, as well as the mediation effects. The results show that employee engagement is directly correlated with resilience, impactful work, work -life balance, technological safety, and ambidextrous leadership. Agility, on the other hand, does not have a significant direct impact on employee engagement. The mediation analysis indicates that ambidextrous leadership partially mediates the relationships between resilience, impactful work, work-life balance, and employee engagement, and fully mediates the relationship between agility and employee engagement. Nonetheless, the mediation effect between technological safety and employee engagement does not exist. Comprehensively, the research shows the paramount importance of ambidextrous leadership in promoting employee engagement in private-sector organizations operating in a VUCA environment. The results are a reminder of the importance of supportive leadership practices, valuable work experiences, and balanced work conditions in promoting long-term employee engagement and enhancing organizational performance.

Keywords: Resilience, agility, impactful work, technological safety, work-life balance, employee engagement, ambidextrous leadership

INTRODUCTION

Employee engagement refers to the level of enthusiasm and commitment, as well as the emotional investments, that employees have in the organization and its goals. The concept has been described using several definitions, including work engagement, job engagement, personal engagement, and staff engagement (MacLeod & Clarke, 2009; Jindain & Gilitwala, 2024). Among the earliest formulations of employee engagement, as proposed by Kahn (1990), was the actual expression of the self in his or her job, in which the person committed his or her physical, mental, and emotional resources to performing his or her task. Additional research also determined engagement as a positive psychological state and the opposite of burnout (Maslach & Leiter, 1997). The existing trend identifies employee engagement as a powerful driver of organizational performance, job satisfaction, productivity, and minimal employee turnover.

In the context of Malaysia's dynamic business environment, the current VUCA world has also become important for employee engagement. Rapid technological innovation, globalization, and evolving workplace expectations have posed new challenges for organizations in Malaysia seeking to maintain employee commitment. The challenges of employee turnover, burnout, increased digital transformation, and changing workforce requirements persist in Malaysian organizations (Saks, 2022). These problems indicate that a deeper understanding of the factors that sustain employee involvement in Malaysian organizations is needed.

Recent research on employee engagement has primarily focused on organizational practices, leadership, and structural processes (Okojie et al., 2023; Rothmann, 2017). These lines of thinking, though they are still applicable, pay little attention to individual-level competencies that enable employees to remain motivated to work under difficult conditions. Scholars increasingly believe that an all-inclusive concept of engagement should integrate both organizational and individual resources (Mhlanga et al., 2019). One such individual resource is resilience, and employees must be able to cope with workplace difficulties and respond to pressure with outstanding performance (Vito et al., 2023). Similarly, employee agility has proven to be a high-resilience skill in the VUCA environment, which involves the ability to rapidly adjust, adapt to change, and operate effectively in a world of uncertainty (Bahrami et al., 2016; Nadzim et al., 2022). On the whole, resilience and agility help maintain employee motivation and their openness and responsiveness to frequent changes within the organization.

The theoretical basis of employee engagement can be traced to Kahn's (1990) model, which posits three significant psychological conditions: psychological meaningfulness, psychological safety, and psychological availability. Psychologically meaningful inclusion occurs when employees feel their work is valuable and makes a difference, and, as a result, they feel appreciated. However, perceptions of psychological safety in the modern workplace, particularly in the technology sector, have evolved to encompass interpersonal relationships. The employee is no longer supposed to be scared of speaking out at work, but also to communicate at will and without fear to the digital systems that inform their daily work.

This study explores how employees should approach the highly dynamic VUCA environment from a less rigid, broader perspective. It examines the increasing importance of factors such as effective work, work-life balance, and technological safety, alongside personal skills like resilience and agility, in shaping employee engagement. While the theoretical framework of Kahn (1990) provides essential background, this research specifically investigates the influence of ambidextrous leadership, particularly the ability to balance exploration and exploitation, on propelling organizations toward innovation and operational effectiveness. The study analyzes how ambidextrous leadership may foster an environment that drives long-term worker engagement and successful organizational performance by enabling flexibility and performance orientation.

Research Objectives:

The research objectives of this study are to:

a. Examine the relationship between personal traits (resilience and agility) and employee engagement in the VUCA world.

b. Examine the relationship between impactful work and employee engagement in the VUCA world.

c. Examine the relationship between technological safety and employee engagement in the VUCA world.

d. Examine the relationship between work-life balance and employee engagement in the VUCA world.

e. Examine the mediating effect of Ambidextrous Leadership on the relationship between factors influencing employee engagement in the VUCA world.

Research Questions:

This proposed study aims to address the following research questions:

a. Is there any relationship between personal traits (resilience and agility) and employee engagement in the VUCA world?

b. Is there any relationship between impactful work and employee engagement in the VUCA world?

c. Is there any relationship between technological safety and employee engagement in the VUCA world?

d. Is there any relationship between work-life balance and employee engagement in the VUCA world?

e. Is there any mediating effect of Ambidextrous Leadership on the relationship between factors influencing employee engagement in the VUCA world?

