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The Role of E-Leadership in Enhancing Team Connectivity and Commitment in Distributed Work Environments¹

Dağıtık Çalışma Ortamlarında Takım Bağlantılılığını ve Bağlılığını Artırmada E-Liderliğin Rolü

ÖZET

Kuruluşlar giderek uzaktan ve hibrit çalışma modellerini benimsedikçe, liderliğin sanal ortamlarda ekip bağlarını ve bağlılığını sağlamak için evrilmesi gerekmektedir. Doğrudan gözetim ve yüz yüze etkileşimlere dayanan geleneksel liderlik teorileri, coğrafi olarak dağıtık ekiplerin karmaşıklıklarını ele almakta yetersiz kalmaktadır. E-liderlik, iş birliğini, katılımı ve ortak amacı teşvik etmek için dijital araçlar ve iletişim stratejilerinden yararlanan kritik bir kavram olarak ortaya çıkmıştır. Ancak, e-liderliğin ekip bağlılığını artırdığı mekanizmalar – örneğin ekip bağlantılılığı – hâlen yeterince incelenmemiştir.

Bu çalışma, İstanbul'daki teknoparklarda faaliyet gösteren yazılım geliştirme ekipleri bağlamında e-liderliğin ekip bağlantılılığı ve ekip bağlılığı üzerindeki etkisini incelemektedir. Kısmi En Küçük Kareler Yapısal Eşitlik Modellemesi (PLS-SEM) kullanılarak, 46 firmadan 195 yeni ürün geliştirme (NPD) ekibi üyesinden toplanan anket verileri analiz edilmiştir. Bulgular, e-liderliğin ekip bağlantılılığını ve ekip bağlılığını anlamlı şekilde artırdığını göstermektedir. Ancak, geleneksel beklentilerin aksine, ekip bağlantılılığı e-liderlik ile ekip bağlılığı arasındaki ilişkiyi aracılık etmemektedir. Bu durum, sanal ekiplerde bağlılığın, akranlar arası etkileşimlerden ziyade lider-üye uyumuyla şekillendiğini göstermektedir.

Bu sonuçlar, e-liderlik ve dijital ekip yönetimine ilişkin büyüyen literatüre katkı sağlayarak, dağıtık ekiplerde vizyon odaklı liderliğin, stratejik iletişimin ve duygusal katılımın önemini vurgulamaktadır. Çalışma, etkili e-liderliğin yalnızca dijital iletişimi kolaylaştırmanın ötesine geçmesi gerektiğini; sanal ekiplerde bağlılığı sürdürmek için ortak amaç, motivasyon ve güveni etkin biçimde geliştirmesi gerektiğini ortaya koymaktadır.

Anahtar Kelimeler: e-liderlik, ekip bağlantılılığı, ekip bağlılığı, dönüşümcü liderlik, dijital ekipler, uzaktan çalışma, dağıtık çalışma ortamı.

ABSTRACT

As organizations increasingly adopt remote and hybrid work models, leadership must evolve to ensure team connectivity and commitment in virtual environments. Traditional leadership theories, which rely on direct supervision and face-to-face interactions, are inadequate in addressing the complexities of geographically dispersed teams. E-leadership has emerged as a critical construct, leveraging digital tools and communication strategies to foster collaboration, engagement, and shared purpose. However, the mechanisms, such as team connectivity, through which e-leadership enhances team commitment remain underexplored.

This study examines the impact of e-leadership on team connectivity and team commitment within the context of software development teams operating in Istanbul's technology parks. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), we analyze survey data from 195 new product development (NPD) team members across 46 firms. The findings reveal that e-leadership significantly enhances team connectivity and team commitment. However, contrary to conventional expectations, team connectivity does not mediate the relationship between e-leadership and team commitment, suggesting that commitment in virtual teams is shaped more by leader-member alignment than by peer interactions.

These results contribute to the growing discourse on e-leadership and digital team management by emphasizing the importance of vision-driven leadership, strategic communication, and emotional engagement in distributed teams. The study underscores that effective e-leadership extends beyond enabling digital communication—it must actively cultivate shared purpose, motivation, and trust to sustain commitment in virtual teams.

Keywords: e-leadership, team connectivity, team commitment, transformational leadership, digital teams, remote work, distributed work environment.

