

The Impact of Agile Leadership on Workforce Productivity: The Mediating Role of Employee Engagement in Saudi Arabia's Ministry of Human Resources

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Abstract: *As public-sector organizations face increasing pressure to enhance organizational performance and adapt to rapidly changing environments, effective leadership has become a key driver of workforce productivity. In line with Saudi Vision 2030, this study examines the effect of Agile Leadership on Workforce Productivity and the mediating role of Employee Engagement within the Ministry of Human Resources and Social Development (MHRSD), Saudi Arabia. Drawing on Job Demands-Resources (JD-R) Theory and Social Exchange Theory, the study proposes that Agile Leadership enhances Workforce Productivity directly and indirectly through Employee Engagement. A quantitative cross-sectional design was employed. A total of 390 questionnaires were collected and included in the final analysis. The proposed model was analyzed using SPSS. Multiple regression analysis and mediation analysis using the Baron and Kenny approach and Sobel test were employed to test the proposed hypotheses, while Welch's ANOVA and independent-samples t-tests were conducted to examine group differences. The findings reveal that Agile Leadership has significant positive effects on both Employee Engagement and Workforce Productivity. Employee Engagement also has a significant positive effect on Workforce Productivity and significantly mediates the relationship between Agile Leadership and Workforce Productivity. These findings suggest that Agile Leadership enhances Workforce Productivity not only through direct managerial influence but also by strengthening employees' psychological engagement with their work. This study contributes to the literature on Agile Leadership by providing empirical evidence from the Saudi public sector and offers practical implications for strengthening Employee Engagement and Workforce Productivity.*

Keywords: Agile Leadership, Employee Engagement, Job Demands-Resources Theory, Saudi Public Sector, Social Exchange Theory, Workforce Productivity.

1. Introduction

Contemporary organizations operate in increasingly volatile environments characterized by digital transformation, global competition, and continuous institutional change. These developments have reshaped organizational expectations regarding flexibility, resilience, and rapid adaptation, requiring leaders to move beyond traditional hierarchical management approaches. Across both private and public sectors, organizational sustainability increasingly depends on leaders' ability to foster innovation, adaptability, and continuous learning. Organizations that fail to respond effectively risk

declining productivity, reduced innovation, and diminished workforce stability (Alhazmi, 2022). In Saudi Arabia, the national transformation agenda under Vision 2030 has accelerated public-sector modernization, placing greater emphasis on organizational effectiveness, digital transformation, and high-quality public service delivery. Government entities are expected to improve operational efficiency while responding to evolving economic and societal demands. Among these entities, the Ministry of Human Resources and Social Development (MHRSD) plays a pivotal role in labour market regulation, workforce development, and institutional reform. As the Ministry continues to implement digital initiatives and performance-oriented practices, understanding the leadership approaches that can sustain employee productivity has become increasingly important.

Despite the growing recognition of agile leadership as an effective approach for managing organizational change, empirical evidence regarding its influence on workforce productivity remains inconsistent. While several studies report positive effects of agile leadership on employee and organizational outcomes, others have produced inconsistent findings, suggesting that the relationship may depend on underlying psychological or organizational mechanisms rather than direct leadership behaviours alone. These inconsistencies indicate that further investigation is needed to explain how agile leadership translates into improved workforce productivity, particularly within public-sector organizations undergoing large-scale institutional transformation. Moreover, empirical research within Saudi public-sector institutions remains limited. The role of employee engagement in explaining how agile leadership enhances workforce productivity has also received comparatively less empirical attention, particularly within government organizations.

Against this background, the present study examines the effect of agile leadership on workforce productivity and investigates the mediating role of employee engagement within the Ministry of Human Resources and Social Development (MHRSD), Saudi Arabia. This study extends current knowledge by providing empirical evidence from a Saudi public-sector context and by examining the mediating role of employee engagement between agile leadership and workforce productivity. The findings are expected to offer practical insights for policymakers and public-sector leaders seeking to enhance employee engagement and workforce productivity through more adaptive leadership practices.

1.1 Literature Review

1.2 Agile Leadership

Agile leadership has emerged as a contemporary leadership approach that enables organizations to respond effectively to rapidly changing and uncertain environments. Originating from agile project management principles, it has evolved into a broader leadership philosophy emphasizing adaptability, collaboration, employee empowerment, and continuous learning. Unlike traditional leadership approaches based on hierarchical control and centralized decision-making, agile leadership promotes flexibility, rapid decision-making, and shared responsibility in responding to technological disruption, market uncertainty, and evolving stakeholder expectations. (Idris, 2024; Luthia, 2023). Research increasingly recognizes agile leadership as a strategic capability that promotes adaptability, collaboration, and continuous learning under conditions of environmental uncertainty. Recent studies consistently suggest that agile leaders foster open communication, empower employees, and encourage cross-functional collaboration, thereby creating organizational conditions that support innovation and resilience (Bahri, 2022; Rialti et al., 2024; Porkodi, 2024). Rather than relying on hierarchical authority, agile leadership emphasizes flexibility, iterative decision-making, and shared

responsibility, allowing organizations to respond effectively to continuous organizational and technological change.

The relevance of agile leadership has become particularly evident within public-sector organizations undergoing large-scale institutional reforms. As governments continue to modernize administrative systems and expand digital public services, leaders are expected to balance adaptability with accountability, transparency, and service quality. In this context, agile leadership provides an appropriate framework for supporting employee adaptability, facilitating transformation, and supporting workforce productivity.

1.3 Employee Engagement

Employee engagement is widely recognized as a positive work-related psychological state reflecting emotional, cognitive, and behavioral connection to work. It is commonly conceptualized through three interrelated dimensions—vigor, dedication, and absorption—which capture energy, commitment, and involvement in job roles (Schaufeli et al., 2002). Unlike job satisfaction, which primarily reflects attitudes toward work, employee engagement emphasizes the willingness to invest discretionary effort and actively contribute to organizational success. Over the past two decades, employee engagement has become one of the most influential constructs in organizational behavior because of its consistent association with positive work outcomes. Engaged employees are generally more motivated, resilient, committed, and willing to exceed formal job requirements. Consequently, organizations with higher levels of employee engagement tend to experience improved productivity, better service quality, stronger commitment, and greater adaptability to change (Biswakarma & Subedi, 2025; Cao et al., 2024).

The importance of employee engagement is particularly evident in public-sector organizations, where employees operate in environments characterized by increasing accountability, administrative reforms, and continuous digital transformation. Maintaining high levels of engagement enables them to adapt more effectively to changing organizational demands while sustaining service quality and operational performance. Accordingly, employee engagement represents an important organizational resource for supporting institutional effectiveness in dynamic public-sector settings.

1.4 Workforce Productivity

Workforce productivity is commonly defined as employees' capacity to perform assigned responsibilities efficiently and effectively while creating value for organizational objectives. Contemporary perspectives extend this concept beyond operational efficiency to include service quality, adaptability, collaboration, and responsiveness to organizational change, particularly in knowledge-intensive and public-sector organizations (Alharthi, 2024). Consequently, workforce productivity is increasingly regarded as a multidimensional outcome influenced by organizational resources and leadership practices. Within public-sector organizations, workforce productivity extends beyond operational efficiency to include responsiveness, regulatory compliance, service quality, and employees' ability to adapt to organizational and technological change. Achieving high levels of productivity therefore depends not only on organizational resources and technological capabilities but also on leadership practices that encourage employee motivation, collaboration, and continuous improvement (Alharthi, 2024).

As governments continue to modernize public administration and strengthen institutional performance, workforce productivity has become an increasingly important strategic objective. In the

context of the present study, workforce productivity represents the principal organizational outcome through which the effectiveness of agile leadership and employee engagement is examined. Building upon the conceptual understanding of the three study variables, the following section presents the theoretical foundations underpinning the proposed research model.