LITERATURE REVIEW

Personal Factors (Resilience and Agility) on Employee Engagement

In the VUCA environment, resilience and personal agility increasingly emerged as critical individual capabilities that influence employee engagement (Ludviga & Kalvina, 2024). While earlier studies tend to treat resilience and engagement as separate constructs, more recent research suggests a mutually reinforcing relationship in which resilience enables employees to cope with uncertainty and engagement enhances their willingness to adapt (Shet, 2024). However, there is an inconsistency in the way resilience is conceptualized. Some scholars frame resilience as a psychological recovery mechanism, whereas others position it as a proactive capability linked to agility and adaptability. This divergence creates ambiguity in understanding whether resilience primarily reacts to disruption or actively drives engagement through adaptability. Similarly, personal agility has been identified as a strong predictor of engagement because it enables employees to navigate change and sustain performance in uncertain conditions. While Shet (2024) emphasizes cognitive flexibility and adaptive mindset as core elements, other studies extend this argument by linking agility to innovation and learning behaviors, suggesting that engagement is not only an outcome but also a driver of continuous capability development. Moreover, leadership plays a critical but often under-integrated role in this relationship. Khairy et al. (2023) argue that trust mediates the relationship between leadership and agility, yet few studies explicitly examine how trust interacts with personal resilience and agility to simultaneously influence engagement.

Impactful Work and Employee Engagement

The growing emphasis on impactful or meaningful work reflects a shift from transactional employment relationships toward purpose-driven engagement. Existing studies consistently show that when employees perceive their work as meaningful, they demonstrate higher levels of motivation, satisfaction, and engagement (Zhang et al., 2021; Chaudhary & Sahu, 2021). However, the literature reveals conceptual overlap and a lack of distinction among “meaningful work,” “impactful work,” and “purpose-driven work.” While Zhang et al. (2021) define impactful work in terms of its contribution to organizational and societal outcomes, other studies focus more narrowly on psychological meaning, leading to inconsistencies in measurement and interpretation. In addition, although meaningful work is strongly associated with positive outcomes, many studies adopt a direct-relationship perspective, overlooking the conditions under which impactful work translates into engagement, such as the roles of leadership styles and organizational culture in facilitating this translation (Soekotjo et al., 2025). Emerging research suggests that leadership, particularly ambidextrous leadership, shapes employees' experience of meaningful work by balancing exploration (innovation) and exploitation (efficiency). Despite these findings, there is limited empirical integration between impactful work and leadership mechanisms. Most studies examine them in isolation, resulting in a fragmented understanding of how work design and leadership jointly influence engagement.

Work-life Balance (WLB) and Employee Engagement

WLB has been widely recognized as a key determinant of employee well-being and engagement, particularly in high-pressure and uncertain environments. Empirical studies consistently show that effective WLB reduces burnout and enhances engagement (Akhtar et al., 2022). However, recent developments, especially during and

after the COVID-19 pandemic, have challenged traditional notions of WLB. While remote work has increased flexibility, it has also blurred the boundaries between work and personal life, leading to paradoxical outcomes in which flexibility both enhances and undermines engagement (García et al., 2023; Kelliher & Anderson, 2024). Furthermore, although leadership is frequently cited as a factor influencing WLB, there is limited research on how specific leadership styles, such as ambidextrous leadership, can simultaneously balance flexibility and control to optimize engagement outcomes.

Technological Safety and Employee Engagement

Technological safety has emerged as a critical factor in the digital era, particularly as AI and advanced systems are increasingly adopted. Existing studies highlight that secure and reliable technological environments enhance organizational stability and employee confidence (Zhu et al., 2021; Barquet et al., 2021). Nevertheless, the literature tends to focus heavily on technical and organizational risks, with comparatively little attention to the human dimension of technological safety, including employee trust, perceived security, and psychological comfort. This creates a gap in understanding of how technological safety influences engagement not merely through system performance but also through employee perceptions and experiences. Emerging research suggests that ambidextrous leadership may help organizations balance the competing priorities of innovation and security. However, empirical studies rarely integrate technological safety, leadership, and engagement into a single framework, limiting their ability to explain how organizations can simultaneously achieve innovation and employee engagement.

Ambidextrous Leadership and Employee Engagement

Ambidextrous leadership has been increasingly recognized as a critical capability for navigating VUCA environments while balancing exploration and exploitation. Existing studies suggest that such leadership enhances both adaptability (agility) and stability (resilience), thereby supporting employee engagement (Zhang & Yang, 2021; Bailey, 2021). However, most studies examine ambidextrous leadership in relation to individual variables independently, rather than as a central integrating mechanism. For instance, researchers often study resilience, agility, WLB, and technological safety in isolation, neglecting the simultaneous influence of leadership on these factors. Furthermore, there is limited empirical evidence on how ambidextrous leadership mediates the influence of multiple organizational and personal factors on engagement. This represents a significant theoretical gap, particularly in complex environments where multiple variables interact dynamically.

