

The Influence of E-Leadership on Virtual Team Performance with Work Environment as a Moderating Variable at PT Dua Bintang Muda Cemerlang

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Abstrack. *This study aims to examine the influence of e-Leadership on virtual team performance, with the work environment acting as a moderating variable at PT Dua Bintang Muda Cemerlang. The research is motivated by the shift to remote and hybrid work systems that demand effective digital Leadership and a supportive work environment. A quantitative approach was employed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) method. Data were collected from 100 respondents, all of whom are members of virtual teams. The results indicate that e-Leadership has a positive and significant effect on virtual team performance. Additionally, the work environment also positively and significantly affects performance. More importantly, the work environment strengthens the relationship between e-Leadership and virtual team performance, confirming its role as a moderating variable. These findings align with e- Leadership and contingency Leadership theories, emphasizing that Leadership effectiveness depends on situational factors, including the work setting. This study implies that companies implementing virtual work should prioritize Leadership development and invest in creating conducive digital environments. Practical steps include training leaders in virtual communication, providing stable digital infrastructure, and encouraging collaborative virtual culture. The study contributes to understanding Leadership dynamics in remote work and supports the design of effective virtual team management strategies.*

Keywords: *Environment; Leadership Performance; Virtual.*

1. Introduction

The development of digital technology has had a significant impact on the way organizations conduct their activities. Digital transformation requires not only changes in business processes but also in leadership patterns that adapt to the use of information technology (Putri, 2024). Today's organizations, including those in the creative and service sectors such as wedding organizers and digital agencies, increasingly rely on flexible, technology-based virtual teamwork models (Safitri et al., 2025). In a fast-paced world, adapting quickly to technology is essential for organizations to remain competitive. Rigid organizational

structures and traditional leadership are no longer able to accommodate modern work dynamics that prioritize flexibility, collaboration, and speed. Therefore, transformation goes beyond tools, but touches the core of culture and leadership patterns.

PT Dua Bintang Muda Cemerlang is a company engaged in several service sectors, particularly as a wedding event organizer and digital agency that handles various digital marketing, branding, and creative campaign needs. The company operates in Surabaya and Jakarta and is known for its innovation in delivering technology-based services and engaging and relevant digital campaigns. To improve operational efficiency and flexibility, the company has implemented an online work system (Work From Home/WFH), where the majority of coordination and task execution activities are carried out virtually. This work structure allows the team to work flexibly from various locations without compromising productivity or service quality.

In this context, the presence of e-Leadership becomes crucial. E-Leadership is not only about delivering instructions, but also about how a leader is able to manage digital communication, build virtual trust, and motivate online teams to stay aligned with organizational goals (Almadina Rakhmaniar, 2023). The implementation of e-Leadership is key to overcoming the challenges of communication, collaboration, and decision-making in virtual teams. E-Leadership refers to a leadership style that utilizes information and communication technology to lead teams effectively (Paranggi & Tanaamah, 2024). A digital leader is required to have the ability to coordinate work across platforms, convey a vision through digital media, and build emotional closeness even without face-to-face interaction. In the digital era, technical skills are not enough; the ability to adapt to virtual communication media is a key competency. Therefore, the presence of a leader with an e-Leadership style is crucial to the success or failure of a virtual team in achieving organizational goals.

The work environment is a crucial factor influencing the effectiveness of task execution in modern organizations. In today's digital era, the work environment is no longer limited to physical space, but encompasses technological infrastructure, communication systems, work flexibility, and an organizational culture that supports remote collaboration. A conducive work environment can create comfort, a sense of security, and motivation for employees to carry out their roles, both individually and as part of a team. The availability of supporting facilities such as adequate work equipment, a stable internet connection, and functional digital platforms are essential for smooth work activities, especially in organizations that implement online work systems. Conversely, an unsupportive work environment can seriously hinder employees from completing their tasks optimally. A lack of work facilities, unclear procedures, and an organizational culture that is not adaptive to technological changes can lead to work stress, miscommunication, and decreased productivity. Therefore, the work environment plays a strategic role in creating a healthy, productive, and innovative work atmosphere. In the context of a modern organization like PT Dua Bintang Muda Cemerlang, which relies on a virtual and collaborative work structure, a good work environment not only influences individual comfort but also strengthens leadership effectiveness and integration between organizational units. In other words, a supportive work

environment can strengthen the influence of digital leadership in achieving overall organizational goals (Almadina Rakhmaniar, 2023).

