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Linking Distributed Leadership to Organizational Citizenship Behavior in Turkish Software Development Companies: The Mediating Role of Work Engagement

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Abstract

This research examines how distributed leadership shapes organizational citizenship behavior within Türkiye's software development sector, with work engagement positioned as a mediating variable. As authority disperses from a singular leader toward a collective, collaborative framework, distributed leadership becomes ever more salient in agile, knowledge-intensive businesses such as software development. Data were collected through an online questionnaire completed by 273 software practitioners positioned in different locations in Türkiye. The sample encompassed a spectrum of occupational roles, educational attainments, and professional longevity, thereby reflecting the sector's heterogeneous character. Results highlight that higher levels of distributed leadership are associated with higher work engagement and organizational citizenship behavior. A major distributed leadership impact on organizational citizenship behavior is channeled through work engagement, which underscores the cognitive and affective pathways through which distributed leadership facilitates organizational citizenship behavior. These findings contribute to the leadership literature by showing how distributed leadership takes advantage of intrinsic motivation and discretionary effort, particularly in highly innovative and collaborative environments, and they align with results reported in previous studies on leadership, engagement, and citizenship behavior. From a managerial perspective, the study recommends the promotion of shared decision-making and engagement as means to enhance work engagement. This research fills a critical gap as it is the first empirical study to test the mediating role of work engagement in the relationship between distributed leadership and organizational citizenship behavior within Türkiye's software development companies.

Keywords: Distributed Leadership (DL), Organizational Citizenship Behavior (OCB), Work Engagement (WE), Software Development in Türkiye.

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1. Introduction

The swift expansion and mounting global competition within Türkiye's software development sector have made traditional, hierarchical leadership paradigms increasingly inadequate. Distributed leadership, which relocates authority away from a single chief officer and toward a distributed, collectively governed process in which influence and decision authority circulate, constitutes a potentially robust means of managing the adaptive demands that are urged by rapid and multifaceted change (Harris, 2008:173). Nonetheless, in Türkiye, its actual application remains circumscribed, impeded by persistently rigid bureaucratic layers and an underdeveloped apparatus for leadership cultivation (Özdemir and Demircioğlu, 2015:920; Kılınç and Özdemir, 2015:4).

At nearly 10.3 billion USD, the software-driven IT industry forms the backbone of Türkiye's Information and Communication Technologies (ICT) sector, according to Türkiye Bilişim Sanayicileri Derneği (TÜBİSAD, 2025:32). Nevertheless, over the past five years, Türkiye Odalar ve Borsalar Birliği (TOBB) statistics have ranked software companies (computer programming, NACE 62.10) recurrently among the ten sectors with the highest insolvency incidence and frequently within the top five. During June 2025, software companies registered the steepest closure rate, representing 7.3 per cent of the total, while overall liquidations in Türkiye grew by 12 per cent in the year's first five months relative to the same months of 2024 (TOBB, 2025). These data signal leadership's decisive contribution to an organization's survival trajectory (Garousi et al., 2015:34; Koch et al., 2014:16). Viewed through the adaptive lens of distributed leadership, characterized by participative ownership, situational flexibility, and rapid responsiveness, these statistics suggest a plausible strategic countermeasure to such existential fragility.

Against this backdrop, organizational citizenship behavior, discretionary activities that augment but exceed core contractual obligations, acquires central importance for the endurance of innovation and collective resilience (Podsakoff et al., 2009:122). Empirical investigations reveal that leadership that promotes personal agency and institutional trust correlates positively with the frequency and scope of such behavior.

Nonetheless, the mediating role of work engagement, commitment, and immersion that employees manifest in their tasks, within the dynamic between distributed leadership and organizational citizenship behavior in Türkiye's software sector, remains insufficiently characterized.