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1. INTRODUCTION

The rapid acceleration of digital transformation has fundamentally reshaped leadership paradigms in contemporary organizations. As remote and hybrid work models become increasingly prevalent, the ability of leaders to foster cohesion, engagement, and commitment within distributed teams has emerged as a critical determinant of organizational effectiveness. Traditional leadership theories, which emphasize physical presence, interpersonal rapport, and direct supervision, encounter significant limitations in virtual environments, necessitating a reconceptualization of leadership as a digitally mediated process (Kniel & Comi, 2021; Maurer et al., 2022). This shift has given rise to e-leadership, a distinct leadership model that prioritizes digital fluency, adaptive communication, and the capacity to cultivate trust in virtual settings (Waizenegger et al., 2023; Raybourn, 2020).

Unlike conventional leadership, which relies heavily on hierarchical authority and in-person interactions, e-leadership requires a more nuanced set of competencies tailored to virtual work environments. Effective e-leaders utilize digital tools not only to coordinate tasks but also to foster a shared vision, sustain engagement, and create a high-performance culture (Pandey, 2023; Paganin et al., 2023). However, while virtual connectivity enhances operational efficiency, it does not inherently cultivate deeper team commitment, raising the need to explore the mechanisms through which e-leadership translates into sustained engagement and cohesion (Susskind & Odom-Reed, 2016).

The increasing reliance on remote collaboration has underscored the significance of team connectivity—the extent to which team members engage in open communication and knowledge sharing. Research suggests that high connectivity fosters collaboration, innovation, and problem-solving, particularly in knowledge-intensive industries such as software development (Amelkin et al., 2018; Ke et al., 2019). Nevertheless, connectivity alone does not guarantee long-term commitment (Nooraie, 2024). While well-connected teams may exchange information efficiently, sustained commitment necessitates a deeper psychological bond, a sense of belonging, and alignment with a shared purpose (Zhang & Wang, 2020).

Team commitment, defined as the psychological attachment individuals develop toward their team and its objectives, has been identified as a key predictor of job satisfaction, retention, and overall performance (Peiris & Jayathilake, 2022; Rhoades et al., 2001). Traditionally, commitment has been reinforced through in-person interactions, shared experiences, and informal networking—elements that are inherently limited in virtual settings. As a result, e-leaders must compensate for the absence of physical proximity by leveraging vision-driven leadership, personalized engagement strategies, and strategic recognition practices (Podsakoff et al., 1990; Mercurio, 2015). By fostering a collective identity and reinforcing a sense of belonging despite geographical dispersion, e-leaders play a pivotal role in shaping commitment within virtual teams (Buła, 2024).

Although e-leadership, team connectivity, and team commitment are interrelated, their precise interdependencies remain underexplored. Some scholars argue that strong connectivity strengthens commitment by reinforcing social bonds and group identity (Peiris & Jayathilake, 2022), while others contend that commitment is driven more by leader-member alignment than by peer-to-peer interactions (Podsakoff et al., 2003). This study seeks to clarify this debate by examining the mediating role of team connectivity in the relationship between e-leadership and team commitment.

To address this research gap, this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze survey data from 195 team members across 46 technology firms in Istanbul. The study aims to elucidate the underlying mechanisms through which e-leadership fosters team commitment, offering empirical insights into its impact on virtual team dynamics. Furthermore, the findings are expected to contribute to the growing discourse on e-leadership, highlighting its critical role in sustaining connectivity and commitment within distributed team environments.

2. HYPOTHESIS DEVELOPMENT AND RESEARCH MODEL

As digital transformation reshapes organizational structures, traditional leadership frameworks are being challenged by the complexities of remote and hybrid work models. Leaders must navigate these challenges by leveraging digital tools and adaptive leadership strategies to maintain team connectivity and team commitment in distributed work environments (Waizenegger et al., 2023; Pandey, 2023). This study proposes an integrative research model that examines the direct and indirect effects of e-leadership on team commitment, with team connectivity as a potential mediator.