1.5 Theoretical Foundation

Theoretical frameworks provide the conceptual basis for explaining the relationships among the study variables. In leadership and organizational behavior research, they explain how leadership behaviors influence employees' attitudes and, ultimately, organizational outcomes. Given the objective of this study, selecting appropriate theoretical perspectives is essential for explaining the relationship between agile leadership, employee engagement, and workforce productivity. This study is underpinned by two complementary theories: the Job Demands–Resources (JD-R) Theory and Social Exchange Theory (SET). The JD-R Theory serves as the primary theoretical lens by explaining how organizational resources enhance employee engagement and subsequently improve performance. Social Exchange Theory complements this perspective by explaining how supportive and empowering leadership encourages positive employee responses. Together, these theories explain how agile leadership contributes to workforce productivity through employee engagement within the Saudi public sector.

Job Demands–Resources (JD-R) Theory The Job Demands–Resources (JD-R) Theory is a widely applied framework for explaining employee motivation, engagement, and performance across different organizational contexts (Bakker & Demerouti, 2023). The theory proposes that employee outcomes are determined by the balance between job demands and job resources. Excessive job demands may lead to strain and reduced performance, whereas adequate job resources enhance motivation, work engagement, and organizational outcomes. Within this study, agile leadership is conceptualized as an important organizational resource. By promoting empowerment, collaboration, flexibility, and continuous support, agile leaders provide employees with the resources needed to cope with changing work demands and maintain high levels of engagement. From the JD-R perspective, these behaviors stimulate vigor, dedication, and absorption, ultimately contributing to higher workforce productivity. Accordingly, the JD-R Theory provides the primary explanation for the proposed relationships among the study variables.

Social Exchange Theory (SET) Social Exchange Theory (SET) explains workplace relationships through the principle of reciprocity, whereby employees respond positively to supportive treatment from leaders and organizations (Cropanzano et al., 2023). When leaders demonstrate trust, fairness, empowerment, and support, employees reciprocate through stronger commitment, higher engagement, and behaviors that contribute to organizational effectiveness. The assumptions of SET closely align with agile leadership, which emphasizes open communication, participation, collaboration, and employee empowerment. These practices strengthen leader–employee relationships and encourage greater psychological investment in work. Consequently, SET complements the JD-R Theory by explaining how agile leadership enhances employee engagement and, in turn, workforce productivity. Together, the two theories provide the theoretical foundation for the proposed research model.

1.6 Empirical Review

Previous empirical research has examined the relationships among agile leadership, employee engagement, and workforce productivity across different organizational contexts. Although most

studies report positive associations among these constructs, differences remain regarding the strength of these relationships, their underlying mechanisms, and their applicability across organizational settings. Accordingly, the empirical literature is organized according to the four relationships proposed in the research model.

1.7 Agile Leadership and Employee Engagement

Empirical evidence consistently suggests that agile leadership contributes positively to employee engagement by fostering trust, empowerment, collaboration, and transparent communication. These leadership behaviors strengthen employees' motivation and willingness to contribute beyond formal job requirements, thereby enhancing engagement. Although these findings are generally consistent, most evidence has been derived from private-sector and technology-oriented organizations, highlighting the need for further investigation within Saudi public-sector organizations such as the Ministry of Human Resources and Social Development (MHRSD).

Table 1 : summarizes the principal empirical studies examining the relationship between agile leadership and employee engagement.

Relation	Study / Citation (Year)	Problem Statement	Objective	Theory / Framework	Methodology	Key Findings	Similarity to Current Study	Difference / Gap Highlighted
Agile Leadership → Employee Engagement	Rialti et al. (2024) "Leaders, let's get agile"	Lack of understanding of how agile leadership drives employee engagement during digital transformation	Examine how agile leader behaviors (transparency, adaptability) affect engagement	Implicit SET, Agile Leadership model	Mixed methods (interviews + surveys)	Agile leaders enhance engagement via communication, empowerment, and trust	Confirms that agile behaviors strengthen engagement	Conducted in private sector; lacks public-sector context (MHRSD)
	Porkodi (2024) Meta-analysis of agile leadership effects	Scattered evidence on agile leadership outcomes	Quantify effect of agile leadership on engagement	Multi-theory meta-analysis	Meta-analysis across sectors	Positive correlation between agile leadership and engagement; stronger in private sector	Supports overall relationship	No public-sector studies; no Saudi context
	Ahmad et al. (2023) Empowerment mediation study	Limited evidence of psychological empowerment linking leadership to engagement	Test empowerment as mediator between agile leadership and engagement	SET + JD-R	Cross-sectional SEM	Empowerment mediates leadership → engagement	Aligns with SET (reciprocity) & JD-R (resource) mechanisms	Focused on IT firms, not ministries
	Tripathi (2022) Leadership & engagement	Unclear mechanism of leadership–engagement in government reforms	Explore leadership effects on civil servant engagement	JD-R	Survey (public servants)	Leadership behaviors predict engagement through job resources	Most relevant to the current study context	Did not include productivity outcome

1.8 Employee Engagement and Workforce Productivity

Previous empirical research consistently indicates that employee engagement positively influences workforce productivity across different organizational settings. Engaged employees demonstrate higher motivation, commitment, adaptability, and work performance, resulting in improved productivity and service quality. Although this relationship has received substantial empirical support. Although relatively few studies have examined this relationship within Saudi public-sector organizations, investigating it in MHRSD extends the existing evidence to an important public-sector context.

Table 2 : illustrated a summary of the principal empirical studies examining the relationship between employee engagement and workforce productivity.

Relation	Study / Citation (Year)	Problem Statement	Objective	Theory / Framework	Methodology	Key Findings	Similarity to Current Study	Difference / Gap Highlighted
Employee Engagement → Workforce Productivity	Cao et al. (2024) Frontiers study	Lack of clarity on engagement as mediator in JD-R model	Test engagement as mediator between job resources & performance	JD-R	Survey (n>800), SEM	Engagement mediates job resources → performance	Supports mediation mechanism	
	Biswakarma & Subedi (2024) Service industry	How learning culture influences performance via engagement	Test mediation of engagement	SET	Quantitative (PLS-SEM)	Engagement mediates learning culture → performance	Validates engagement's role	
	Ali et al. (2022) Public-sector engagement	Limited data on engagement–productivity link in public orgs	Assess engagement & service performance	JD-R (adapted)	Survey + service KPIs	High engagement → faster service & better outcomes	Confirms engagement's productivity link	

1.9 Agile Leadership and Workforce Productivity

The relationship between agile leadership and workforce productivity has attracted increasing scholarly attention in recent years. Existing evidence generally suggests that agile leadership enhances productivity by promoting adaptability, collaboration, innovation, and continuous improvement. However, findings regarding the direct relationship remain less consistent than those reported for other relationships. While several studies identify significant positive effects, others suggest that leadership influences productivity indirectly through psychological or organizational mechanisms. These findings highlight the need for further investigation within public-sector organizations experiencing continuous organizational change.

Table 3 : summarizes previous empirical studies investigating the relationship between agile leadership and workforce productivity.

Relation	Study / Citation (Year)	Problem Statement	Objective	Theory / Framework	Methodology	Key Findings	Similarity to Current Study	Difference / Gap Highlighted
Agile Leadership → Workforce Productivity	Kaya (2023)	Unclear link between agile leadership and performance	Test how agile leadership builds dynamic capabilities for performance	Dynamic Capabilities Theory (DCT)	Quantitative survey + mediation analysis	Leadership enhances dynamic capabilities → higher performance	Matches DCT use in your framework	Private-sector focus; no employee-level mediation
	Denning (2018)	How agile leadership improves innovation & outcomes	Identify productivity benefits of agile practices	Agile management model	Case studies	Agile leadership improves adaptability & efficiency	Conceptual support for AGL→productivity	Not empirical, pre-reform context

1.10 The Mediating Role of Employee Engagement

Growing empirical evidence suggests that employee engagement functions as an important mechanism linking agile leadership to workforce productivity. Agile leaders create supportive work environments that enhance employees' psychological investment in their work, which subsequently improves productivity. Although previous studies provide encouraging evidence for this mediating role, empirical findings remain limited within Saudi public-sector organizations. Accordingly, further investigation is required to examine this relationship in the context of the Ministry of Human Resources and Social Development (MHRSD).