This study contends that distributed leadership positively affects organizational citizenship behavior both directly and through pathways that involve work engagement. By granting trust, psychological safety, and inclusivity, distributed leadership strengthens work engagement that, in turn, energizes cooperative and proactive behavior, thereby improving organizational effectiveness. Therefore, this study is necessary to provide sector-specific empirical evidence on whether distributed leadership can function as a practical leadership response to Türkiye's "growth–fragility" paradox, strong market expansion alongside recurrent firm closures, by clarifying how (and to what extent) work engagement transmits leadership influence into discretionary, resilience-building behavior. The study is theoretically grounded in Distributed Leadership Theory, Social Exchange Theory, and Role Engagement Theory, which together explain how shared leadership practices can translate into engagement and discretionary, extra-role behavior.

Through addressing these mechanisms, the study shows how adaptive and distributed leadership influences in Türkiye's software industry can result in increased engagement and discretionary effort. The article is based on a doctoral dissertation that will be defended at Istanbul Ticaret University, which examined the theory and empirical evidence in the ecosystem of distributed leadership, work engagement, and organizational citizenship behavior in Turkish software development companies.

2. Theoretical Background

2.1. Research Theories

This study adopts three theories to analyze how distributed leadership fosters organizational citizenship behavior through work engagement: Distributed Leadership Theory, Social Exchange Theory, and Role Engagement Theory.

Distributed Leadership Theory views leadership as a shared endeavor and views cooperation as leadership (Gronn, 2002:428-430; Bolden, 2011:251-253). Through shared decision-making, distributed leadership enhances autonomy, engenders trust, and fosters mutual accountability, all critical to knowledge work excellence.

The workplace is governed by reciprocity in social exchange (Blau, 1964:193-206). Pay and leadership equity lead employees to engagement as a form of reciprocity. An employee is bound to pay back the investment through attending to extra-role behavior of peer support and organizational advocacy (Cropanzano and Mitchell, 2005:875-877).

Role Engagement Theory (Kahn, 1990:703-704) proposes three psychological conditions, meaningfulness, safety, and availability, which lead to a loyal investment in engagement. Distributed leadership fosters these conditions through trust and participation, thus affording psychological safety and greater engagement (Schaufeli et al., 2002:74-75).

Based on these theories, it is possible to argue that distributed leadership shapes the psychological and social environment that supports employee engagement and discretionary action critical to organizational performance.

2.2. Distributed Leadership and Work Engagement

As noted by Bolden (2011:254-255), distributed leadership is not an action executed by an individual leader, but rather a social phenomenon that arises through the agency of multiple social actors. In the context of workplace dynamics, work engagement is marked by three interrelated components: vigor, dedication, and absorption (Schaufeli and Bakker, 2004a:294).

Distributed leadership fosters work engagement by promoting shared stewardship, trust, participation, and engagement, matching those of Kahn's (1990:703-704) engagement conditions. This is supported by empirical research across the educational, healthcare, and academic sectors (Quek et al., 2021:7; Wibowo et al., 2024:45). However, much of this research tends to treat engagement as a general phenomenon that is an essential component for high-pressure, energy-intensive occupations such as software development. Therefore, both core theories (Distributed Leadership Theory and Role Engagement Theory) and the available empirical evidence converge on a positive association between distributed leadership practices and work engagement (Gronn, 2002:428-430; Bolden, 2011:251-253; Kahn, 1990:703-704). These studies and others led to the first hypothesis:

H1: Distributed leadership has a positive effect on work engagement.

2.3. Work Engagement and Organizational Citizenship Behavior

Organ (1997:86) defines organizational citizenship behavior as conduct that is directed to the social and psychological context that underpins performance, which reinforces task performance. In simple terms, organizational citizenship behavior represents voluntary behavior such as helping coworkers and taking the initiative that enhances collaboration and performance.