On the other hand, the success of e-Leadership implementation depends not only on leadership style, but also on the effectiveness of virtual communication within the organization. Virtual communication encompasses all forms of exchange.

Information is shared online, whether through email, instant messaging apps, online meetings, or project management platforms. When virtual communication runs smoothly, team collaboration improves, decision-making is faster, and errors are minimized. However, if virtual communication is ineffective, it can lead to miscommunication, decreased team morale, and even internal conflict (Nutrisari et al., 2024). Therefore, virtual communication plays a role not only as a tool but also as a determining factor in the success of e-Leadership in influencing team performance.

In this study, the work environment is positioned as a moderating variable that can strengthen or weaken the influence of e-Leadership on virtual team performance. This means that even if a leader has strong e-Leadership skills, if the work environment within the organization is not supportive, for example in terms of the availability of digital infrastructure, organizational policies, or a collaborative culture, its impact on team performance will be reduced. Conversely, if the work environment is managed effectively and is able to provide optimal support for employees, the positive impact of e-Leadership on virtual team performance will be even greater. Therefore, it is important to evaluate the relationship between e-Leadership and virtual team performance by considering the role of the work environment as a factor that strengthens or weakens the relationship.

The urgency of this research is heightened given that PT Dua Bintang Muda Cemerlang has adopted a hybrid work model that combines online and face-to-face work. In this model, the effectiveness of e-Leadership is highly dependent on the quality of the work environment, which can support collaboration across space and time. As a company operating in the highly competitive creative industry, PT Dua Bintang Muda Cemerlang needs to ensure that its virtual teams can work productively, efficiently, and adaptively. This can only be achieved if the work environment provides comprehensive support, including non-technical and technical assistance, so that leaders can build trust, manage team dynamics, and maintain work motivation in a virtual environment.

This research is also important because it can theoretically enrich the study of digital leadership and virtual team management in Indonesia. To date, literature on e-Leadership has been largely developed in Western countries, while empirical studies in the context of Indonesian organizations, particularly those adopting hybrid and digital work systems, are still limited. Therefore, this research is expected to make a significant empirical contribution to the development of modern technology-based management science. Furthermore, the findings of this study can serve as a practical reference for other organizations in Indonesia that are currently adopting or will adopt a virtual work model, so they can design work environments that support the effectiveness of e-Leadership and team performance.

Several previous studies support the importance of this study. First, research by (Syukerti et

al., 2024) found that e-Leadership is significantly influenced by the work environment, particularly in terms of technological support and an adaptive organizational culture. This study emphasizes that trust and work efficiency are determined not only by the leader, but also by how the work environment is able to support digital work processes. Second, research by (Safitri et al., 2025) shows that virtual leaders who work in communicative and flexible work environments tend to be better able to adapt their communication styles to digital technology, thereby increasing collaboration and teamwork effectiveness. Third, research by (Ismadya Putra & Tiarapuspa, 2023) confirms that e-Leadership is closely related to a supportive work environment, such as adequate digital infrastructure, clear work systems, and a work culture open to change. A positive work environment has been shown to strengthen the impact of e-Leadership on various aspects of the organization, including employee engagement and goal achievement.

Regarding the work environment, several studies also reinforce the urgency of this study. First, a study by (Purnama et al., 2024) stated that the effectiveness of the work environment, including comfort, technological support, and system flexibility, directly impacts team productivity in a remote work context. Second, research by (Putri, 2024) shows that

An unsupportive work environment, such as a lack of digital infrastructure or unclear work systems, is often a major cause of project failure in organizations implementing virtual work systems. Third, a study by Pramanik (2020) found that aspects of the work environment, such as openness, availability of work facilities, and social support, have a positive correlation with employee job satisfaction and performance. These findings confirm that the work environment is a crucial factor that should not be overlooked in modern organizations that increasingly rely on hybrid or virtual work models.

Although several studies have discussed the influence of e-Leadership on team performance, these studies remain limited. First, previous research findings have been contradictory, as revealed by (Shafariah et al., 2024) and (Dzikriana et al., 2024), where the effectiveness of e-Leadership does not always result in consistent performance improvements. Second, most studies have not considered the role of the work environment as a moderating variable that can strengthen or weaken the relationship. Third, empirical studies examining this relationship in the context of Indonesian organizations, particularly in the creative sector such as digital agencies and wedding organizers, are still very limited. Therefore, this study is important to fill this gap and provide theoretical and practical contributions to understanding the influence of e-Leadership on virtual team performance by considering the work environment as a moderating factor.