Table 4 : summarizes the principal empirical studies examining the mediating role of employee engagement in the relationship between agile leadership and workforce productivity.

Relation	Study / Citation (Year)	Problem Statement	Objective	Theory / Framework	Methodology	Key Findings	Similarity to Current Study	Difference / Gap Highlighted
Agile Leadership → Engagement → Productivity (Mediation)	Prasetyawan et al. (2025)	How leadership indirectly impacts performance through engagement	Test mediation of engagement	SET + JD-R	SEM on service employees	Engagement mediates leadership–performance link	Confirms indirect path	No DCT integration; private sector
	Almazrouei & Hilmi (2024)	Effect of leadership on performance via engagement	Test engagement mediation	SET	Survey (public employees)	Engagement mediates leadership–performance	Supports mediation model	Similar regional context but not Saudi MHRSD
	Tripathi (2021)	How leadership functions as resource under high job demands	Examine engagement as mediator	JD-R	Quantitative, cross-sectional	Leadership as job resource reduces strain, increases engagement → performance	Theoretical alignment	Lacks DCT and Saudi data

1.11 Hypothesis Development

1.12 Agile Leadership and Employee Engagement

Empirical literature consistently indicates that agile leadership enhances employee engagement by promoting empowerment, collaboration, trust, and adaptability. Leadership behaviors that encourage employee participation and supportive work environments strengthen employees' psychological attachment to their work and willingness to contribute to organizational objectives. Drawing upon the Job Demands–Resources (JD-R) Theory and Social Exchange Theory (SET), agile leadership can be viewed as an important organizational resource that strengthens employees' motivation and fosters positive attitudes toward the organization. Accordingly, the following hypothesis is proposed: H2: Agile leadership has a positive and significant effect on employee engagement.

1.13 Employee Engagement and Workforce Productivity

Previous research consistently demonstrates that engaged employees exhibit higher levels of motivation, commitment, and discretionary effort, leading to improved individual and organizational performance. Within the JD-R framework, employee engagement represents the motivational mechanism through which organizational resources are translated into desirable work outcomes. Consequently, engaged employees are expected to contribute more effectively to organizational goals and demonstrate higher workforce productivity. Therefore, the following hypothesis is proposed: H3: Employee engagement has a positive and significant effect on workforce productivity.

1.14 Agile Leadership and Workforce Productivity

Agile leadership is expected to contribute directly to workforce productivity by encouraging organizational adaptability, collaborative decision-making, continuous learning, and employee empowerment. Leaders who create supportive and flexible work environments enable employees to respond effectively to organizational change while maintaining high performance. Although previous findings regarding this relationship remain somewhat inconsistent, the empirical evidence and theoretical perspectives adopted in this study suggest that agile leadership contributes positively to workforce productivity. Accordingly, the following hypothesis is proposed: H1: Agile leadership has a positive and significant effect on workforce productivity.

1.15 The Mediating Role of Employee Engagement

Theoretical arguments derived from the JD-R Theory and Social Exchange Theory suggest that leadership practices influence organizational outcomes through employees' psychological responses to their work environment. Agile leadership is expected to enhance employee engagement by providing organizational resources and fostering positive leader–employee relationships, while higher engagement subsequently contributes to workforce productivity. Therefore, employee engagement is expected to explain, at least partially, how agile leadership influences workforce productivity. Based on this reasoning, the following hypothesis is proposed: H4: Employee engagement mediates the relationship between agile leadership and workforce productivity.

1.16 Conceptual Framework

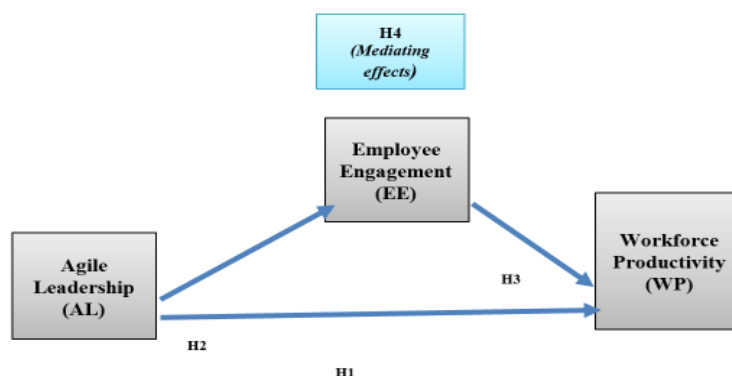


Figure 1 : conceptual framework

Figure 1 shows the conceptual framework developed for this study. The framework proposes that agile leadership functions as the independent variable influencing workforce productivity both directly and indirectly through employee engagement. Drawing upon the Job Demands–Resources (JD-R) Theory and Social Exchange Theory (SET), the model assumes that agile leadership provides organizational and relational resources that enhance employees' psychological engagement with their work. Higher levels of employee engagement are, in turn, expected to contribute to improved workforce productivity. The conceptual framework integrates the four proposed hypotheses and provides the conceptual basis for the empirical model tested in this study.

2. Methodology

2.1 Research Design

This study adopted a quantitative research design to examine the relationships between agile leadership, employee engagement, and workforce productivity within the Ministry of Human Resources and Social Development (MHRSD) in Saudi Arabia. This design was selected because it allows the hypothesized relationships between variables to be tested objectively using numerical data and statistical techniques. A quantitative approach is particularly appropriate for this study as it enables the measurement of leadership behaviors, psychological states, and productivity outcomes in a structured and standardized manner. By using quantitative data, the study ensures greater objectivity, replicability, and generalizability of the findings across the target population.

This study employed a descriptive–analytical cross-sectional survey design. The descriptive component allows the researcher to describe the current levels of agile leadership practices, employee engagement, and workforce productivity among employees of MHRSD. The analytical component goes beyond description by statistically examining the direct and indirect relationships among the study variables. The study follows a deductive research approach, where hypotheses were developed based on established theories and prior empirical studies, particularly the Job Demands–Resources (JD-R) Theory and Social Exchange Theory (SET). In the context of this study, agile leadership is conceptualized as an organizational resource that enhances employee engagement and subsequently improves workforce productivity.

2.2 Participants and Data Collection

The study population comprised employees working in the Ministry of Human Resources and Social Development (MHRSD) in Saudi Arabia. MHRSD was selected because of its central role in labour governance, workforce development, and public-sector transformation under Saudi Vision 2030, making it an appropriate context for examining agile leadership, employee engagement, and workforce productivity. Employees within MHRSD operate in an environment characterized by digital transformation, administrative reforms, and increased performance expectations. Accordingly, employees from different organizational units were included to obtain broad representation of the public-sector workforce. Data were collected using a structured questionnaire administered electronically through Google Forms. A total of 390 questionnaires were received during the data collection period. Following the data screening process, all questionnaires met the study requirements, with no incomplete or duplicate responses identified. Consequently, all 390 responses were retained for the final analysis. The final sample was considered adequate for testing the proposed research model.

2.3 Measures

The questionnaire was developed to examine the effect of agile leadership on workforce productivity and the mediating role of employee engagement within the Ministry of Human Resources and Social Development (MHRSD). It consisted of four sections. Section A collected demographic information, including organizational unit, employment type, years of service, region, work mode, and exposure to transformation or agility-related programmes. Sections B, C, and D measured agile leadership, employee engagement, and workforce productivity, respectively. All measurement items were adapted from established instruments used in previous studies to ensure relevance and suitability for the public-sector context. Agile leadership was measured using a 12-item behavioural scale (Q1–Q12) and operationalized as a unidimensional construct. Employee engagement was measured using the Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006), comprising the three dimensions of vigor, dedication, and absorption. Workforce productivity was measured using perceived performance items covering task performance, contextual performance, and counterproductive work behaviour.