Work engagement, defined as deployed energy across a number of domains, is consistently shown to drive organizational citizenship behavior. Engaged workers tend to invest their energy into

what was previously voluntary. Discretionary effort is a term defined by Ariani (2013:52), who noted that engagement was a way to enhance organizational citizenship behavior in the service industry in Indonesia. Evidence from healthcare settings shows that Liu et al. (2023:6) concluded that engaged nurses exceeded performance expectations.

In this regard, work engagement, defined by energy, persistence, and resilience, emerges as the most powerful driver of organizational citizenship behavior by stimulating the energy needed for such behavior (Kiat et al., 2023:245), especially at the software development level, where performance is a function of continuous effort. This study, based on Social Exchange Theory, proposes that support from the employer (or relevant others) leads to organizational citizenship behavior, with work engagement fueling the energy needed to keep the cycle going. Thus, the reciprocity mechanism in Social Exchange Theory provides a clear explanation for why higher engagement should translate into greater organizational citizenship behavior (Blau, 1964:193-206). Together, these findings indicate that engaged employees infuse workplaces with greater initiative, cooperation, and altruism, which leads us to the second hypothesis:

H2: Work engagement positively affects organizational citizenship behavior.

2.4. Distributed Leadership and Organizational Citizenship Behavior

Prior studies generally appear to connect distributed leadership with organizational citizenship behavior. From a theoretical perspective, distributed leadership is expected to promote OCB by strengthening trust, mutual accountability, and reciprocity, which increase employees' willingness to contribute beyond formal roles (Gronn, 2002:428-430; Bolden, 2011:251-253; Blau, 1964:193-206; Cropanzano and Mitchell, 2005:875-877). Kılınç (2014:74) reported in his study on Turkish secondary schools that the distribution of leadership roles promoted stronger citizenship behavior. Internationally, the phenomenon has been noted as well. Hulpia et al. (2010:40-42) reported it in European schools, Lin and Shieh (2015:1) noted increased productivity and teamwork in a manufacturing context, and Jang (2022:1) noted that South Korean hotel managers showed stronger leadership that fostered employee resilience and a collective spirit in the post-pandemic recovery period. From the creative industries, Yasini et al. (2019:85) also reported that distributed leadership increased organizational citizenship behavior by enhancing self-efficacy and trust in the organization.

Taken together, these studies highlight distributed leadership's capacity to cultivate trust, reciprocity, and empowerment, which drive voluntary extra-role behavior. Strong evidence in various fields supported the third hypothesis:

H3: Distributed leadership positively affects organizational citizenship behavior.

2.5. Mediation Role of Work Engagement

Distributed leadership builds trust, psychological safety, and autonomy, which reinforce work engagement. Furthermore, engaged employees are more inclined to exhibit organizational citizenship behavior and contribute to organizational effectiveness. This pathway is theoretically grounded in Role Engagement Theory (Kahn, 1990:703-704) and Social Exchange Theory (Blau, 1964:193-206).

Results from other leadership theories add to this reasoning. Transformational leadership centered on work engagement serves as a mediating variable to organizational citizenship behavior (Fallash et al., 2024:3811; Jufrizen et al., 2023:8). There is also research focused on the relationship between distributed leadership, work engagement, and organizational citizenship behavior: Wibowo et al. (2024:45) showed that distributed decision-making and shared goal setting stimulated organizational citizenship behavior as a result of a positive work environment. Wibowo's study, however, examined these variables together without formally testing work engagement as a mediator.

While mediation has been established for other leadership styles, distributed leadership is the one leadership style that has not been explicitly tested for work engagement as a mediating variable in the relationship with organizational citizenship behavior. Accordingly, the theoretical logic (Kahn, 1990:703-704; Blau, 1964:193-206) and the empirical pattern in prior work together justify testing whether work engagement is the mechanism translating distributed leadership into OCB (Wibowo et al., 2024:45). Answering this question is important for understanding whether the engagement distributed leadership cultivates is the main factor converting shared leadership into discretionary actions, particularly in dynamic sectors such as Türkiye's software industry. Addressing this gap, the final hypothesis is proposed:

H4: Work engagement mediates the relationship between distributed leadership and organizational citizenship behavior.