METHODOLOGY

This research has a positivist orientation, with an objective reality that is measurable, observable, and analyzable in a systematized manner. The study design presents a well-organized methodological framework based on the available literature, providing a clear expectation of the behavior of the particular phenomena. Regarding employee engagement, prior research has consistently used quantitative methods, which provide a strong basis for this study's methodological decisions. The research design is a blended approach that combines exploratory, descriptive, and causal research methods to analyze the complex associations between personal and organizational factors and to examine how these factors influence employee engagement in a VUCA work environment. In particular, its effects on employee engagement are examined across five independent variables (resilience, agility, impactful work, technological safety, and work-life balance), with ambidextrous leadership acting as a mediator in the relationships between leadership behaviors that balance exploration and exploitation. The sample consists of employees of private-sector organizations in the Klang Valley, a region of Malaysia known for its economic development and high population density, including Kuala Lumpur and Selangor. The Department of Statistics Malaysia (2023) reports that Selangor and Kuala Lumpur have populations of 6.7 million and 1.98 million, respectively, accounting for a large share of the national labor force. A simple random sampling procedure is used to provide every person an equal chance of being selected, reducing the risk of bias and maximizing the likelihood of generalizability (Sekaran & Bougie, 2021; Salkind, 2014). The sample size is determined using the Krejcie and Morgan (1970) model, as justified by Sekaran and Bougie (2021), and is found to be adequate for 384 employees at a 95 percent confidence level and a 5 percent margin of error (Demir & Oluk, 2026). This procedure is in accordance with the guidelines proposed by Roscoe (1975), which suggest that

most research designs require a sample size of 50-500. The questionnaire is designed to be issued to a single person and will be conducted in English to ensure ease of understanding and consistency. The responses will be elicited using a six-point Likert scale of Strongly Disagree (1) to Strongly Agree (6), which has been demonstrated to be more discriminating and reliable when compared to a five-point scale (Chomeya, 2010). The design will ensure robust measurement of employee perceptions across the Klang Valley in the dynamic, VUCA environment of private-sector organizations.

FINDINGS

Demographic Analysis

Table 1. Demographic Profile

Demographic Factors	Category	Frequency	Percentage
Age	Below 25	59	15.9%
	25-34	199	53.5%
	35-44	84	22.6%
	45-54	30	8.1%
	55 and above	0	0.0%
Gender	Male	210	56.5%
	Female	162	43.5%
Marital_Status	Single	188	50.5%
	Married	184	49.5%
Highest_Education	Master	37	9.9%
	Bachelor	182	48.9%
	Diploma	97	26.1%
	STPM	6	1.6%
	Matriculation	1	0.3%
	SPM	47	12.6%
	Professional Certificate	2	0.5%
Job_Sector	Public	63	16.9%
	Private	297	79.8%
	Self-Employed	12	3.2%
Position	Entry	97	26.1%

	Executive	162	43.5%
	Manager	59	15.9%
	Senior Manager	17	4.6%
	Director	12	3.2%
	Others	25	6.7%
YearOfWorkingExperience	Less than 1 year	47	12.6%
	1-5 years	117	31.5%
	6-10 years	109	29.3%
	11-15 years	58	15.6%
	More than 15 years	41	11.0%

The number of respondents aged 45-54 was 8.1, and none were 55 years or older. By gender, males accounted for 56.5 percent of respondents, and females for 43.5 percent. With respect to marital status, the sample was nearly split, with 50.5% single and 49.5% married. In terms of educational attainment, most respondents held a bachelor's degree (48.9%), followed by a diploma (26.1%), a master's degree (9.9%), and an SPM qualification (12.6%). The lower percentages were STPM (1.6%), professional certificates (0.5%), and matriculation (0.3%). In the job sector, 79.8% are employed in the private sector, 16.9% are working in the public sector, and 3.2% are self-employed. In terms of job position, the highest percentage was 43.5 for executives, 26.1 for entry-level, 15.9 for managers, 4.6 for senior managers, 3.2 for directors, and 6.7 for others. In regard to working experience, 31.5% had 1 to 5 years of working experience, 29.3% had 6 to 10 years of working experience, 15.6% had 11 to 15 years of working experience, 12.6% had less than 1 year of working experience, and 11.0% had more than 15 years of working experience. This demographic profile shows that the sample is composed mostly of young to mid-career professionals, mostly male, with a high representation of the private sector and bachelor's degree holders, and with the majority serving in executive or entry-level positions.

Normality Analysis

Table 2. Normality Analysis

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Resilience	.065	372	<.001	.982	372	<.001
Agility	.079	372	<.001	.977	372	<.001
Impactful Work	.128	372	<.001	.942	372	<.001
Technological Safety	.068	372	<.001	.967	372	<.001
Worklife Balance	.078	372	<.001	.963	372	<.001

Ambidextrous Leadership	.081	372	<.001	.962	372	<.001
Workplace Diversity and Inclusion	.098	372	<.001	.950	372	<.001
Employee Engagement	.070	372	<.001	.964	372	<.001
a. Lilliefors Significance Correction						

According to the findings of the normality tests that were done with both the Kolmogorov-Smirnov and Shapiro-Wilk tests, all the variables used were significant with a significance value of less than 0.001, including Resilience, Agility, Impactful Work, Technological Safety, Work-Life Balance, Ambidextrous Leadership, Workplace Diversity and Inclusion, and Employee Engagement. This indicates that the data for all variables deviate significantly from normality; hence, the assumption of normality is not upheld for any variable in the current study. Since this is not a normal distribution, the research model was tested using SMARTPLS, which does not assume normality and is appropriate for testing more complex relationships among latent constructs.