All items were assessed using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The complete measurement items and detailed supplementary tables are provided in the Appendix. 3.4 Data Analysis Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). All statistical analyses were performed using a significance level of $\alpha = .05$ (two-tailed). Descriptive statistics were first calculated to summarize the respondents' demographic characteristics and the main study variables. Preliminary data analysis included data screening, normality assessment, and common method bias evaluation to ensure the quality and suitability of the dataset before the main statistical analyses. The analyses included reliability and validity assessment, item analysis using corrected item–total correlation (CITC), normality testing, parallel analysis, Pearson correlation analysis, multiple regression analysis, mediation analysis (Baron and Kenny approach and Sobel test), moderated regression analysis, Welch's ANOVA, and independent-samples t-tests to evaluate the measurement properties of the study variables and test the proposed hypotheses.

2.4 Ethical Considerations

This study adhered to established ethical standards for research involving human participants. Participation in the study was voluntary, and informed consent was obtained from all respondents.

before completing the questionnaire. The anonymity and confidentiality of participants were strictly maintained throughout the research process. No personally identifiable information was collected, and all data were used solely for academic research purposes.

3. Results

3.1 Respondents' Characteristics

The demographic profile provides an overview of the respondents' employment background and organizational context within the Ministry of Human Resources and Social Development (MHRSD). Specifically, the analysis focuses on years of service, employment type, work mode, and participation in organizational transformation programmes, as these characteristics provide useful contextual information for interpreting the study findings.

Table 5 : Respondents' Characteristics

Variable	Category	Count	%
Years of Service	11–15 years	186	47.7%
	5–10 years	157	40.3%
	More than 15 years	40	10.3%
	Less than 5 years	7	1.8%
Employment Type	Permanent	386	99.0%
	Contract	4	1.0%
Work Mode	On-site	389	99.7%
	Remote/Hybrid	1	0.3%
Transformation Programme Participation	No prior participation	357	91.5%
	Previously participated	33	8.5%
Total respondents		390	100%

Table 5 illustrates the demographic profile of the respondents. The results indicate that the sample largely consisted of experienced employees working within a stable public-sector environment. The largest proportion had between 11 and 15 years of service (47.7%), followed by those with 5–10 years (40.3%). Employees with more than 15 years of service represented 10.3%, while only 1.8% had less than five years of service. Regarding employment type, the majority of respondents (99.0%) were permanent employees, whereas only 1.0% were employed on a contractual basis. Similarly, almost all respondents (99.7%) worked under traditional on-site arrangements, with only one respondent (0.3%) reporting remote or hybrid work.

With respect to organizational transformation programmes, 91.5% of respondents reported that they had not previously participated in formal transformation initiatives, while 8.5% indicated prior participation. Overall, the sample consisted primarily of experienced and permanently employed public-sector staff, providing an appropriate context for interpreting the study findings.

3.2 Preliminary Data Analysis

Preliminary data analysis was conducted to evaluate the quality and suitability of the dataset before performing the main statistical analyses. Following the recommendations of Hair et al. (2022), the preliminary assessment included data screening, reliability and validity assessment, item analysis (CITC), normality testing, and parallel analysis. The results confirmed that the dataset satisfied the requirements for the subsequent analyses.

3.3 4.2.1 Data Screening

Data screening was conducted to evaluate the completeness, consistency, and accuracy of the collected responses. Following the data collection process, all questionnaires were reviewed for completeness, response consistency, duplicate submissions, and unusual response patterns. The screening process indicated that all questionnaires met the study requirements, with no incomplete or duplicate responses identified. Furthermore, descriptive examinations confirmed that the responses were within acceptable ranges and suitable for statistical analysis. Consequently, all 390 responses were retained for subsequent analyses.

3.4 Reliability and Validity

Reliability and convergent validity were assessed using Cronbach's alpha (α), McDonald's omega (ω), Composite Reliability (CR), and Average Variance Extracted (AVE). As presented in Table 6, all constructs exceeded the recommended thresholds ($\alpha > 0.70$, $\omega > 0.70$, $CR > 0.70$, and $AVE > 0.50$), indicating excellent internal consistency and satisfactory convergent validity. Agile Leadership and Employee Engagement demonstrated excellent reliability across all indicators, while the Workforce Productivity scale also showed strong measurement properties. Average inter-item correlations exceeded the recommended range across all constructs, suggesting possible item redundancy despite the excellent reliability coefficients. This finding may partially explain the exceptionally high internal consistency observed in the scales and should be considered when interpreting the measurement results.

Table 6 : Reliability and Validity of the Study Constructs

Scale	Cronbach's α	McDonald's ω	AVE	CR	Judgment
Agile Leadership	0.988	0.990	0.888	0.990	Excellent
Employee Engagement	0.981	0.984	0.875	0.984	Excellent
Workforce Productivity (13 items)	0.940	0.949	0.634	0.949	Good*
Workforce Productivity (10 pure items)	0.975	0.979	0.821	0.979	Excellent
Acceptance Thresholds	> 0.70	> 0.70	> 0.50	> 0.70	

Note: The productivity scale differs when computed across all 13 items ($AVE = 0.634$) versus the 10 pure items ($AVE = 0.821$). The difference is attributable to the reversed items (P11–P13), which exhibited low factor loadings and represented a distinct dimension of counterproductive work behaviors. Item Analysis (CITC) Item analysis was performed to evaluate the quality and consistency of the individual measurement items using Corrected Item–Total Correlation (CITC), Cronbach's alpha if item deleted, skewness, and kurtosis. Detailed item-level analysis results are presented in

Appendix B (Tables B1–B2).all Agile Leadership and Employee Engagement items demonstrated excellent psychometric properties, with CITC values exceeding the recommended threshold of 0.30. Likewise, the ten retained Workforce Productivity items achieved satisfactory CITC values, confirming that each item contributed meaningfully to its respective construct. The three reverse-scored productivity items (P11–P13), which measure counterproductive work behaviors, showed weak item performance, with CITC values below 0.30 accompanied by extreme skewness and kurtosis. These findings indicate that the three items represent a distinct dimension rather than the intended productivity construct. Consequently, P11–P13 were treated as a separate subscale and excluded from the inferential analyses involving Workforce Productivity.

3.5 Normality Test

The normality of the study variables was assessed using the Kolmogorov–Smirnov (KS) test, together with skewness and kurtosis statistics. As presented in Table 8, the KS test was statistically significant for all three constructs ($p < .001$). However, given the relatively large sample size ($N = 390$), the KS test is known to be highly sensitive and may reject normality even when deviations are minimal. Therefore, greater emphasis was placed on the skewness and kurtosis statistics when evaluating the distribution of the data. The skewness values ranged from -1.285 to -1.580 , while kurtosis values ranged from 0.626 to 2.816 , all of which fall within the commonly accepted thresholds for approximate normality (skewness $< \pm 2$ and kurtosis $< \pm 7$). According to the Central Limit Theorem, the large sample size ensures that the sampling distribution of the means approximates normality, supporting the use of subsequent parametric statistical analyses. Accordingly, the data were considered sufficiently normally distributed for the analyses performed in this study.

Table 7 : Normality Test Results and Distributional Properties by Scale

Scale	KS Statistic	Skewness	Kurtosis	Decision
Agile Leadership	0.399	-1.580	2.816	$N > 200 \rightarrow$ Parametric tests acceptable
Employee Engagement	0.418	-1.285	0.626	$N > 200 \rightarrow$ Parametric tests acceptable
Workforce Productivity	0.420	-1.445	1.045	$N > 200 \rightarrow$ Parametric tests acceptable

3.6 Parallel Analysis

Parallel analysis was conducted to evaluate the dimensionality of the study constructs and determine the appropriate number of factors to retain. As presented in Table 8, the first observed eigenvalue exceeded the corresponding randomly generated eigenvalue, whereas the remaining observed eigenvalues were consistently lower than their random counterparts. The results generally supported the unidimensional structure of the Agile Leadership and Employee Engagement scales. For Workforce Productivity, the analysis indicated that the three reverse-scored items (P11–P13) formed a separate dimension, supporting their exclusion from the composite productivity measure used in the inferential analyses.