Referring to these previous studies, it is increasingly clear that the combination of e-Leadership and the work environment plays a strategic role in supporting organizational effectiveness, particularly in the context of virtual work. However, few studies have explicitly examined how the work environment can moderate the relationship between e-Leadership and virtual team performance. Therefore, this study is important to fill the gap in the literature and provide a deeper understanding of the mechanisms of the relationship between these variables. Furthermore, this research is also expected to produce a conceptual

model and empirical findings that can be implemented practically by organizations that are transforming towards a digital work system.

2. Research Methods

This research is quantitative with an associative approach. According to Sugiyono (2019), a quantitative approach is used to test previously formulated hypotheses and to examine the relationships between variables. This study aims to examine the effect of e-Leadership on virtual team performance, with virtual communication as a moderating variable, at PT Dua Bintang Muda Cemerlang.

3. Results and Discussion

Research Respondent Characteristics Table

No	Characteristics	Category	Frequency	Percentage
1	Gender	Woman	65	65.0%
		Man	35	35.0%
		Total	100	100.0%
2	Age	20–30 years	97	97.0%
		31–40 years	3	3.0%
		Total	100	100.0%
3	Length of work	< 1 year	72	72.0%
		1–3 years	27	27.0%
		4–6 years	1	1.0%
		Total	100	100.0%
4	Position in the Team	Team Members	86	86.0%
		Team Coordinator	9	9.0%
		Supervisor/Manager	5	5.0%
		Total	100	100.0%

Source: Research Respondent Data

Based on the data tabulation results, the majority of respondents in this study were female with a proportion of 65%, while men accounted for 35%. This dominance of female respondents indicates that the role of women in virtual teams at PT Dua Bintang Muda Cemerlang is quite significant, especially in project-based and digital work structures. In terms of age, almost all respondents (97%) were in the 20-30 year age range, which reflects that the team composition is dominated by the younger generation or digital natives who generally have a high level of technology adaptation and a preference for flexible and digital-based work. This is relevant to the context of research that focuses on the effectiveness of e-

Leadership, because leaders need to understand the characteristics of this generation to be able to build effective digital communication and motivate teams virtually.

Furthermore, 72% of respondents had worked for less than a year, and only 27% had worked for 1–3 years, and 1% had 4–6 years of work experience. This data indicates that the majority of respondents are still relatively new to the organizational structure and virtual work systems implemented. Therefore, the role of e-Leadership is crucial in the adaptation process, establishing a digital work culture, and fostering performance from the beginning of their involvement in the team. Furthermore, a supportive work environment is a strategic element in helping new employees quickly adjust to the remote work system. A flexible, collaborative work environment supported by adequate digital infrastructure will greatly assist leaders in directing and developing team performance, especially in the early stages of forming team dynamics.

In terms of team position, the majority of respondents (86%) were team members, while the remainder consisted of team coordinators (9%) and supervisors/managers (5%). This reinforces the relevance of the research focus, where the influence of e-Leadership on virtual team performance will be largely determined by how leaders are able to build two-way communication, provide direction, and maintain the motivation of team members who work without direct face-to-face interaction. Because most respondents are direct implementers in virtual projects, their perceptions of leadership and the digital work environment will be important benchmarks for assessing the extent to which e-Leadership can be effectively implemented in the context of technology-based organizations and creative services.

Overall, the characteristics of the respondents studied strongly reflect the dynamic, flexible, and digital-based virtual work conditions implemented at PT Dua Bintang Muda Cemerlang. The predominance of young age, relatively short work experience, and the majority of them as virtual team members make e-Leadership a key element in creating team effectiveness. Meanwhile, the work environment is a very determining variable, because without the support of a clear work system and adequate technological infrastructure, the potential of e-Leadership will not be maximized. Therefore, this characteristic analysis not only provides a descriptive picture of the respondents, but also serves as an important foundation in understanding the context of digital leadership implementation and its impact on the performance of virtual teams that work collaboratively and geographically dispersed.