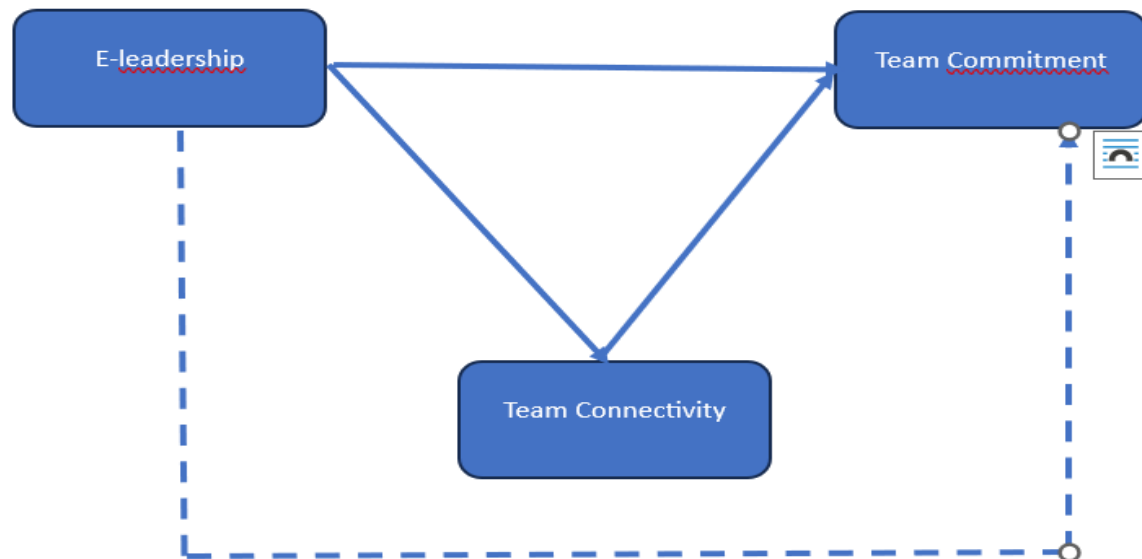


Figure 1. The Proposed Research Model

The conceptual framework is grounded in transformational leadership theory (Podsakoff et al., 1990) and e-leadership literature (Van Wart et al., 2019), integrating insights from studies on team connectivity and engagement in virtual teams (Susskind & Odom-Reed, 2016; Nooraie, 2024). The model posits that e-leadership fosters team commitment both directly and indirectly by strengthening team connectivity.

2.1. E-Leadership and Team Connectivity

Leadership effectiveness in distributed teams hinges on the ability to facilitate open communication, create shared understanding, and maintain engagement despite physical distance (Raybourn, 2020; Khalid, 2024). E-leadership enables leaders to foster interpersonal trust, knowledge exchange, and social cohesion within virtual teams by leveraging digital communication tools and adaptive leadership strategies (Paganin et al., 2023). Empirical evidence suggests that leaders who effectively manage digital interactions can enhance collaboration, reduce isolation, and create an inclusive virtual work environment (Nooraie, 2024; Susskind & Odom-Reed, 2016). Given these findings, we hypothesize that:

H1: *E-leadership positively and significantly affects team connectivity within distributed team settings.*

2.2. E-Leadership and Team Commitment

Commitment within virtual teams is shaped by the leader's ability to establish a compelling vision, provide individualized support, and foster a sense of belonging (Podsakoff et al., 1990; Zhang & Wang, 2020). Unlike traditional leadership, e-leadership must compensate for the absence of physical proximity by reinforcing emotional engagement, role clarity, and purpose-driven motivation (Bula, 2024; Ke et al., 2019). Research indicates that transformational e-leaders, who effectively align team members with organizational goals and demonstrate consistent support, are more likely to cultivate strong commitment levels within remote teams (Hansbrough & Schyns, 2018). Thus, we propose the following hypothesis:

H2: *E-leadership positively and significantly affects team commitment within distributed team settings.*

2.3. The Role of Team Connectivity in Driving Team Commitment

Team connectivity—defined as the degree of interaction, collaboration, and shared experiences among team members—has long been associated with higher levels of trust, psychological safety, and engagement (Amelkin et al., 2018; Peiris & Jayathilake, 2022). Teams that exhibit strong connectivity benefit from enhanced knowledge-sharing, improved conflict resolution, and greater collective problem-solving capabilities (Gupta & Fernandez, 2011). However, while team connectivity is a necessary condition for high performance, its role in directly influencing commitment remains an open question (Mercurio, 2015). Given the empirical link between interpersonal bonds and organizational attachment, we hypothesize:

H3: *Team connectivity positively and significantly affects team commitment within distributed team settings.*

2.4. The Mediating Role of Team Connectivity

While e-leadership directly influences both connectivity and commitment, it is unclear whether team connectivity acts as a mediating mechanism in this relationship. Some scholars argue that leaders who facilitate digital collaboration and encourage open communication indirectly enhance commitment by strengthening interpersonal connections among team members (Podsakoff et al., 2003; Rhoades et al., 2001). However, alternative perspectives suggest that commitment in virtual teams may be driven more by leader-member alignment than by team cohesion alone (Nooraie, 2024). To test this assumption, we hypothesize:

H4: *Team connectivity mediates the relationship between e-leadership and team commitment within distributed team settings.*

3. METHODOLOGY

3.1. Measures

This study explores the interrelationships between e-leadership, team connectivity, and team commitment. To test the proposed hypotheses, validated multi-item scales from established research were employed to measure the key variables. Each construct was assessed using a 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5).