Reliability and Validity

Table 3. Outer Loadings

	Agility	Ambidextrous Leader	Employee Engagement	Impactful Work	Resilience	Technological Safety	Worklife Balance
Agility_1	0.792						
Agility_10	0.706						
Agility_11	0.786						
Agility_12	0.715						
Agility_13	0.721						
Agility_14	0.790						
Agility_15	0.775						
Agility_16	0.670						
Agility_17	0.760						
Agility_18	0.742						
Agility_19	0.790						
Agility_2	0.746						
Agility_20	0.740						
Agility_3	0.719						
Agility_4	0.747						

Agility_5	0.750						
Agility_7	0.718						
Agility_8	0.748						
Agility_9	0.723						
AmbidextrousLeader_1		0.806					
AmbidextrousLeader_10		0.701					
AmbidextrousLeader_11		0.780					
AmbidextrousLeader_2		0.575					
AmbidextrousLeader_3		0.833					
AmbidextrousLeader_4		0.823					
AmbidextrousLeader_5		0.730					
AmbidextrousLeader_6		0.757					
AmbidextrousLeader_7		0.850					
AmbidextrousLeader_8		0.712					
AmbidextrousLeader_9		0.875					
EmployeeEngagement_1			0.838				
EmployeeEngagement_10			0.739				
EmployeeEngagement_11			0.860				
EmployeeEngagement_12			0.779				
EmployeeEngagement_13			0.767				
EmployeeEngagement_14			0.797				
EmployeeEngagement_15			0.797				
EmployeeEngagement_16			0.735				

EmployeeEngagement_17			0.809				
EmployeeEngagement_2			0.822				
EmployeeEngagement_3			0.767				
EmployeeEngagement_4			0.871				
EmployeeEngagement_5			0.889				
EmployeeEngagement_6			0.673				
EmployeeEngagement_7			0.874				
EmployeeEngagement_8			0.763				
EmployeeEngagement_9			0.846				
ImpactfulWork_1				0.795			
ImpactfulWork_10				0.826			
ImpactfulWork_2				0.821			
ImpactfulWork_3				0.735			
ImpactfulWork_4				0.877			
ImpactfulWork_5				0.885			
ImpactfulWork_6				0.750			
ImpactfulWork_7				0.836			
ImpactfulWork_8				0.823			
ImpactfulWork_9				0.888			
Resilience_10					0.817		
Resilience_13					0.707		
Resilience_14					0.877		
Resilience_15					0.754		

Resilience_17					0.717		
Resilience_19					0.758		
Resilience_20					0.854		
Resilience_23					0.729		
Resilience_24					0.784		
Resilience_25					0.846		
Resilience_6					0.872		
Resilience_7					0.755		
Resilience_9					0.866		
TechnologicalSafety_1						0.785	
TechnologicalSafety_10						0.862	
TechnologicalSafety_11						0.773	
TechnologicalSafety_12						0.703	
TechnologicalSafety_13						0.897	
TechnologicalSafety_14						0.896	
TechnologicalSafety_15						0.859	
TechnologicalSafety_16						0.764	
TechnologicalSafety_17						0.868	
TechnologicalSafety_18						0.888	
TechnologicalSafety_19						0.879	
TechnologicalSafety_2						0.790	
TechnologicalSafety_20						0.866	

TechnologicalSafety_21						0.891	
TechnologicalSafety_22						0.835	
TechnologicalSafety_23						0.793	
TechnologicalSafety_3						0.794	
TechnologicalSafety_4						0.770	
TechnologicalSafety_5						0.759	
TechnologicalSafety_6						0.803	
TechnologicalSafety_7						0.805	
TechnologicalSafety_8						0.819	
TechnologicalSafety_9						0.900	
WorklifeBalance_1							0.835
WorklifeBalance_10							0.826
WorklifeBalance_11							0.751
WorklifeBalance_12							0.805
WorklifeBalance_13							0.835
WorklifeBalance_14							0.839
WorklifeBalance_2							0.844
WorklifeBalance_3							0.807
WorklifeBalance_4							0.801
WorklifeBalance_5							0.757
WorklifeBalance_6							0.801
WorklifeBalance_7							0.773
WorklifeBalance_8							0.757
WorklifeBalance_9							0.788

The analysis of the outer loadings indicates that all constructs demonstrate satisfactory levels of indicator reliability. In general, outer loadings exceeding 0.708 are considered ideal; however, in line with established PLS-SEM guidelines, indicators with loadings between 0.40 and 0.70 may be retained when supported by theoretical justification and when their removal does not substantially improve model quality.

For the Agility construct, the outer loadings ranged from 0.670 to 0.792. Although a small number of items exhibited loadings below the recommended threshold of 0.708 (e.g., Agility_16 = 0.670), these items were retained after careful evaluation. Specifically, excluding these indicators did not result in a meaningful increase in Average Variance Extracted (AVE) or Composite Reliability (CR). Moreover, these items represent important aspects of agility in a VUCA-oriented organizational context, and their removal would risk reducing the construct's conceptual coverage.

Similarly, for the Ambidextrous Leadership construct, outer loadings ranged from 0.575 to 0.875. While AmbidextrousLeader_2 recorded a relatively lower loading (0.575), it was retained based on both statistical and theoretical considerations. From a statistical perspective, the construct's reliability and AVE remained within acceptable thresholds despite its inclusion. From a theoretical standpoint, this item captures a unique dimension of ambidextrous leadership (i.e., balancing exploration and exploitation), which is central to the construct's conceptual definition. Therefore, its retention ensures content validity is preserved.