Table 8 : Parallel Analysis Results

Scale	Factors (PA)	Random λ_1	Observed λ_1	Decision
Agile Leadership (12 items)	1	1.29	10.65	Unidimensional
Employee Engagement (9 items)	1	1.24	7.87	Unidimensional

Scale	Factors (PA)	Random λ_1	Observed λ_1	Decision
Workforce Productivity (13 items)	3	1.31	8.24	3 factors — P11–P13 form separate dimension

3.7 Common Method Bias

Common method bias was assessed using Harman's Single-Factor Test. The first unrotated factor explained 38.42% of the total variance, which is below the recommended threshold of 50%. Therefore, common method bias was not considered a significant concern in this study.

3.8 Descriptive Statistics

Descriptive statistics were computed to summarize respondents' perceptions of the three study constructs. Item-level descriptive statistics are provided in Appendix B (Tables B3–B5), while Table 9 presents the overall descriptive statistics and 95% confidence intervals for each construct. All three constructs recorded very high mean scores, indicating consistently positive perceptions among respondents.

Table 9 : Descriptive Summary and 95% Confidence Intervals for Main Constructs

Scale	n	95% CI	Mean	SD	Level
Agile Leadership (12 items)	390	[4.633 – 4.734]	4.684	0.509	Very High
Employee Engagement (9 items)	390	[4.645 – 4.741]	4.693	0.487	Very High
Workforce Productivity (13 items — descriptive only)	390	[4.754 – 4.824]	4.789	0.353	Very High

The descriptive summary shows that Workforce Productivity achieved the highest mean score ($M = 4.789$, $SD = 0.353$), followed by Employee Engagement ($M = 4.693$, $SD = 0.487$) and Agile Leadership ($M = 4.684$, $SD = 0.509$). The observed pattern is broadly consistent with the proposed conceptual model. The results also indicate a noticeable ceiling effect, with approximately 95–97% of responses concentrated in the upper end of the five-point scale. Although this pattern is consistent with studies conducted in public-sector organizations undergoing organizational transformation, it may reduce between-group variability and should be considered when interpreting the findings.

3.9 Correlation Matrix and Discriminant Validity

Pearson correlation analysis was conducted to examine the relationships among the study constructs. As presented in Table 10, all correlations were positive and statistically significant ($p < .001$), indicating that higher levels of Agile Leadership were associated with higher Employee Engagement and Workforce Productivity. The strongest correlation was observed between Agile Leadership and Employee Engagement ($r = .950$), followed by the relationship between Employee Engagement and Workforce Productivity ($r = .889$) and between Agile Leadership and Workforce Productivity ($r = .847$). Although the correlation between Agile Leadership and Employee Engagement was notably high, subsequent multicollinearity diagnostics and mediation analyses confirmed that the constructs remained statistically distinguishable and suitable for further regression analyses.

Regarding discriminant validity, the Heterotrait–Monotrait ratio (HTMT) indicated adequate discriminant validity between Agile Leadership and Workforce Productivity and between Employee

Engagement and Workforce Productivity. However, the HTMT value between Agile Leadership and Employee Engagement exceeded the recommended threshold, suggesting substantial conceptual overlap between the two constructs. This finding is discussed further in the limitations section.

Table 10 : Correlation Matrix Results

Relationship	r ²	Partial r*	Pearson r	Spearman rs	Significance
Agile Leadership ↔ Workforce Productivity	0.717	0.830	0.847	0.889	p < .001
Agile Leadership ↔ Employee Engagement	0.903	0.944	0.950	0.928	p < .001
Employee Engagement ↔ Workforce Productivity	0.790	0.873	0.889	0.933	p < .001

Discriminant validity was assessed using the Heterotrait–Monotrait ratio (HTMT) and the Fornell–Larcker criterion. As presented in Table 11, the HTMT value between Agile Leadership and Employee Engagement exceeded the recommended threshold of 0.90. The HTMT value between Employee Engagement and Workforce Productivity also slightly exceeded the threshold, while the relationship between Agile Leadership and Workforce Productivity was borderline. These results indicate substantial overlap among the constructs and should be considered when interpreting the findings.

Table 11 : HTMT and Fornell–Larcker Criteria for Discriminant Validity

Construct Pair	sqrt(AVE)	Pearson r	HTMT	Judgment
Agile Leadership ↔ Employee Engagement	0.942 / 0.935	0.950	0.964	Exceeds 0.90 threshold
Agile Leadership ↔ Workforce Productivity	0.942 / 0.796	0.847	0.867	Borderline
Employee Engagement ↔ Workforce Productivity	0.935 / 0.796	0.889	0.911	Exceeds 0.90 threshold
Acceptance Criterion	sqrt(AVE) > r	—	< 0.90	—

Direct Effects (Regression Analysis) Multiple regression analyses were conducted to examine the direct effects of Agile Leadership on Workforce Productivity and Employee Engagement, as well as the effect of Employee Engagement on Workforce Productivity. The results are presented in Table 12. The findings indicate that Agile Leadership had a significant positive effect on Workforce Productivity ($\beta = .847$, $B = 0.587$, $p < .001$), explaining 71.7% of the variance in productivity ($R^2 = .717$). Similarly, Agile Leadership exerted a significant positive effect on Employee Engagement ($\beta = .950$, $p < .001$), while Employee Engagement also demonstrated a significant positive effect on Workforce Productivity ($\beta = .889$, $p < .001$). These findings provide strong support for H1, H2, and H3, indicating that higher levels of agile leadership are associated with increased employee engagement and workforce productivity, and that employee engagement is positively related to workforce productivity.

Table 12 : Regression Results for the Effect of Agile Leadership on Workforce Productivity (H1)

<i>Path</i>	<i>B</i>	<i>β (std.)</i>	<i>F</i>	<i>R²</i>	<i>95% CI</i>
<i>Agile Leadership → Productivity</i>	0.587	0.847	985.7	0.717	[0.550, 0.624]
<i>Agile Leadership → Employee Engagement</i>	0.909	0.950	3617.8	0.902	[0.879, 0.939]
<i>Employee Engagement → Productivity</i>	0.643	0.889	1464.8	0.790	[0.610, 0.676]

3.10 Mediation Analysis

Mediation analysis was conducted to examine whether Employee Engagement mediates the relationship between Agile Leadership and Workforce Productivity using the Baron and Kenny approach together with the Sobel test. The results are presented in Tables 13 and 14. As shown in Table 13, Agile Leadership had a significant direct effect on Workforce Productivity when entered alone in the regression model ($B = 0.587$, $R^2 = 0.717$, $p < .001$). However, after Employee Engagement was included as a mediator, the direct effect of Agile Leadership became non-significant ($B = 0.022$, $p = .210$), whereas Employee Engagement remained a significant predictor of Workforce Productivity ($B = 0.622$, $p < .001$). This pattern is consistent with an indirect-effect-dominant mediation model.

The Sobel test further confirmed the significance of the indirect effect ($a \times b = 0.566$, $Z = 11.35$, $p < .001$), with a 95% confidence interval of [0.468, 0.663], which excluded zero. Approximately 96.3% of the total effect of Agile Leadership on Workforce Productivity was transmitted through Employee Engagement, indicating that the influence of Agile Leadership on productivity operates primarily through enhancing employee engagement. Accordingly, H4 was supported.