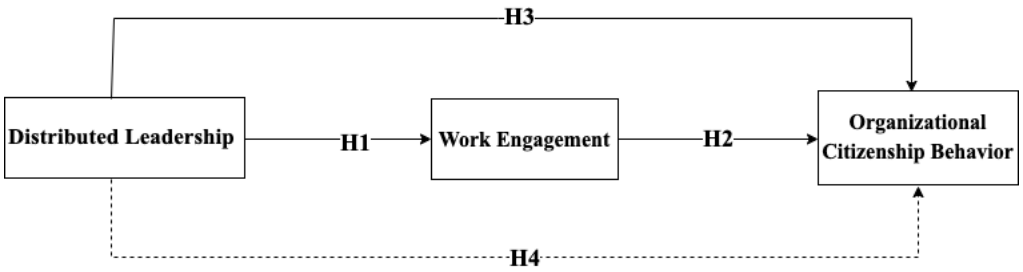
3. Materials and Methods

The methodological approach used to test the proposed relationships among distributed leadership, work engagement, and organizational citizenship behavior in Türkiye's software development sector is presented below. The research model and hypotheses are introduced first, followed by the data collection process and sampling strategy, and then the measurement instruments and statistical procedures used to assess reliability, validity, and the hypothesized direct and mediating effects.

3.1. Research Model

Figure 1 shows the model of the research subjects and the relationships that are proposed for the study. The model assumes that distributed leadership has a positive impact on work engagement and organizational citizenship behavior. Also, work engagement is hypothesized to mediate the influence of distributed leadership on organizational citizenship behavior. The paths are marked with hypotheses (H1 to H4), which summarize the basic assumptions of the model.

Figure 1. Model diagram with hypothesis numbers



3.2. Sample

This research focuses on the software development sector in Türkiye, with nearly 300,000 software developers (Sanayi ve Teknoloji Bakanlığı, 2023:201). In total, 320 responses were collected, out of which 273 were maintained following the data cleaning process; 47 samples were excluded due to incompleteness or not meeting the inclusion criteria. Due to the sector's organizational and geographic diversity, purposive sampling was employed. While this method lacks randomness, it is advantageous in construct-centered quantitative research (Hair et al., 2010:24-270). The final sample included participants from diverse regions, company sizes, and subfields, enhancing their generalizability.

3.3. Data Collection Procedure

From November 2023 to January 2024, data were collected via an online questionnaire distributed through professional networks and forums located in technology parks. Ethics approval was issued by Istanbul Ticaret University, and all participants provided informed consent. Participants were anonymous and voluntarily contributed to the study.

3.4. Instruments/Measures

The survey had 53 items, which measured distributed leadership, work engagement, and organizational citizenship behavior, all rated on a five-point Likert scale. Distributed leadership was measured using the 23-item Distributed Leadership Inventory developed by Hulpia et al. (2009), which was adapted for Türkiye by Özdemir (2012), capturing Supportive Leadership, Leadership Supervision, and Coherent Leadership; a sample item is "There is a well-functioning leadership team." Work engagement was measured using the Turkish six-item scale developed by Güler et al. (2019) from the original Utrecht Work Engagement Scale (UWES) that was developed by Schaufeli and Bakker (2004b:7); a sample item is "My job gives me the enthusiasm to work." Organizational citizenship behavior was measured with the 24-item scale developed by Basım and Şeşen (2006), adapted from Podsakoff et al. (1990), which included dimensions of Altruism, Conscientiousness, Sportsmanship, Civic Virtue, and Courtesy; a sample item is "My attendance at work is above the standards." Age, gender, education, job type, and tenure were recorded as covariates for the study.