The existing literature lacks a widely accepted conceptualization and measurement framework for e-leadership. Sukmawati (2024) defines e-leadership as a paradigm shift from traditional leadership models, emphasizing the integration of technology to enhance communication and collaboration. Hansbrough and Schyns (2018) highlight the transformational leader's role in fostering a shared vision and a sense of belonging, which are equally relevant in e-leadership contexts. Building on these perspectives, this study adopts the team transformational leadership framework while incorporating an e-social skills dimension to reflect the technological aspects of leadership. Accordingly, e-leadership is measured using a combination of the four-item e-social skills scale from Van Wart et al. (2019) and the transformational leadership scale developed by Podsakoff et al. (1990), with its Turkish adaptation validated by İşcan (2002). The final e-leadership scale consists of 27 items distributed across six dimensions: e-social skills (4 items), vision-inspiring role model (8 items), fostering acceptance of group goals (4 items), intellectual stimulation (4 items), individualized support (4 items), and high-performance expectations (3 items). All items were rated on a 5-point Likert scale to assess varying levels of agreement. Representative items include: "My team leader actively engages with team members through online platforms to foster collaboration and facilitate knowledge sharing," reflecting e-social skills; "My team leader effectively inspires others to commit to and align with their vision," illustrating the vision-inspiring role model dimension; and "My team leader motivates team members to collaborate and function as cohesive team players," capturing the fostering acceptance of group goals aspect. Additional examples include: "My team leader poses thought-provoking questions that stimulate critical thinking and innovation," exemplifying intellectual stimulation; "My team leader consistently demonstrates respect and sensitivity toward my personal feelings and concerns," illustrating individualized support; and "My team leader sets and communicates high-performance expectations, encouraging us to strive for excellence," representing high-performance expectations. These items were carefully designed to comprehensively capture the multifaceted nature of e-leadership and its impact on team dynamics.

To assess team connectivity, this study adopts and adapts the connectivity scale developed by Caridi-Zahavi et al. (2016) to a team-level context. This unidimensional scale comprises four items, each rated on a 5-point Likert scale. Sample items include: "There are open relationships between team members" and "Team members are always open to listening to each other's new ideas," which reflect the concepts of reconciliation and openness in team interactions.

To evaluate team commitment, the study employs an adapted version of Allen and Meyer's (1990) organizational commitment scale, modified to a team-level setting. The original scale comprises three dimensions: affective commitment, normative commitment, and continuance commitment. However, existing literature suggests that affective commitment serves as the core dimension of organizational commitment, distinguishing itself from continuance and normative commitment (e.g., Mercurio, 2015; Tsareva, 2021; Kharel, 2018; Rhoades et al., 2001). In light of this, the present study focuses exclusively on the affective commitment dimension to measure team commitment. The final team commitment scale consists of three items, including: "I really feel as if this team's problems are my own" and "This team has a great deal of personal meaning for me." These items were structured to capture the emotional attachment and engagement of team members, ensuring a nuanced understanding of their commitment to the team.

The selected scales and measurement items were carefully adapted to ensure validity and reliability in assessing e-leadership, team connectivity, and team commitment. By integrating technological, relational, and emotional dimensions, this study provides a comprehensive framework for analyzing the impact of e-leadership on team dynamics and cohesion.

3.2. Sampling

The initial sample comprised software development team members from 80 firms specializing in software development and operating within technology parks in İstanbul. To initiate data collection, the managers of these 80 firms were contacted via telephone, during which the objectives of the study were explained. Following these discussions, 61 firms agreed to participate in the study.

To ensure respondent anonymity and encourage candid participation, all participants were informed that their responses would remain strictly confidential and would not be linked to them individually, their firms, or the software products they developed. This assurance was intended to mitigate concerns regarding potential reprisals and enhance motivation for cooperation. Furthermore, respondents were explicitly informed that there were no right or wrong answers and were encouraged to respond as honestly as possible, following best practices for survey administration (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Among the 61 firms that agreed to participate, 43 firms successfully completed the questionnaires, yielding a total of 203 surveys. However, eight responses were excluded due to missing data. Consequently, the final sample comprised 46 firms and 195 new product development (NPD) team members. Table 1 provides a comprehensive summary of the demographic characteristics of the study's participants, including gender, age, education, professional experience, team roles, team sizes, and work modalities.