Table 13 : Mediation Model: Direct and Indirect Effects

Model	F	R²	B Leadership (unstd.)	B Engagement (unstd.)	Interpretation
M1: Agile Leadership only	985.7	0.717	0.587**	—	Direct effect only
M2: Leadership + Engagement	727.9	0.790	0.022 (ns)	0.622**	Consistent with an indirect-effect-dominant mediation pattern

Table 14 : Mediation Path Estimates and Sobel Test Results

Indicator	Value	Judgment
Path a: Agile Leadership → Employee Engagement	$a = 0.909$, $SE = 0.015$	—
Path b: Employee Engagement → Productivity	$b = 0.622$, $SE = 0.054$	—
Indirect Effect — Sobel Test	$a \times b = 0.566$, $Z = 11.35$, $p < .001$	Highly significant
Residual Direct Effect (c')	$c' = 0.022$, $p = .210$	Non-significant — consistent with an indirect-effect-dominant mediation pattern
95% Confidence Interval — Indirect Effect	CI = [0.468 – 0.663]	Does not contain zero
Proportion Mediated	96.3% of total effect	96.3% (indirect-effect-dominant pattern)

3.11 Moderated Mediation Analysis

To further examine whether the indirect relationship between Agile Leadership and Workforce Productivity varied across different levels of experience, a moderated mediation analysis was conducted using Years of Service as the moderator. The interaction model, simple slope analysis, and subgroup regression results are presented in Tables 15a–15c. As shown in Table 14a, the interaction between Agile Leadership and Years of Service was statistically significant under the conventional OLS estimation ($B = -0.107$, $t = -4.382$, $p < .001$). However, the interaction became non-significant when HC3 heteroscedasticity-robust and cluster-robust standard errors were applied ($p = .270$ and $p = .221$, respectively). These findings indicate that the moderation effect is sensitive to the estimation method and should therefore be interpreted with caution.

The simple slope analysis (Table 15b) showed that the positive association between Agile Leadership and Employee Engagement was strongest among employees with 5–10 years of service ($\beta = 0.940$) and gradually weakened as years of service increased ($\beta = 0.795$ for employees with more than 15 years of service). Similarly, subgroup regression analysis (Table 15c) demonstrated that the 5–10 years group exhibited the strongest relationship between Agile Leadership and Employee Engagement ($R^2 = 0.957$), whereas the subgroup with less than five years of service ($n = 7$) was too small for reliable statistical inference and was interpreted descriptively only. Overall, these findings suggest an exploratory moderation pattern that requires confirmation in future research using more robust analytical approaches.

Table 15 : a. Interaction Regression Results

<i>Term</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>Significance</i>
<i>Constant (Intercept)</i>	4.704	—	—	$p < .001$
<i>Agile Leadership (centered)</i>	0.867	0.019	46.29	$p < .001$
<i>Years of Service (centered)</i>	0.044	0.003	14.76	$p < .001$
<i>Interaction: Leadership $\times$ Years of Service</i> ($R^2 = 0.909$; $\Delta R^2 = 0.005$)	-0.107	0.024	-4.382	OLS: $p < .001$; HC3: $p = .270$ (ns); Cluster: $p = .221$ (ns)

Table 16 : b. Simple Slopes at Different Levels of Experience

<i>Experience Level</i>	<i>Simple Slope β</i>	<i>95% CI</i>	<i>Interpretation</i>
<i>Low experience: 5–10 years</i>	0.940	[0.902, 0.978]	<i>Leadership effect stronger — most responsive group</i>
<i>Average experience: sample mean</i>	0.867	[0.830, 0.904]	<i>Overall sample-level association</i>
<i>High experience: > 15 years</i>	0.795	[0.748, 0.842]	<i>Leadership effect weaker — independent engagement sources</i>

Table 17 : c. Subgroup Regression by Years of Service

<i>Experience Category</i>	<i>n</i>	<i>B</i>	<i>95% CI</i>	<i>R²</i>	<i>Significance</i>
Less than 5 years	7	0.605	[0.285, 0.925]	0.733	$p = .014$
5–10 years	157	0.971	[0.939, 1.004]	0.957	$p < .001$
11–15 years	186	0.722	[0.668, 0.776]	0.789	$p < .001$

Experience Category	n	B	95% CI	R ²	Significance
More than 15 years	40	0.898	[0.775, 1.022]	0.843	$p < .001$

3.12 Group Difference Tests

Group difference analyses were conducted to examine whether respondents differed in their perceptions of Agile Leadership, Employee Engagement, and Workforce Productivity according to years of service and prior participation in transformation programmes. Because the assumption of homogeneity of variance was violated (Levene's test, $p < .001$), Welch's ANOVA was used to compare years-of-service groups, followed by Games–Howell post-hoc comparisons. In addition, an independent samples t-test was performed to compare respondents based on prior participation in transformation programmes. Welch's ANOVA revealed significant differences across years-of-service groups for all three constructs: Agile Leadership (Welch $F(3, 26.8) = 19.39$, $p < .001$), Employee Engagement (Welch $F(3, 26.8) = 26.19$, $p < .001$), and Workforce Productivity (Welch $F(3, 26.6) = 32.24$, $p < .001$). The effect size for Agile Leadership was $\eta^2 = 0.152$, indicating a large practical effect. As shown in the Games–Howell comparisons, the significant differences were primarily attributable to the 5–10 years group, which reported significantly lower Agile Leadership scores than both the 11–15 years group and the more than 15 years group, whereas no significant differences were observed for employees with less than five years of service.

The independent-samples t-test indicated no statistically significant difference in Agile Leadership perceptions between respondents who had previously participated in transformation programmes and those who had not ($t = 1.229$, $p = .220$; Cohen's $d = 0.224$).

Table 18 : Welch's ANOVA Results by Years of Service

Category	n	M Leadership	M Engagement	M Productivity	Welch F (df) — Leadership	Welch F (df) — Engagement / Productivity
11–15 years	186	4.856	4.889	4.934	Welch $F(3, 26.8) = 19.39$	Welch $F(3, 26.8) = 26.19$ / Welch $F(3, 26.6) = 32.24$
More than 15 years	40	4.808	4.794	4.883		
Less than 5 years	7	4.786	4.778	4.769		
5–10 years (lowest)	157	4.443	4.431	4.594		All $p < .001$

Table 19 : Games–Howell Post-Hoc Comparisons

Group 1	Group 2	Mean Diff. (1–2)	p_{GH}	df
5–10 years	11–15 years	-0.413	$p < .001$	269.51
5–10 years	More than 15 years	-0.365	$p < .001$	87.36
5–10 years	Less than 5 years	-0.343	$p = .457$ (ns)	6.54
More than 15 years	11–15 years	-0.048	$p = .891$ (ns)	57.58

Table 20 : Independent-Samples t-Test by Transformation Programme Participation

Participation Status	n	Mean	SD	Cohen's d	Significance
Yes — Prior participation	33	4.788	0.373	0.224 (small)	t = 1.229, p = .220 (ns)
No — No prior participation	357	4.674	0.519		

4. Discussion

4.1 Principal Findings

This study examined the impact of Agile Leadership on Workforce Productivity and investigated the mediating role of Employee Engagement among employees of the Ministry of Human Resources and Social Development (MHRSD) in Saudi Arabia. Drawing on the Job Demands–Resources (JD-R) theory, the study proposed that agile leadership functions as an organizational resource that enhances employee engagement, which subsequently improves workforce productivity. Overall, the findings provided strong support for the proposed research model. Agile Leadership had significant positive effects on Workforce Productivity and Employee Engagement, while Employee Engagement significantly enhanced Workforce Productivity. These findings indicate that agile leadership improves workforce productivity both directly and through higher employee engagement.