3.5. Data Analysis Procedure

Analyses were performed using SPSS 26 and AMOS 24. Mediation effects were assessed using Hayes' PROCESS Macro Model 4. In sequence, descriptive and correlation analyses were performed along with a common method bias assessment using Harman's single-factor test. Construct validity was assessed using exploratory and confirmatory factor analyses (EFA and CFA), and reliability was established with Cronbach's alpha and Composite Reliability. Validity was assessed through convergent and discriminant validity using Average Variance Extracted (AVE) and HTMT ratios. The relationships between distributed leadership, work engagement, and organizational citizenship behavior were estimated using SEM with bootstrapping to test mediation significance.

4. Data Analysis

The results are presented in the following order: descriptive statistics, measurement model (reliability/validity), correlations, structural model, and mediation effects.

4.1. Demographic Analysis

Demographic and profile information is reported to describe the study sample and to provide context for interpreting subsequent analyses. The subsection summarizes overall respondent characteristics and presents descriptive patterns in distributed leadership and organizational citizenship behavior across key groups (job role, education level, and tenure).

4.1.1. Demographics and Descriptive Insights

The sample depicted an early career and youthful workforce in the software industry in Türkiye. Respondent demographics were 72.2% male, 50.5% within the 26 to 35 age range, and over three-quarters had an associate or bachelor's degree. The largest proportion, 56.4%, were software developers. The perception that the industry is youthful was reinforced by the fact that most participants had less than a decade of industry experience.

4.1.2. Role-Based Differences in Distributed Leadership and Organizational Citizenship Behavior

Differences emerged that could be structured around job roles. Project Managers showed the highest mean scores on distributed leadership (DL: M = 3.44) and organizational citizenship behavior (OCB: M = 3.52). At the other extreme, the Quality Assurance staff had the lowest scores (DL: M = 3.06; OCB: M = 3.09). Developers and UI/UX professionals were positioned in the middle (DL ≈ 3.19; OCB ≈ 3.33–3.41). No inferential group comparison test (e.g., ANOVA) was conducted; therefore, these values are reported descriptively.

4.1.3. Education-Level Effects

Those who hold associate diplomas had the highest mean DL score (M = 3.28), while postgraduates displayed the highest mean score on OCB (M = 3.35), even though their DL score was lower (M = 3.10). High school graduates obtained the lowest scores for both DL (M = 3.06) and OCB (M = 3.27). These values are reported descriptively.

4.1.4. Tenure and Leadership Perception

A clear trend appeared, as the longer the employees had worked in the organization, the more they perceived distributed leadership and organizational citizenship behavior. Employees with 0-3 years of tenure had the lowest scores (DL: 2.92, OCB: 3.21), while those with more than 10 years had the highest (DL: M = 3.63; OCB: M = 3.51). Scores increased across organizational tenure groups.

4.1.5. Non-Significant Predictors

As found in the regression analysis, gender, age, and total years of work were not significant predictors of distributed leadership and organizational citizenship behavior scores ($p > 0.05$ for all).

4.2. Measurement Model: Validity and Reliability of Constructs

For the constructs distributed leadership, work engagement, and organizational citizenship behavior, the measurement model was checked for reliability and validity using confirmatory factor analysis (CFA) and internal consistency checks, convergent and discriminant validity, along with model fit analysis.

4.2.1. Internal Consistency and Convergent Validity

In regard to internal consistency, all subscales showed strong internal consistency, as indicated by alpha and Composite Reliability (CR) values greater than 0.70. Each construct also achieved greater than 0.50 for the Average Variance Extracted (AVE), suggesting convergent validity (Table 1).