Table 1. Demographics of the sample

Variable	Category	N	(%)
Gender	Female	76	38.97%
	Male	119	61.03%
Age	23–27	61	31.28%
	28–33	84	43.08%
	34–47	50	25.64%
Education Level	High School/Associate Degree	11	5.64%
	Bachelor's Degree	123	63.08%
	Master's/Doctorate	61	31.28%
Position Level	Team Leader	56	28.72%
	Team Member	139	71.28%
Team Size	3 Members	65	33.33%
	4 Members	65	33.33%
	5 Members	43	22.05%
	6 Members	22	11.28%
	More than 6 Members	0	0.00%
Work Modality	Fully Remote	89	45.64%
	1 Day in Office	39	20.00%
	2 Days in Office	61	31.28%
	3 Days in Office	6	3.08%
	4 Days in Office	0	0.00%
	Fully Office-Based	0	0.00%

The sample consists of 195 participants, including 76 females (38.97%) and 119 males (61.03%), indicating a higher representation of male participants. Participants' ages range from 23 to 47 years, with the majority (43.08%) falling within the 28–33 age group, followed by 31.28% aged 23–27 and 25.64% aged 34–47. This distribution suggests that the workforce is relatively young and dynamic.

In terms of educational background, the sample is highly qualified, with the majority (63.08%) holding a bachelor's degree and an additional 31.28% possessing a master's or doctorate. Only a small fraction (5.64%) have an associate degree or high school education, reflecting an advanced academic profile.

Regarding position levels, the sample includes 56 team leaders (28.72%) and 139 team members (71.28%), indicating that leadership roles are present but team members form the majority of the workforce.

The team sizes show an even distribution, with 33.33% of teams consisting of 3 members and an equal proportion (33.33%) having 4 members. Teams with 5 members (22.05%) and 6 members (11.28%) are less

frequent. Notably, teams with more than six members are absent (0.00%), suggesting that smaller, more agile teams are the norm in this sample.

In terms of work modality, the data highlights a strong preference for remote and hybrid work models. Nearly half of the participants (45.64%) work fully remotely, while 20.00% attend the office one day per week and 31.28% work two days in the office. Only 3.08% of participants work three days in the office, and none are fully office-based. This distribution underscores the prominence of flexible and remote work arrangements in the sample.

Overall, the sample is characterized by a young and highly educated workforce, a balanced representation of team leaders and members, and diverse but predominantly small team sizes. The data also indicates a strong preference for flexible work arrangements, with fully remote and hybrid models being dominant.

3.3. Analysis

The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was employed to estimate both the measurement and structural parameters within the structural equation model (SEM) (Chin, 2001).

3.4. Measurement Validation

In this study, we employed reflective indicators for all constructs, following the approach of Kleijnen, Ruyter, and Wetzels (2007). To assess the psychometric properties of the measurement instruments, we initially estimated a null model that did not include any structural relationships. Reliability was evaluated using composite reliability (CR), Cronbach's alpha, and average variance extracted (AVE). After removing one item from team commitment due to its adverse impact on the AVE, the constructs—e-leadership, team connectivity, and team commitment—exhibited satisfactory reliability and validity. A detailed evaluation of the scales concluded that the removal of this item did not compromise the content validity of the team commitment scale. The results indicated that the PLS-based CR values for all measures were well above the recommended threshold of 0.70. Similarly, Cronbach's alpha values exceeded the threshold of 0.70, and the AVE values were either above or very close to the acceptable threshold of 0.50 (see Table 2). Convergent validity was further assessed by examining the standardized loadings of the items on their respective constructs. The findings demonstrated that all items exhibited standardized loadings greater than 0.60, indicating satisfactory convergent validity.

We next assessed the discriminant validity of the measures. Table 2 shows the correlation among all variables -excluding the secondary data on firm performance- that provide further evidence of discriminant validity. To fully satisfy the requirements for discriminant validity, AVE for each construct should be expected to be greater than the squared correlation between constructs (Fornell & Larcker, 1981). Such results suggest that the items share more common variance with their respective constructs than any variance the construct shares with other constructs (Howell & Avolio, 1993). In the model, none of the inter-correlations of the constructs exceeded the square root of the AVE of the constructs (see Table 2).