The mediation analysis further demonstrated that Employee Engagement plays a substantial role in explaining the relationship between Agile Leadership and Workforce Productivity. The indirect effect was statistically significant, indicating that agile leaders enhance workforce productivity primarily by fostering employees' vigor, dedication, and absorption at work. Taken together, the findings suggest that agile leadership represents an important organizational capability within the Saudi public sector. By encouraging flexibility, collaboration, empowerment, and continuous learning, agile leaders create a work environment that promotes higher employee engagement. These findings are consistent with the assumptions of the JD-R theory, which proposes that organizational resources stimulate employee engagement and ultimately improve work outcomes.

4.2 Comparison with Previous Studies

The findings of this study are generally consistent with previous research demonstrating the positive role of Agile Leadership in enhancing both Employee Engagement and Workforce Productivity. The significant positive relationship between Agile Leadership and Workforce Productivity supports earlier studies suggesting that agile leaders create adaptive work environments that encourage collaboration, responsiveness, and continuous improvement, ultimately leading to higher levels of employee performance and organizational productivity. The results also confirm previous evidence that Agile Leadership is a strong predictor of Employee Engagement. Agile leaders create supportive work environments that enhance employees' vigor, dedication, and absorption. This finding is consistent with earlier empirical studies that identified agile leadership as an important organizational resource for strengthening employee engagement.

Similarly, the positive relationship between Employee Engagement and Workforce Productivity aligns with previous research showing that engaged employees contribute more effectively to organizational goals through higher commitment, efficiency, and discretionary effort. A particularly important finding of this study is the significant mediating role of Employee Engagement. This result extends previous research by demonstrating that the influence of Agile Leadership on Workforce Productivity operates largely through enhancing employee engagement. Rather than affecting

productivity solely through direct managerial practices, agile leadership creates a supportive work environment that encourages employees to become more engaged, which subsequently translates into higher productivity. This finding reinforces the central proposition of the Job Demands–Resources (JD-R) theory, which suggests that organizational resources enhance employee engagement, leading to improved work outcomes.

Although the findings are broadly consistent with previous studies, this research contributes additional evidence from the Saudi public sector, particularly within the Ministry of Human Resources and Social Development. Most previous studies have been conducted in private-sector organizations or in different national contexts. Therefore, the present findings provide further support for the applicability of agile leadership principles within government organizations undergoing digital transformation and organizational reform.

4.3 Theoretical Implications

This study contributes to the growing body of literature on Agile Leadership by providing empirical evidence of its relationship with Employee Engagement and Workforce Productivity within the Saudi public sector. Although agile leadership has received increasing attention in recent years, empirical evidence from government organizations, particularly in developing economies, remains relatively limited. The present study therefore extends the existing literature by examining these relationships in the context of the Ministry of Human Resources and Social Development, an organization actively involved in implementing Saudi Vision 2030 initiatives. The findings also provide empirical support for the Job Demands–Resources (JD-R) theory. Consistent with the theory, Agile Leadership functioned as an important organizational resource that enhanced employee engagement, which subsequently improved workforce productivity. The significant mediating role of Employee Engagement reinforces the central proposition of the JD-R framework that organizational resources promote positive work-related outcomes by increasing employees' psychological engagement.

Furthermore, the study contributes to leadership literature by demonstrating that the relationship between Agile Leadership and Workforce Productivity is not solely direct but is largely explained through Employee Engagement. This finding highlights employee engagement as an important psychological mechanism through which leadership practices influence organizational outcomes. Finally, this study extends the limited evidence on agile leadership within the public sector by demonstrating its relevance in a government organization undergoing large-scale organizational transformation.

4.4 Practical Implications

The findings of this study have several practical implications for managers and policymakers, particularly within public-sector organizations undergoing organizational transformation. The positive relationship between Agile Leadership and Workforce Productivity suggests that leadership development initiatives should place greater emphasis on agile leadership competencies, including adaptability, collaboration, employee empowerment, and continuous learning. Strengthening these competencies may help public organizations improve both employee engagement and overall organizational performance. The significant mediating role of Employee Engagement further highlights the importance of creating work environments that foster employees' psychological involvement in their work. Rather than focusing solely on performance outcomes, managers should implement leadership practices that encourage participation, provide constructive feedback,

recognize employee contributions, and support professional development. Such practices are likely to strengthen employee engagement and, consequently, improve workforce productivity.

For the Ministry of Human Resources and Social Development, the findings provide empirical evidence supporting the integration of agile leadership principles into leadership development programmes and organizational transformation initiatives aligned with Saudi Vision 2030. Promoting agile leadership across different managerial levels may enhance employees' ability to respond effectively to organizational change while maintaining high levels of engagement and productivity. More broadly, the findings may also be relevant to other public-sector organizations facing similar challenges associated with digital transformation and administrative reform. By investing in agile leadership capabilities and fostering an engaging work environment, government organizations can better support sustainable organizational performance in rapidly changing environments.

4.5 Limitations and Future Research

Despite its contributions, this study has several limitations that should be acknowledged. First, the study employed a cross-sectional research design, which limits the ability to establish causal relationships among the study variables. Future research may adopt longitudinal designs to examine how agile leadership, employee engagement, and workforce productivity evolve over time. Second, the study was conducted within a single public-sector organization in Saudi Arabia. Although the Ministry of Human Resources and Social Development provides an important context for examining agile leadership during organizational transformation, the findings may not be fully generalizable to other organizations or sectors. Future studies are encouraged to replicate the proposed model across different public and private organizations as well as in other national contexts.

Third, the study relied on self-reported questionnaire data, which may increase the risk of common method bias. Although several statistical procedures were conducted to assess the measurement quality, future research could benefit from collecting data from multiple sources or combining subjective and objective performance measures. In addition, the measurement results indicated a relatively high overlap between Agile Leadership and Employee Engagement, as reflected by the HTMT analysis. Although subsequent regression and mediation analyses confirmed that the constructs remained statistically distinguishable, future studies should consider refining the measurement scales to further strengthen discriminant validity. Finally, the descriptive results revealed a noticeable ceiling effect, with respondents reporting consistently high scores across the three study constructs. While this pattern may reflect the organizational context, it reduced response variability and may have influenced some statistical estimates. Future research should examine these relationships using more heterogeneous samples to improve variability and strengthen the generalizability of the findings.

5. Conclusion

This study examined the impact of Agile Leadership on Workforce Productivity and investigated the mediating role of Employee Engagement within the Ministry of Human Resources and Social Development in Saudi Arabia. The findings demonstrated that Agile Leadership positively influences both Employee Engagement and Workforce Productivity, while Employee Engagement significantly enhances Workforce Productivity. Furthermore, the mediation analysis confirmed that Employee Engagement serves as a key mechanism through which Agile Leadership improves workforce productivity. These findings provide empirical support for the Job Demands–Resources (JD-R)

theory, demonstrating that Agile Leadership functions as an important organizational resource that promotes employee engagement and ultimately enhances organizational performance. The study also extends the growing body of research on agile leadership by providing evidence from the Saudi public sector, where empirical research remains relatively limited.

From a practical perspective, the findings suggest that public-sector organizations can strengthen workforce productivity by investing in agile leadership capabilities and fostering an engaging work environment. Developing leaders who encourage collaboration, adaptability, employee empowerment, and continuous learning may help organizations respond more effectively to ongoing organizational transformation and the objectives of Saudi Vision 2030. Overall, this study contributes to both theory and practice by demonstrating the interconnected roles of Agile Leadership, Employee Engagement, and Workforce Productivity. It provides valuable evidence for researchers, organizational leaders, and policymakers seeking to improve employee performance and organizational effectiveness in rapidly evolving public-sector environments.