Research result:

1) Descriptive Analysis Test Results

Descriptive analysis in this study was conducted to obtain a general overview of respondents' responses to each of the variables studied, namely E-Leadership, Work Environment, and Virtual Team Performance. This analysis focused on presenting the frequency distribution of respondents' answers and calculating the average value of each statement item in the questionnaire. Through this approach, researchers can understand the tendency of respondents' attitudes and perceptions towards each variable, both overall and for each

indicator. Interpretation of the average value is carried out by referring to certain categories, namely a value of 1.00 to 2.33 is categorized as low, a value of 2.34 to 3.66 is categorized as medium, and a value of 3.67 to 5.00 is categorized as high. The following are the results of the descriptive analysis in this study:

Descriptive Analysis Test Results Table

Variables	Item	SS	S	N	TS	STS	Mean
E-Leadership	X1	42	46	5	7	0	4.23
	X2	43	43	11	3	0	4.26
	X3	40	49	7	4	0	4.25
	X4	41	46	9	4	0	4.24
	X5	41	49	8	2	0	4.29
	Average	41.4	46.6	8	4	0	4,254
Environment Work	Z1	3	45	42	9	1	3.4
	Z2	3	30	55	7	5	3.19
	Z3	5	40	41	10	4	3.32
	Z4	4	43	40	12	1	3.37
	Z5	6	41	39	11	3	3.36
	Average	4.2	39.8	43.4	9.8	2.8	3,328
Performance Virtual Team	Y1	37	40	19	4	0	4.1
	Y2	37	39	21	3	0	4.1
	Y3	34	46	16	4	0	4.1
	Y4	35	41	20	4	0	4.07
	Y5	31	48	16	5	0	4.05
	Y6	40	35	19	6	0	4.09
	Average	35.66667	41.5	18.5	4.333333	0	4,085

Source: Processed Primary Data, 2025

The descriptive analysis results show that the E-Leadership variable received a very positive response from respondents, with an average score of 4.254, which is included in the high category. This reflects the successful implementation of digital-based leadership in the company, where leaders are assessed as being able to utilize technology effectively in directing and managing teams. Most respondents felt that E-Leadership supports smooth team work and communication.

The Work Environment variable received an average score of 3.328, which falls into the

moderate category. This means that respondents generally considered the work environment to be quite supportive, but there are still several aspects that need improvement, such as comfort, employee relations, or organizational support. This score indicates that the company needs to conduct an evaluation to optimize the work environment.

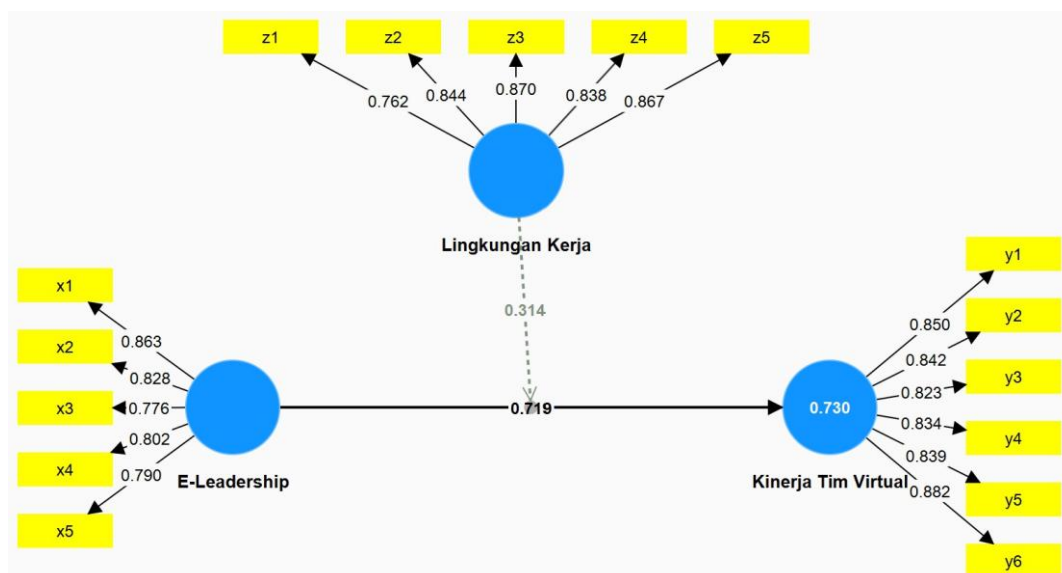
The Virtual Team Performance variable obtained an average score of 4.085, which is considered high. This result indicates that the company's virtual teams are considered capable of working effectively, maintaining productivity, and fostering good collaboration despite not being in the same physical location. This positive perception indicates that the team has been able to adapt to remote work patterns efficiently.

2) Instrument Feasibility Test Results / Outer Model Test

After conducting descriptive analysis, the next stage of SEM data processing based on Partial Least Squares (PLS) is testing the outer model, or measurement model. The outer model test aims to evaluate the construct's validity and reliability, ensuring that the indicators used are able to measure the latent variables accurately and consistently.