Table 2 - Validity and Reliability

Variable	1	2	3	4	5	6	7	8
team commitment	0.802							
e-social skills	0.248	0.734						
team connectivity	0.194	0.239	0.734					
group goals	0.100	0.577	0.263	0.864				
high success	0.411	0.052	0.220	-0.004	0.886			
individual support	0.196	0.528	0.346	0.559	0.085	0.883		
intellectual stimulation	0.165	0.594	0.210	0.608	0.006	0.582	0.841	
vision	0.140	0.538	0.409	0.620	-0.009	0.589	0.630	0.776
α	0.875	0.711	0.789	0.915	0.863	0.860	0.868	0.895
CR	0.900	0.820	0.808	0.937	0.916	0.914	0.906	0.920
AVE	0.644	0.538	0.538	0.747	0.785	0.781	0.708	0.603

Note: α : Cronbach alpha, CR: Composite Reliability, AVE: Average Variance Extracted

Moreover, e-leadership was treated as second-order variables and subjected to a second-order factor analysis, which revealed five latent constructs: e-social skills, vision-inspiring role model, fostering acceptance of group goals, intellectual stimulation, and individualized support. high-performance expectations were

dropped due to its low loading. The results, as illustrated in Figure 1, demonstrate that the standardized regression loadings for each of these constructs exceed the threshold of 0.60. This finding indicates that e-leadership, as a second-order variable, is significantly explained by its five dimensions: e-social skills, vision-inspiring role model, fostering acceptance of group goals, intellectual stimulation, and individualized support.

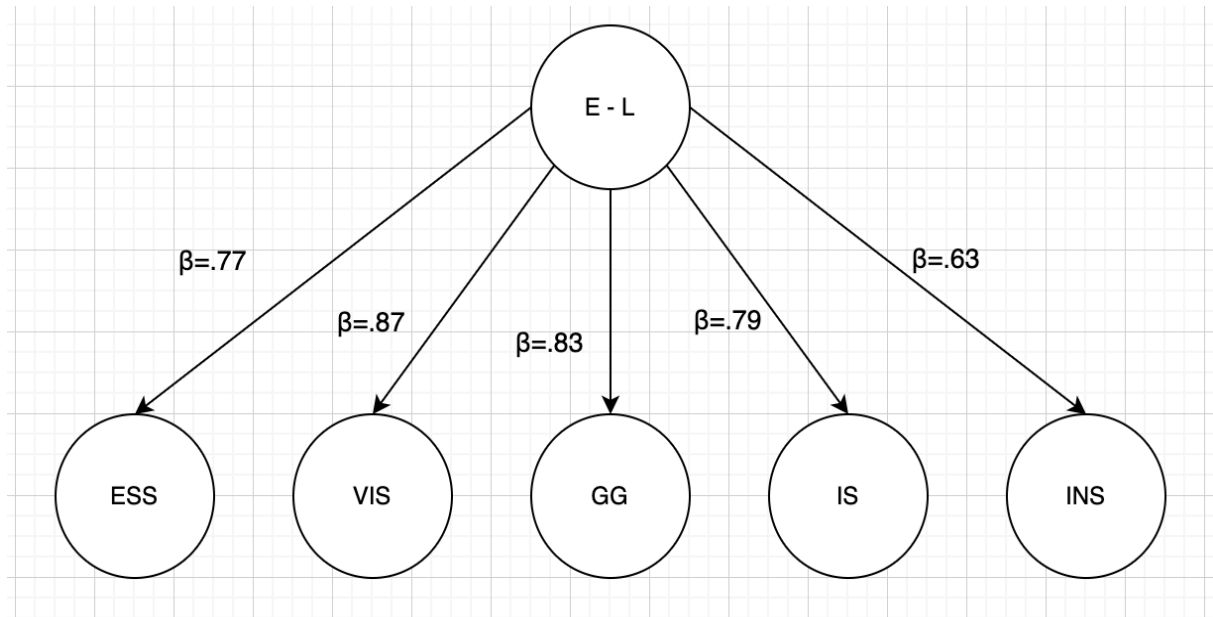


Figure 2 - Second Order Factor Analysis of E-Leadership

Note: E-L: E-leadership, xVIS: Vision-inspiring role model, GG: Fostering acceptance of group goals, IS: Individual Support, INS: Intellectual Stimulation.

3.5. Hypothesis testing

The Partial Least Squares (PLS) approach (Ringle et al., 2005) combined with the bootstrapping resampling method (Chin, 1998) was employed using the SmartPLS 3.0 software to test the hypotheses and evaluate the predictive power of the proposed model (see Figure 2). The resulting path coefficients and their associated t-values indicated the strength and direction of each hypothesized relationship.