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5.1 Appendix A. Measurement Items

Table 21 : A: Item Analysis for the Agile Leadership Scale

Rank	Kurtosis	Skewness	α if Deleted	CITC	Item
1	0.73	-1.311	0.988	0.904	Q1 — Responds quickly to changes in systems or priorities
2	2.74	-1.625	0.988	0.908	Q2 — Encourages experimentation and learning from mistakes
3	4.88	-1.830	0.987	0.945	Q3 — Provides the team with clear information and feedback
4	4.82	-1.844	0.988	0.912	Q4 — Delegates authority and trusts the team's capabilities
5	2.29	-1.581	0.987	0.947	Q5 — Removes cross-departmental barriers to accelerate service delivery
6	1.92	-1.509	0.987	0.958	Q6 — Re-prioritizes tasks based on impact and outcomes
7	1.44	-1.536	0.988	0.913	Q7 — Fosters a psychologically safe environment for sharing ideas
8	1.91	-1.496	0.987	0.929	Q8 — Demonstrates flexibility in internal policies
9	3.79	-1.840	0.987	0.920	Q9 — Leads by example in using agile work tools
10	6.54	-2.037	0.987	0.945	Q10 — Develops team capabilities in a systematic manner
11	6.24	-2.044	0.987	0.930	Q11 — Engages stakeholders early to gather feedback
12	6.01	-1.977	0.987	0.948	Q12 — Balances operational discipline with flexibility

5.2 Appendix B. Supplementary Tables

6.3 Table B1. Item Analysis for the Agile Leadership Scale

Rank	Kurtosis	Skewness	α if Deleted	CITC	Item
1	0.73	-1.311	0.988	0.904	Q1 — Responds quickly to changes in systems or priorities
2	2.74	-1.625	0.988	0.908	Q2 — Encourages experimentation and learning from mistakes
3	4.88	-1.830	0.987	0.945	Q3 — Provides the team with clear information and feedback
4	4.82	-1.844	0.988	0.912	Q4 — Delegates authority and trusts the team's capabilities
5	2.29	-1.581	0.987	0.947	Q5 — Removes cross-departmental barriers to accelerate service delivery
6	1.92	-1.509	0.987	0.958	Q6 — Re-prioritizes tasks based on impact and outcomes
7	1.44	-1.536	0.988	0.913	Q7 — Fosters a psychologically safe environment for sharing ideas
8	1.91	-1.496	0.987	0.929	Q8 — Demonstrates flexibility in internal policies
9	3.79	-1.840	0.987	0.920	Q9 — Leads by example in using agile work tools
10	6.54	-2.037	0.987	0.945	Q10 — Develops team capabilities in a systematic manner

Rank	Kurtosis	Skewness	α if Deleted	CITC	Item
11	6.24	-2.044	0.987	0.930	Q11 — Engages stakeholders early to gather feedback
12	6.01	-1.977	0.987	0.948	Q12 — Balances operational discipline with flexibility

Table 22 : B. Item Analysis for the Employee Engagement and Workforce Productivity Scales

	Kurtosis	Skewness	α if Deleted	CITC	Item
E1	0.93	-1.376	0.978	0.936	I feel energetic and enthusiastic at the start of each workday
E2	1.94	-1.484	0.978	0.927	I persevere in my efforts when faced with difficulties
E3	3.22	-1.762	0.982	0.850	I rarely feel mentally exhausted during my tasks
E4	0.91	-1.379	0.978	0.927	My work is meaningful and contributes to Ministry objectives
E5	0.88	-1.389	0.978	0.934	I feel proud and enthusiastic when talking about my work
E6	0.82	-1.372	0.977	0.941	I find inspiration and generate new ideas through my work
E7	0.77	-1.356	0.978	0.919	Time flies when I am engaged in my work
E8	2.21	-1.549	0.978	0.937	I experience high levels of concentration where I lose track of time
E9	6.41	-2.136	0.980	0.877	I am fully immersed in my daily tasks
P1	1.10	-1.457	0.930	0.859	I complete my tasks according to approved quality standards
P2	2.33	-1.601	0.930	0.854	I meet deadlines consistently
P3	0.72	-1.355	0.930	0.854	I prioritize critical work to complete it first
P4	3.35	-1.724	0.931	0.822	I handle high workloads efficiently
P5	0.82	-1.372	0.931	0.846	I use digital systems effectively
P6	10.83	-2.462	0.930	0.867	I voluntarily support my colleagues
P7	11.68	-2.516	0.932	0.822	I proactively suggest service improvements
P8	11.28	-2.521	0.931	0.856	I adhere to procedures under work pressure
P9	10.54	-2.520	0.931	0.854	I communicate effectively with partner entities
P10	12.25	-2.643	0.931	0.855	I maintain positive professional conduct
P11(*)	91.15	-9.231	0.947	0.223	I intentionally delay tasks without justification (*)
P12(*)	56.15	-7.169	0.948	0.248	I withdraw from collaboration during disagreements (*)
P13(*)	49.86	-6.886	0.949	0.241	I bypass quality procedures to speed up delivery (*)

Table 23 : B. Descriptive Statistics for Agile Leadership Items

Rank	Agreement %	CITC	SD	Mean	Item
1	97.9%	0.947	0.51	4.71	Q5 — Removes cross-departmental barriers to accelerate services
2	97.1%	0.913	0.51	4.71	Q7 — Fosters a psychologically safe environment for ideas
3	97.7%	0.948	0.53	4.70	Q12 — Balances operational discipline with flexibility
4	97.9%	0.945	0.54	4.69	Q10 — Develops team capabilities systematically
5	97.4%	0.930	0.55	4.69	Q11 — Engages stakeholders early

Rank	Agreement %	CITC	SD	Mean	Item
6	97.2%	0.958	0.53	4.68	Q6 — Re-prioritizes based on impact and outcomes
7	97.4%	0.929	0.53	4.68	Q8 — Shows flexibility in internal policies
8	96.9%	0.920	0.56	4.68	Q9 — Leads by example in agile work tools
9	97.2%	0.908	0.55	4.67	Q2 — Encourages experimentation and learning from errors
10	97.0%	0.945	0.56	4.67	Q3 — Provides clear information and feedback
11	96.7%	0.912	0.56	4.67	Q4 — Delegates authority and trusts the team
12	95.6%	0.904	0.56	4.64	Q1 — Responds quickly to changes in systems or priorities

Table 24 : B. Descriptive Statistics for Employee Engagement Items

Rank	Agreement %	CITC	SD	Mean	Item
1	98.2%	0.934	0.49	4.71	E5 — I feel proud and enthusiastic about my work
2	98.2%	0.941	0.49	4.71	E6 — I find inspiration and new ideas through work
3	98.2%	0.919	0.49	4.71	E7 — Time flies when I am engaged in my work
4	98.2%	0.937	0.50	4.71	E8 — I experience intense concentration and lose track of time
5	97.7%	0.927	0.51	4.70	E4 — My work is meaningful and contributes to Ministry goals
6	97.9%	0.927	0.52	4.69	E2 — I persevere when facing difficulties
7	97.2%	0.936	0.52	4.68	E1 — I feel energetic and enthusiastic at the start of the workday
8	96.9%	0.877	0.57	4.68	E9 — I am fully immersed in my daily tasks
9	95.4%	0.850	0.60	4.64	E3 — I rarely feel exhausted during tasks

Table 25 : B. Descriptive Statistics for Workforce Productivity Items

Rank	Agreement %	CITC	SD	Mean	Item
1	99.5%	0.855	0.45	4.79	P10 — I maintain positive professional conduct
2	99.7%	0.822	0.45	4.78	P7 — I proactively suggest service improvements
3	99.5%	0.856	0.46	4.78	P8 — I adhere to procedures under pressure
4	99.5%	0.867	0.46	4.77	P6 — I voluntarily support colleagues
5	99.0%	0.854	0.47	4.77	P9 — I communicate effectively with partner entities
6	98.2%	0.859	0.49	4.72	P1 — I complete tasks to approved quality standards
7	98.5%	0.854	0.48	4.72	P3 — I prioritize critical tasks first
8	98.2%	0.846	0.49	4.71	P5 — I use digital systems effectively
9	97.7%	0.854	0.52	4.70	P2 — I meet deadlines consistently
10	97.9%	0.822	0.52	4.70	P4 — I handle heavy workloads efficiently