Table 1. Internal Consistency and Convergent Validity of Study Constructs

Construct	Sub-Dimension	Cronbach's Alpha (α)	R	VE	Reliability
Distributed Leadership	Supportive Leadership	0.93	.94	.55	0.95
	Leadership Supervision	0.83			
	Coherent Leadership	0.94			
Organizational Citizenship Behavior	Altruism	0.87	.96	.65	0.95
	Conscientiousness	0.88			
	Sportsmanship	0.89			
	Civic Virtue	0.85			
	Courtesy	0.85			
Work Engagement	—	0.91	.91	.68	0.90

Note: Work engagement (WE) was treated as a single-dimensional construct; the six-item UWES scale was analyzed as one factor (α, CR, and AVE reported for the overall scale).

4.2.2. Convergent and Discriminant Validity

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio of correlations. All HTMT values were below 0.85, indicating that distributed leadership, work engagement, and organizational citizenship behavior are distinct constructs (Table 2).

Table 2. HTMT Ratios for Discriminant Validity

Variables	Distributed Leadership	Work Engagement	Organizational Citizenship Behavior
Distributed Leadership	—		
Work Engagement	0.650	—	
Organizational Citizenship Behavior	0.587	0.790	—

Note: Values are HTMT ratios. HTMT values below 0.85 indicate adequate discriminant validity among constructs.

4.2.3. Construct Validity and Model Fit

A second-order confirmatory factor analysis (CFA) performed in AMOS verified the structure of the model. The MaxR(H) values were greater than 0.70, and RMSEA was under 0.08 for all constructs, indicating acceptable model fit (Table 3).

Table 3. CFA Results for Construct Validity and Model Fit

Construct	Test Metric	Test Value	Threshold	Significance
Distributed Leadership	MaxR(H)	0.815	> 0.70	Pass
	RMSEA	0.068	< 0.08	Pass
Organizational Citizenship Behavior	MaxR(H)	0.910	> 0.70	Pass
	RMSEA	0.036	< 0.08	Pass
Work Engagement	MaxR(H)	0.898	> 0.70	Pass
	RMSEA	0.075	< 0.08	Pass

Note: MaxR(H) = maximal reliability (H). RMSEA = root mean square error of approximation. Thresholds shown indicate acceptable values for each metric.

4.3. Correlation Analysis

Table 4 reports Pearson correlations among the study variables. All correlations were positive and significant ($p < .001$).

Table 4. Correlation Matrix Among Study Variables

Variable	Distributed Leadership	Organizational Citizenship Behavior	Work Engagement
Distributed Leadership	—		
Organizational Citizenship Behavior	0.616***	—	
Work Engagement	0.541***	0.721***	—

Note: Values are Pearson correlations. * p < .05; ** p < .01; *** p < .001.

4.4. Structural Model

Data analysis found that both distributed leadership and work engagement significantly predict organizational citizenship behavior, explaining 59.2% of its variance (Table 5). Based on standardized beta coefficients, both constructs are of significance, although with different levels of impact. WE (β = 0.548) has a stronger impact on organizational citizenship behavior as compared to DL (β = 0.320).

Table 5. Regression Results Predicting Organizational Citizenship Behavior

Variable	b (Unstandardized)	SE	β (Standardized)	**t-statistic**	p
Distributed Leadership	0.304	0.044	0.320	6.923	< 0.001
Work Engagement	0.404	0.034	0.548	11.855	< 0.001

Note: b = unstandardized coefficient; β = standardized coefficient; SE = standard error.

4.5. Measurement and Mediation Analysis

4.5.1. Measurement Validation

Exploratory Factor Analysis (EFA) supported the expected factor structures for the constructs. Distributed leadership yielded three factors (Supportive Leadership, Leadership Supervision, and Coherent Leadership), accounting for 60.3% of variance (KMO = 0.940; Bartlett's $\chi^2 = 4331$, $p < 0.001$). Organizational citizenship behavior consisted of five factors (Altruism, Conscientiousness, Sportsmanship, Civic Virtue, Courtesy), accounting for 51.7% of variance (KMO = 0.943). Work engagement was unidimensional, accounting for 61.1% of variance (KMO = 0.899).