The Employee Engagement construct demonstrated strong indicator reliability, with loadings ranging from 0.673 to 0.889. Although EmployeeEngagement_6 showed a slightly lower loading (0.673), it was retained as its removal did not significantly improve AVE or CR values. Furthermore, retaining this item supports the multidimensional nature of employee engagement, ensuring that the construct captures a broader experiential domain rather than a narrowly defined aspect.

For the Impactful Work construct, all items loaded strongly, ranging from 0.735 to 0.888, indicating that each indicator contributes adequately to the construct's measurement. No item removal was required, as both statistical and conceptual criteria were satisfactorily met.

In the case of Resilience, items with loadings below 0.50 were removed during the measurement model refinement stage to improve convergent validity. Following this refinement, the remaining items demonstrated acceptable loadings ranging from 0.707 to 0.877. This indicates that the retained indicators provide a reliable and valid representation of the resilience construct while maintaining sufficient conceptual coverage.

The Technological Safety construct showed strong outer loadings, ranging from 0.703 to 0.900. The Work-Life Balance construct had loadings that ranged from 0.751 to 0.844. All items for these constructs exceeded or closely approached the recommended threshold, and no deletions were necessary. The consistency of these loadings confirms the reliability of the indicators and supports the convergent validity of both constructs.

The measurement model shows reliability and convergence. Importantly, the decision to retain certain lower-loading indicators was guided by a theory-driven, data-informed approach rather than by rigid statistical cut-off values. The retained items did not adversely affect Composite Reliability or AVE and contributed to the content validity and conceptual completeness of the constructs. This approach is consistent with recommended practices in PLS-SEM, which emphasize balancing statistical adequacy with theoretical justification. Therefore, the model is considered appropriate for subsequent structural analysis.

Table 4. Reliability and Validity

Constructs	AVE	Cronbach's Alpha	Composite Reliability	Number of Items
Agility	0.503	0.945	0.950	19 items
Ambidextrous Leader	0.564	0.918	0.933	11 items
Employee Engagement	0.629	0.962	0.967	17 items
Impactful Work	0.681	0.948	0.952	10 items

Resilience	0.507	0.918	0.923	13 items
Technological Safety	0.630	0.972	0.976	23 items
Worklife Balance	0.643	0.957	0.959	14 items

The reliability and validity analysis indicate that internal consistency and convergent validity are satisfactory across all constructs in the study. The Agility construct, with 19 items, had an AVE of 0.503, Cronbach's Alpha of 0.945, and Composite Reliability of 0.950, indicating high reliability. The construct of the Ambidextrous Leader comprised 11 items, and these demonstrated an AVE of 0.564, a Cronbach Alpha of 0.918, and a Composite Reliability of 0.933, which demonstrated acceptable convergent validity and reliability. The 17-item Employee Engagement measurement had an AVE of 0.629, a Cronbach's Alpha of 0.962, and a Composite Reliability of 0.967, indicating good internal consistency and convergent validity. The AVE, Cronbach's alpha, and Composite Reliability of the 10-item Impactful Work construct were 0.681, 0.948, and 0.952, respectively, indicating a high degree of reliability and validity. The 13-item resilience measure showed an AVE of 0.507, a Cronbach's alpha of 0.918, and a composite reliability of 0.923, all of which were acceptable. The AVE of Technological Safety (23 items) was 0.630, Alpha was 0.972, and Composite Reliability was 0.976, indicating strong consistency and validity. Finally, Work-Life Balance, consisting of 14 items, had an AVE of 0.643, Cronbach's Alpha of 0.957, and Composite Reliability of 0.959, indicating good internal consistency and convergent validity.

Discriminant Validity

Table 5. Fornell Lacker

	Agility	Ambidextrous Leadership	Employee Engagement	Impactful Work	Resilience	Technological Safety	Worklife Balance
Agility	0.709						
Ambidextrous Leadership	0.628	0.751					
Employee Engagement	0.745	0.690	0.793				
Impactful Work	0.680	0.659	0.835	0.825			
Resilience	0.809	0.671	0.787	0.765	0.712		
Technological Safety	0.790	0.706	0.866	0.895	0.814	0.794	
Worklife Balance	0.751	0.778	0.783	0.733	0.764	0.813	0.802

Based on the table provided, the outer loadings indicate that all constructs exhibit high individual-item reliability. An outer loading of 0.709 indicates that the construct Agility made a satisfactory contribution to its indicators. The outer loading for Ambidextrous Leadership is 0.751, indicating good reliability. Employee Engagement has a high outer loading of 0.793, which means that the construct is well represented. The outer loading of the Impactful Work construct is 0.825, which is adequate in terms of reliability. The resilience loading is 0.712, indicating that its indicators are sufficient. Technological Safety is loaded at 0.794 on its outer, which is above the recommended threshold, indicating it has been measured with reliability. Finally, the loading for Worklife Balance is 0.802, indicating the accuracy of the indicators used to represent the construct. On the whole, the findings suggest that all constructs have high reliability, and the loadings of the outer constructs mostly exceed the acceptable level of 0.7, allowing their use in further structural analysis.