Table 3 presents the results of the hypothesis testing, detailing the path coefficients (β), significance levels (p-values), and hypothesis outcomes. The findings indicate that e-leadership has a significant positive effect on team connectivity ($\beta = 0.370, p < 0.01$), providing strong support for H1. This result suggests that e-leadership enhances team connectivity, likely by facilitating digital collaboration, improving communication structures, and fostering cohesion within virtual or hybrid teams.

Additionally, e-leadership significantly influences team commitment ($\beta = 0.225, p = 0.023$), supporting H2. This indicates that e-leadership contributes to stronger team commitment, possibly by creating a sense of belonging and shared purpose among team members, despite the digital nature of their interactions.

However, the relationship between team connectivity and team commitment is not statistically significant ($\beta = 0.065, p = 0.617$), resulting in no support for H3. This suggests that while team connectivity is an important aspect of teamwork, it may not directly translate into higher team commitment.

Table 3 - Path Results

Path	β	P	H	Result
E-L \rightarrow TCn	0.370**	0.000	H1	Supported
E-L \rightarrow TCm	0.225*	0.023	H2	Supported
TCn \rightarrow TCm	0.065	0.617	H3	Not Supported

Note: *: $p < 0.05$, **: $p < 0.00$; E-L: E-leadership, TCn: Team connectivity TCm: Team commitment

Table 4 presents the results of the mediation analysis, examining the direct and indirect effects of e-leadership on team commitment through team connectivity. The analysis reveals that the total effect of e-leadership on team commitment is significant ($\beta = 0.249, p < 0.01$), suggesting that e-leadership plays a meaningful role in shaping team commitment. The direct effect of e-leadership on team commitment remains statistically

significant ($\beta = 0.225, p = 0.023$), indicating that the primary influence of e-leadership on team commitment occurs through direct mechanisms rather than mediated pathways.

The indirect effect of e-leadership on team commitment via team connectivity is not statistically significant. The Variance Accounted For (VAF) value of 9.6% confirms that the indirect effect accounts for less than 20% of the total effect, indicating no meaningful mediation (MacKinnon et al., 2000), providing no support for H4. In other words, team connectivity does not mediate the impact of e-leadership on team commitment, and the relationship is predominantly driven by the direct influence of e-leadership.

Table 4. Results for the mediation analysis

Total effect		Direct Effect		Indirect Effect		
Relationship	β	Relationship	β	Relationship	β	VAF(%)
E-L → TCm	.249**	E-L → TCm	.225*	E-L → TCn → TCm	.024*	9.6

Note: *: $p < 0.05$, **: $p < 0.00$ || Note: E-L: E-leadership, TCn: Team connectivity TCm: Team Commitment

3.6. Structural Model

Table 5 presents a comprehensive evaluation of the structural model using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, focusing on key model assessment criteria, including the coefficient of determination (R^2), predictive validity (Q^2), and the standardized root mean squared residual (SRMR).

In this study, the R^2 value for Team Connectivity is 0.137, indicating a moderate effect size, whereas the R^2 value for Team Commitment is 0.066, suggesting a low effect size. These values reflect the extent to which the independent variables explain the variance in the respective dependent variables. Additionally, the Q^2 value for Team Connectivity is 0.290, while Team Commitment has a Q^2 value of 0.035. Given that Q^2 values above zero indicate predictive relevance, both constructs demonstrate moderate predictive validity.

The model fit was assessed using the SRMR value, which evaluates how well the hypothesized model aligns with the observed data. In this study, the SRMR is reported as 0.092. According to Hu and Bentler (1998), an SRMR value below 0.08 indicates a good model fit, while Henseler et al. (2014) suggest that an SRMR value below 0.10 is acceptable within the PLS-SEM framework. Given these thresholds, the obtained SRMR value suggests that the model exhibits an acceptable level of fit to the data.

Overall, the structural model demonstrates an adequate level of explanatory power and predictive validity, with an acceptable model fit.

Table 5: Structural Model Metrics

Endogenous Constructs	R^2	Q^2	SRMR
TCn	0.137	0.290	0.087
TCm	0.066	0.035	

Note: TCn: Team connectivity TCm: Team commitment

4. DISCUSSION

In an era where organizations are increasingly reliant on distributed teams, effective leadership is no longer about physical presence but about leveraging digital tools to foster engagement and commitment. This study extends the team management literature by developing an integrated model of e-leadership, team connectivity, and team commitment, offering a framework for both researchers and project managers to understand how leadership behaviors shape virtual team dynamics.