The confirmatory factor analysis (CFA) supported the model with acceptable fit indices (CMIN/DF = 4.27, RMR = 0.089, CFI = 0.964, TLI = 0.962, RMSEA = 0.076), supporting the use of Structural Equation Modeling (Jöreskog and Sörbom, 1984; Hu and Bentler, 1999).

4.5.2. Mediation Testing

Mediation was assessed using Hayes' PROCESS Model 4 (Table 6). The indirect effect (DL → WE → OCB) was significant (β = 0.281, SE = 0.0428, 95% CI [0.205, 0.372]; z = 6.57, p < 0.001), and the direct effect of distributed leadership on organizational citizenship behavior remained significant (β = 0.304, SE = 0.0501, 95% CI [0.202, 0.394]; z = 6.07, p < 0.001), indicating partial mediation. Indirect effects comprised 48% of the total effect.

Table 6. Path Coefficients and Mediation Effects

Hypothesis	Path	β	SE	95% CI	z	p	Interpretation
H1	DL → WE	0.696	0.0669	[0.562, 0.826]	10.40	< 0.001	Supported
H2	WE → OCB	0.404	0.0415	[0.325, 0.490]	9.74	< 0.001	Supported
H3	DL → OCB (direct)	0.304	0.0501	[0.202, 0.394]	6.07	< 0.001	Supported
H4	DL → WE → OCB	0.281	0.0428	[0.205, 0.372]	6.57	< 0.001	Supported

Note: CI = bootstrap confidence interval. DL = distributed leadership. WE = work engagement. OCB = organizational citizenship behavior.

5. Discussion

5.1. Interpretation of Findings

Grounded in Distributed Leadership Theory, Social Exchange Theory, and Role Engagement Theory, this study provides evidence that distributed leadership influences work engagement and organizational citizenship behavior within Türkiye's software industry. All four hypotheses found support. Distributed leadership both increased engagement (H1) and, subsequently, organizational citizenship behavior (H2). Independently, distributed leadership also impacted organizational citizenship behavior (H3) while work engagement was found to partially mediate the DL–OCB relationship (H4). This type of mediation reinforces the strong impact of shared leadership on engagement, utilizing shared leadership to encourage discretionary, extra-role behavior.

This research provides evidence that distributed leadership increases organizational citizenship behavior both directly and through work engagement as a mediating factor. Distributed leadership often allows for informal decision-making and autonomy, which creates psychological safety, encouraging voluntary behavior. In dynamic and knowledge-intensive industries like software engineering, that kind of leadership is essential.

The current outcomes align with existing research indicating that in the non-software sectors such as education and healthcare, distributed leadership positively correlates with work engagement (Quek et al., 2021:7; Wibowo et al., 2024:45). The current outcome also corroborates with existing research that demonstrates work engagement as a contributor to organizational citizenship behavior in diverse fields (Ariani, 2013:52; Liu et al., 2023:6; Kiat et al., 2023:245). In addition, the positive association between distributed leadership and organizational citizenship behavior corresponds with earlier findings reported in Türkiye and other settings (Kılınç, 2014:74; Hulpia et al., 2010:40–42; Lin and Shieh, 2015:1; Jang, 2022:1; Yasini et al., 2019:85).

5.2. Theoretical Implications

These findings strengthen Role Engagement Theory, which posits that meaning, autonomy, and psychological safety compel employees to fully engage with their roles (Kahn, 1990:703–704; Schaufeli et al., 2002:74–75). This is also supported by Social Exchange Theory, which posits that the existence of trust and fair treatment provides a social incentive for employees to aid (Blau, 1964:193–206; Cropanzano and Mitchell, 2005:875–877). In addition, the findings support Distributed Leadership Theory by showing that distributed leadership is associated with higher work engagement and organizational citizenship behavior in a knowledge-intensive context (Gronn, 2002:428–430; Bolden, 2011:251–253).