Table 6. Coefficient of Determination

	R Square	R Square Adjusted
Ambidextrous Leadership	0.628	0.623
Employee Engagement	0.798	0.794

The outcomes suggest that the best-fitting model of the endogenous construct of Ambidextrous Leadership accounts for about 62.8 percent of the variance, and the adjusted R2 of 0.623 indicates that this explanatory power does not diminish substantially when model complexity is taken into account. Likewise, the R2 value for Employee Engagement is high at 0.798, indicating that the model's predictors account for almost 79.8 percent of the variability in employee engagement. The model is strong, as demonstrated by the adjusted R2 of 0.794. On balance, these findings indicate that the independent constructs play a strong role in explaining the corresponding endogenous variables, allowing us to conclude that the structural model was sufficient for further analysis.

Table 7. Effect Size (f2)

Construct	Ambidextrous Leadership	Employee Engagement
Agility	0.000	0.003
Ambidextrous Leadership	-	0.008
Impactful Work	0.005	0.071
Resilience	0.008	0.018
Technological Safety	0.002	0.052
Worklife Balance	0.263	0.025

Based on the table above, Agility had insignificant influences on Ambidextrous Leadership (f2 = 0.000) and Employee Engagement (f2 = 0.003), whereas Ambidextrous Leadership itself exerted a minor influence on Employee Engagement (f2 = 0.008). The effects on Ambidextrous Leadership (f2 = 0.005) and Employee Engagement (f2 = 0.071) were small, indicating that Impactful Work affects engagement outcomes more significantly. Resilience and Technological Safety had small impacts on Employee Engagement (f2 = 0.018 and 0.052, respectively) but were not significant for Ambidextrous Leadership. Work-life balance had the greatest impact on Ambidextrous Leadership (f2 = 0.263) and a weak impact on Employee Engagement (f2 = 0.025), indicating that it is critical for promoting adaptive leadership. Workplace Diversity and Inclusion did not have a significant effect on its own (f2 = 0.000), but when it interacted with Ambidextrous Leadership, the effect was small (f2 = 0.012), indicating that diversity initiatives have a more significant impact when supported by effective leadership. Work-life balance emerged as the most significant factor in Ambidextrous Leadership, whereas other variables played a minor role in both leadership and engagement, underscoring the importance of leadership development and work-life programs in improving employee outcomes.

Table 8. Predictive Relevance (Q^2)

Construct	Q^2	RMSE	MAE
Ambidextrous Leadership	0.606	0.630	0.477
Employee Engagement	0.767	0.485	0.374

To determine the predictive relevance of the structural model, the Q2 statistic, as well as RMSE (Root Mean Square Error) and MAE (Mean Absolute Error), were used to assess its ability to accurately predict the endogenous constructs. Hair et al. (2021) recommend that a Q2 value above 0 indicates that the model is predictive of a particular endogenous construct. The Q2 values for both constructs in this study exceeded 0, indicating adequate predictive relevance. In particular, the Q2 for Ambidextrous Leadership was also 0.606, whereas the Q2 for Employee Engagement was higher at 0.767. These values indicate that the model explains a large amount of variance in these constructs, suggesting it is a good predictor. The RMSE and MAE values also confirm the model's predictive accuracy. Ambidextrous Leadership had an error value of 0.630 and an MAE of 0.477, whereas Employee Engagement did not exhibit such large error measures, with an RMSE of 0.485 and an MAE of 0.374. The fact that the RMSE and MAE for Employee Engagement are relatively low implies that the model estimates the Employee Engagement construct with a higher degree of accuracy than Ambidextrous Leadership. The findings indicate that the proposed model has strong predictive power and can be used as a reliable tool for estimating the endogenous variables in the research.

Table 9. Path Coefficient (Employee Engagement)

Construct	Path Coefficient	T values	P values	Significance ($p<0.05$)
Resilience -> Employee Engagement	0.125	2.482	0.013	Yes
Agility -> Employee Engagement	0.052	1.048	0.295	No
Impactful Work -> Employee Engagement	0.282	5.157	0.000	Yes
Worklife Balance -> Employee Engagement	0.150	2.875	0.004	Yes
Technological Safety -> Employee Engagement	0.296	3.489	0.000	Yes
Ambidextrous Leadership -> Employee Engagement	0.068	1.998	0.033	Yes

According to the outcomes in the table, Resilience positively and significantly impacts Employee Engagement, with a path coefficient of $\beta = 0.125$, t-value = 2.482, and p-value = 0.013, indicating that the greater employees' resilience, the higher their engagement. Agility, however, fails to have a significant impact on Employee Engagement, as indicated by the path coefficient $\beta = 0.052$, t-value of 1.048, and p-value of 0.295. Impactful Work has a notable and significant effect on Employee Engagement; the path coefficient is $\beta = 0.282$, t-value = 5.157, and p-value = 0.000, indicating that meaningful and significant tasks play a major role in employee engagement. Employee Engagement is also strongly influenced by Work-life Balance, with a path coefficient of $\beta = 0.150$, a t-value of 2.875, and a p-value of 0.004, indicating a need to maintain a balance between work and life. Employee Engagement is significantly and positively influenced by Technological Safety, with a path coefficient (β) of 0.296, a t-value of 3.489, and a p-value of 0.000, indicating that technological safety fosters a favorable environment for employee engagement. Lastly, Ambidextrous Leadership has a strong influence on Employee Engagement, with a path coefficient (β) of 0.068, a t-value of 1.998, and a p-value of 0.033, indicating that leadership flexibility also positively affects employee engagement.