Building on the premise that leadership effectiveness is contingent upon its ability to influence and align team members, this study presents four key findings that contribute to the ongoing discourse on e-leadership and distributed team management.

First, the results confirm that e-leadership plays a crucial role in strengthening team connectivity. Leaders who effectively integrate digital tools and communication platforms foster stronger connections among team members, reinforcing the idea that leadership in digital contexts is not about authority, but about facilitation. This finding aligns with the view that well-designed virtual interactions can compensate for physical distance, enabling seamless collaboration and enhancing social cohesion in distributed teams (Susskind & Odom-Reed, 2016; Gupta & Fernandez, 2011). Moreover, leaders who effectively leverage digital

technologies can cultivate more integrated and engaged teams, regardless of physical distance or hybrid work settings (Pandey, 2023; Paganin et al., 2023).

Second, the analysis reveals a significant positive relationship between e-leadership and team commitment. Beyond merely facilitating communication, e-leaders act as enablers of motivation, engagement, and shared purpose. By providing clear vision, structured support, and engagement strategies tailored to virtual settings, e-leaders bridge the emotional distance that often characterizes remote work environments. This finding is consistent with prior research emphasizing that commitment is not dictated by proximity but by purpose and trust—critical factors in hybrid and remote work settings (Khalid, 2024; Paganin et al., 2023).

Third, contrary to conventional expectations, team connectivity does not directly translate into team commitment. While connectivity fosters information sharing and collaboration, it does not inherently lead to a stronger sense of belonging or emotional attachment. In distributed teams, even if members remain well-connected through digital platforms, this connectivity may remain functional rather than relational, failing to create the deep psychological bonds necessary for long-term commitment. This finding underscores an essential managerial insight: high-performing virtual teams are not necessarily those that are well-connected, but those that are deeply engaged and purpose-driven.

Finally, the mediation analysis further reveals that team connectivity does not significantly mediate the relationship between e-leadership and team commitment. This suggests that in distributed settings, commitment is more of an individual construct than a collective one. Unlike co-located teams, where informal social interactions naturally reinforce group identity, virtual teams often function as networks of professionals rather than cohesive units. As a result, team members may develop commitment more toward their leader than toward the team itself, since leaders serve as the primary source of vision, motivation, and personalized support. This finding highlights an important paradox: e-leadership strengthens commitment not necessarily by enhancing team cohesion, but by reinforcing individual alignment with leadership-driven goals.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

While this study provides valuable insights into the mechanisms of e-leadership, several limitations should be considered.

First, the research is limited to a single industry (software development) and a specific geographical region (technology parks in Istanbul). While software teams frequently rely on e-leadership, the findings may not be generalizable to industries where face-to-face leadership remains dominant. Future studies should conduct cross-industry comparisons to explore whether similar leadership dynamics emerge in different organizational contexts.

Second, while the study establishes direct effects of e-leadership on team commitment and connectivity, it does not account for other potential mediating or moderating factors. Variables such as psychological safety, trust, job satisfaction, and digital communication overload could further shape these relationships. Future research should adopt a multi-layered approach, incorporating additional psychological and organizational variables to uncover more nuanced leadership effects.

Third, the study relies on a cross-sectional design, which limits the ability to infer causality. While the findings establish strong associations, they do not capture the evolution of leadership influence over time. Future studies should employ longitudinal designs or experimental methodologies to explore how e-leadership influences team outcomes across different phases of team development. Additionally, incorporating objective performance measures alongside self-reported data could enhance the validity of findings.

Lastly, the non-significant mediation effect of team connectivity suggests that alternative mechanisms may better explain how e-leadership translates into team commitment. Future research could investigate mediators such as digital trust, knowledge-sharing behaviors, or innovation climate, which may provide stronger explanatory power for commitment outcomes.

6. CONCLUSION

As organizations continue to navigate the realities of hybrid and digital work, leadership must evolve from traditional command structures to influence-driven models that prioritize engagement, trust, and purpose. This study highlights that e-leadership directly influences both team connectivity and team commitment,

while also challenging the assumption that connectivity alone fosters commitment. Instead, it reveals that commitment in virtual teams is driven less by network density and more by leader-member alignment.

The findings emphasize that leaders must go beyond enabling digital communication and focus on cultivating shared goals, emotional investment, and deep engagement to ensure that connectivity translates into commitment. As organizations increasingly embrace virtual collaboration, understanding the evolving nature of leadership and team dynamics will remain a critical area for future research.

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