Beyond confirming these theoretical expectations, the study contributes by specifying work engagement as a tested mediating mechanism through which distributed leadership translates into organizational citizenship behavior in Türkiye's software development companies. This also builds upon the existing evidence of mediation in other leadership styles in which engagement acts as a conduit for the impact of leadership on OCB (Fallash et al., 2024:3811; Jufrizen et al., 2023:8), and addresses the gap in distributed leadership research where variables were examined together without formally testing engagement as the mediator (Wibowo et al., 2024:45).

The findings are interesting in that they suggest distributed leadership may be feasible in Türkiye, which is stereotypically known for its more hierarchical organizational structures and cultures. This could mean that the technology sector is experiencing a change in the organizational culture and structure to a more participative leadership framework. This research illustrates the impact of distributed leadership on proactive behavior and thus addresses several gaps at the intersection of leadership and engagement discourse.

In this respect, the results are also informative for Türkiye's context, where distributed leadership has been described as constrained by rigid bureaucratic layers and limited leadership cultivation mechanisms (Özdemir and Demircioğlu, 2015:920; Kılınç and Özdemir, 2015:4). The positive associations observed in software development firms suggest that distributed leadership may operate more feasibly in sectors characterized by agile routines, interdependence, and rapid problem-solving, even when broader organizational norms remain comparatively hierarchical. Taken together, these results confirm and extend dominant findings from largely Western contexts by showing that distributed leadership can also support engagement and citizenship behavior in Türkiye's software industry.

5.3. Practical Implications

For practitioners, the findings imply that adopting distributed leadership cannot be as simple as task delegation. Trust and distributed leadership must be cultivated throughout all company levels. Formal leaders are not the only focus of training programs. Team members should be taught collaboration, communication, and problem-solving skills as well. Mentoring and peer learning circles, as well as cross-functional teams, can help strengthen distributed leadership and sustain engagement.

Voluntary citizenship behavior and enhanced engagement necessitate meaning, autonomy, and opportunity for growth in the workplace. Distributed leadership should embed criteria that emphasize psychological safety and shared responsibility at all levels of the organization. Such embracing environments are known to facilitate participative management, strengthen accountability, and enhance performance sustainably.

5.4. Limitations

A few limitations should be noted. The cross-sectional approach is a limitation because it is not possible to make causal assumptions. The focus on the software industry in Türkiye might limit the findings. Other industries and cultures might have a different approach to distributed leadership and engagement. Internal dynamics, such as in-group/out-group perceptions, were not looked at, but could greatly influence how leadership is felt.

The sample had a greater proportion of respondents employed as software developers compared to all other roles. Wider role representation would better enable the realization of leadership's relational influence, considering the multilevel hierarchy within the organization. Moreover, the use of self-reported data creates the potential for bias; the use of supervisor or peer evaluations would strengthen future research.

5.5. Future Research Directions

A longitudinal approach would be able to clearly show directionality. Moreover, only work engagement was evaluated as a mediator. Other psychological mechanisms, such as psychological empowerment, trust, or organizational identification (Güvendi and İyigün, 2024), could be explored in subsequent research. Other possible moderators, including team size, the complexity of tasks undertaken, and culture within the organization, call for further examination.

Overall, the study shows that distributed leadership increases organizational citizenship behavior both directly and through work engagement as a mediating factor within Türkiye's software industry. It is critical for Türkiye's technology sector that distributed leadership, together with strong employee engagement, be strategically embraced to enhance collaboration and long-term competitiveness.

Çatışma Beyanı (Competing Interests)

Çalışmanın yazarları, herhangi bir çıkar çatışması olmadığını beyan etmektedirler.

The authors declare that they have no competing interests.

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Etik Beyanı (Ethical Statement)

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

Araştırmacıların Katkı Oranı (Author's Contributions)

Yazarlar çalışmaya eşit oranlarda katkı sağlamışlardır.

The authors contributed equally to the study.

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