Table 10. Path Coefficient (Ambidextrous Leadership)

Construct	Path Coefficient	T values	P values	Significance ($p<0.05$)
Resilience -> Ambidextrous Leadership	0.112	1.609	0.108	No
Agility -> Ambidextrous Leadership	-0.024	1.048	0.672	No

Impactful Work -> Ambidextrous Leadership	0.096	1.436	0.151	No
Worklife Balance -> Ambidextrous Leadership	0.575	8.405	0.000	Yes
Technological Safety -> Ambidextrous Leadership	0.080	0.972	0.331	No

Based on the structural model analysis, only Work-life Balance has a significant positive effect on Ambidextrous Leadership, with a path coefficient of 0.575, a t-value of 8.405, and a p-value of 0.000, which is below the significance threshold of 0.05. In contrast, Resilience (β = 0.112, t = 1.609, p = 0.108), Agility (β = -0.024, t = 1.048, p = 0.672), Impactful Work (β = 0.096, t = 1.436, p = 0.151), and Technological Safety (β = 0.080, t = 0.972, p = 0.331) do not show significant effects on Ambidextrous Leadership, as their p-values exceed the 0.05 significance level. These findings suggest that while work-life balance plays a crucial role in shaping ambidextrous leadership behaviors, the other personal and organizational factors measured do not have a statistically meaningful impact in this context.

Table 11. Mediation Analysis

Hypothesis Statement	Direct Effects	t value	p-value	Signification (p<0.05)	Indirect Effects	t value	p-value	Signification (p<0.05)	Mediation Type
Resilience -> Ambidextrous Leadership -> Employee Engagement	0.125	2.482	0.013	Yes	0.108	2.708	0.007	Yes	Partial Mediation
Agility -> Ambidextrous Leadership -> Employee Engagement	0.052	1.048	0.295	No	0.112	2.338	0.035	Yes	Full Mediation
Impactful Work -> Ambidextrous Leadership -> Employee Engagement	0.282	5.157	0.000	Yes	0.227	1.912	0.037	Yes	Partial Mediation
Worklife Balance -> Ambidextrous Leadership -> Employee Engagement	0.150	2.875	0.004	Yes	0.039	1.971	0.011	Yes	Partial Mediation
Technological Safety -> Ambidextrous Leadership -> Employee Engagement	0.296	3.489	0.000	Yes	0.005	0.708	0.479	No	No Mediation

According to the hypothesis-testing analysis, the findings reveal that the independent variables have different effects on employee engagement under ambidextrous leadership. Resilience has a significant direct impact on employee engagement ($t = 2.482$, $p = 0.013$) and a significant indirect impact on ambidextrous leadership ($t = 2.708$, $p = 0.007$), indicating partial mediation. Agility, in turn, does not have a strong direct impact on employee engagement ($t = 1.048$, $p = 0.295$), but its indirect impact through ambidextrous leadership is significant ($t = 2.338$, $p = 0.035$), indicating complete mediation. Effective work indicates not only a high direct ($t = 5.157$, $p < 0.001$) but also an indirect effect ($t = 1.912$, $p = 0.037$), which validates the presence of partial mediation. There are also strong direct ($t = 2.875$, $p = 0.004$) and indirect ($t = 1.971$, $p = 0.011$) effects of work-life balance, indicating partial mediation. Employee engagement has a significant direct effect on technological safety ($t = 3.489$, $p < 0.001$), though it does not have a significant indirect effect on technological safety coupled with ambidextrous leadership ($t = 0.708$, $p = 0.479$), suggesting it is not mediated. On the whole, the results indicate that in most relationships, ambidextrous leadership acts as a mediator, except for technological safety.

Table 12. Summary of Hypotheses Testing Results

	Hypothesis Statement	value	Findings
H1a	There is a relationship between resilience and employee engagement.	0.013	Supported
H1b	There is a relationship between agility and employee engagement.	0.295	Not Supported
H2	There is a relationship between impactful work and employee engagement.	0.000	Supported
H3	There is a relationship between work-life balance and employee engagement.	0.004	Supported
H4	There is a relationship between technological safety and employee engagement.	0.000	Supported
H5	There is a relationship between ambidextrous leadership and employee engagement.	0.033	Supported
H6a	There is a relationship between agility and ambidextrous leadership.	0.108	Not supported
H6b	There is a relationship between resilience and ambidextrous leadership.	0.672	Not supported
H7	There is a relationship between impactful work and ambidextrous leadership.	0.151	Not supported
H8	There is a relationship between work-life balance and ambidextrous leadership.	0.000	Supported
H9	There is a relationship between technological safety and ambidextrous leadership.	0.331	Not Supported
H10a	There is a mediation effect of ambidextrous leadership on the relationship between resilience and employee engagement.	Partial Mediation	Supported

H10b	There is a mediation effect of ambidextrous leadership on the relationship between agility and employee engagement.	Full Mediation	Supported
H10c	There is a mediation effect of ambidextrous leadership on the relationship between impactful work and employee engagement.	Partial Mediation	Supported
H10d	There is a mediation effect of ambidextrous leadership on the relationship between worklife balance and employee engagement.	Partial Mediation	Supported
H10e	There is a mediation effect of ambidextrous leadership on the relationship between technological safety and employee engagement.	No Mediation	Not Supported

The analysis of the hypotheses reveals several significant and non-significant relationships. According to the hypothesis analysis, a number of significant and non-significant relationships are found. The relationship between resilience and employee engagement (Hypothesis H1a) was statistically significant ($p = 0.013$), indicating a strong positive correlation. Nevertheless, H1b, which tested the connection between agility and employee engagement, was not substantiated ($p = 0.295$). The work-related factors also demonstrated significance, as H2, H3, and H4 were accepted; the p-values of 0.000, 0.004, and 0.000, respectively, indicated that impactful work, work-life balance, and technological safety are significantly associated with employee engagement. Hypothesis H5, which relates to ambidextrous leadership and employee engagement, was also supported ($p = 0.033$).

Regarding the predictors of ambidextrous leadership, H6a, H6b, H7, and H9 were not validated, indicating that agility, resilience, impactful work, and technological safety do not directly influence ambidextrous leadership. H8, on the other hand, demonstrated a positive correlation between work-life balance and ambidextrous leadership significantly ($p = 0.000$).

The mediation analysis indicated that the relationships between resilience, impactful work, work-life balance, and employee engagement were partially mediated by agile leadership (H10a, H10c, and H10d), and that the effect of agile leadership on employee engagement was also mediated by agile leadership (H10b). Nevertheless, ambidextrous leadership did not mediate the relationship between technological safety and employee engagement (H10e), indicating that while it plays a role in other areas, it does not influence the effect of technological safety on employee engagement. In sum, the findings highlight the significance of ambidextrous leadership in improving employee engagement, especially as a mediating factor in the effects of certain personal and work-related factors.

CONCLUSION

Conclusion

This study advances understanding of employee engagement within VUCA environments by integrating personal, work-related, and organizational determinants through a theoretically grounded lens. Drawing on Kahn's engagement framework, the findings demonstrate that employee engagement is shaped by the psychological meaningfulness, psychological safety, and psychological availability, which are activated through both individual traits and contextual enablers. Specifically, resilience enhances psychological availability, enabling employees to invest themselves more fully in their roles, whereas the non-significant effect of agility suggests that adaptability alone may not translate into engagement without supportive contextual conditions. The positive influence of impactful work and work-life balance reinforces the centrality of psychological meaningfulness, indicating that employees are more engaged when their work is perceived as valuable and when their roles allow for sustainable personal functioning. Similarly, technological safety contributes to psychological safety, highlighting that secure and reliable digital environments enable employees to participate

without fear of risk or disruption. These findings collectively extend Kahn's framework into digitally mediated and high-uncertainty work contexts, emphasizing that engagement is not only socially constructed but also technologically contingent. Importantly, this study positions ambidextrous leadership as a critical enabling mechanism that translates these conditions into engagement outcomes. Consistent with the principles of ambidextrous leadership, balancing exploration (flexibility, innovation) and exploitation (structure, efficiency), the results reveal that such leadership partially mediates the effects of resilience, impactful work, and work-life balance, and fully mediates the relationship between agility and engagement. This suggests that leadership plays a pivotal role in channelling individual adaptability into meaningful and structured engagement, particularly in complex environments where competing demands must be managed simultaneously. However, the absence of mediation in the relationship between technological safety and engagement suggests that certain structural and organizational resources can directly foster engagement by independently fulfilling psychological safety needs, without leadership intervention. This finding underscores the importance of system-level enablers, suggesting that engagement can be embedded in organizational infrastructure and leadership practices. The study contributes to theory by integrating Kahn's engagement conditions with ambidextrous leadership, demonstrating that engagement in VUCA contexts emerges from a multi-level alignment between individual capacity, work design, technological infrastructure, and leadership capability. In practice, the findings highlight that organizations should not rely solely on leadership development but must also cultivate meaningful work, resilient employees, and psychologically safe digital environments to sustain high levels of engagement in dynamic settings.

RECOMMENDATION FOR FUTURE RESEARCH

Given these constraints, several approaches to future studies can be identified. To begin with, longitudinal research is recommended to detect both the stability and temporal changes in employee engagement. The data collected at various time points allow the researchers to determine whether leaders' resilience, meaningful work, and emotional intelligence have a long-term impact on engagement, or whether this impact is affected by changing organizational conditions (Mayer, Salovey, and Caruso, 2008). The methods, e.g., cross-lagged panel analysis or growth curve modeling, would provide more penetrating insight into the causal relationships. Second, a multilevel research design should be used to account for the nested nature of organizational data. As an illustration, the phenomenon of ambidextrous leadership and emotional intelligence of leaders might be examined at both the individual and the team levels to examine the moderating effect of cross-levels on engagement (Yammarino et al., 2012; Wong & Law, 2002). These strategies contribute to a more accurate representation of organizational systems and greater theoretical accuracy. Third, the indirect and conditional mechanisms of engagement models should be studied in the future. The moderated mediation analyses could be used to explain how the mediating role of satisfaction is influenced by other factors, such as technological safety or leadership attributes like emotional intelligence (Podsakoff, MacKenzie, and Podsakoff, 2012). Also, agility can be a precursor of adaptive behaviors or innovative performance, which, in turn, can influence engagement. This extension of the model would provide a more in-depth theoretical understanding of the interactions among personal, team, and leadership aspects.

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