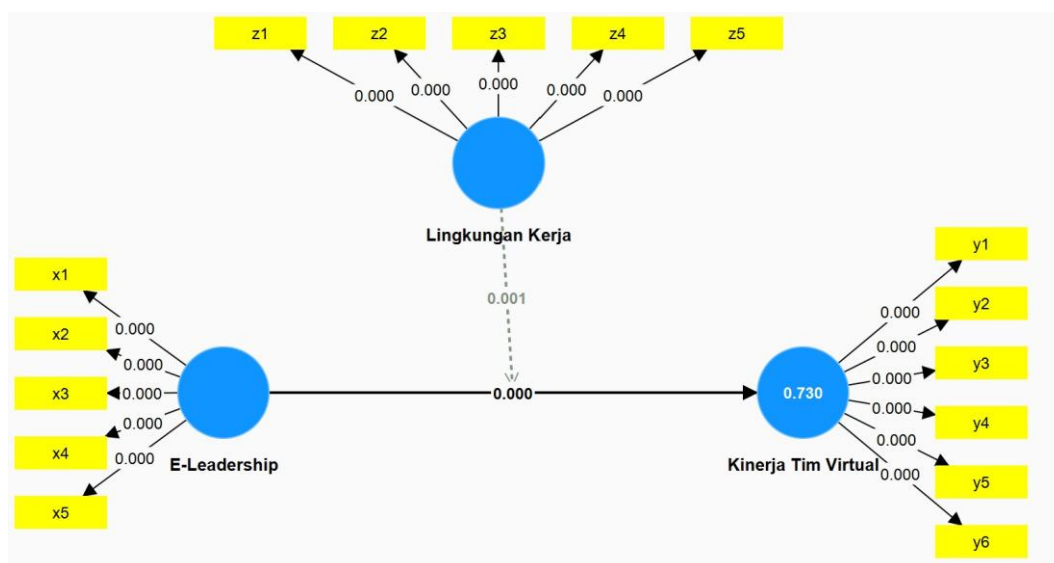
This model includes several important components: loading factor values to measure indicator validity, loading factor values and Average Variance Extracted (AVE) to measure validity, and Composite Reliability and Cronbach's Alpha values to measure construct reliability. Testing is conducted using specific statistical criteria to ensure the constructed model meets empirical measurement requirements. The following are the results of the outer model test.

Outer Model Test Results Images



The inner model or structural model test is conducted to evaluate the relationships between latent constructs in the research model and to assess the predictive power of the model. This test includes three main components: the f-square, r-square, and q-square values. The r-

square value is used to measure the magnitude of the influence of the independent variable on the dependent variable, or the degree to which the endogenous variable can be explained by the independent variable in the model. The f-square value is used to determine the effect size of each exogenous variable on the endogenous variable individually. Meanwhile, the q-square value is used to assess the predictive relevance of the model to the observational data, namely the extent to which the model has the ability to predict the values of the endogenous constructs. These three measures are used comprehensively to assess the feasibility and strength of the structural model developed in the study. The following is a graphical output of the inner model test results.



Graphical Output Inner Model Image

Source: Processed Primary Data, 2025

1) F-Square Test Results

F-Square Test Results Table

	f-square
E-Leadership -> Virtual Team Performance	1,492
Work Environment -> Virtual Team Performance	0.705
Work Environment x E-Leadership -> Virtual Team Performance	0.176

Source: Processed Primary Data, 2025

Based on the results of the f-square test in the table, information was obtained regarding the effect size of each variable on Virtual Team Performance. The f-square value of 1.492 on the relationship between E-Leadership and Virtual Team Performance shows a very large effect, meaning that the E-Leadership variable makes a substantial contribution to improving Virtual Team Performance. Furthermore, the f-square value of 0.705 on the relationship between Work Environment and Virtual Team Performance also shows a large effect, indicating that Work Environment plays an important role in influencing Virtual Team Performance. The f-

square value of 0.176 on the interaction between Work Environment and E-Leadership and Virtual Team Performance shows a moderate effect, meaning that the moderating variable (the interaction between the two) has a significant influence but not as large as the direct influence of each independent variable. Overall, these results indicate that both E-Leadership and Work Environment individually and in their interaction have a significant contribution in explaining variations in Virtual Team Performance.

2) R-Square Test Results

R-Square Test Results Table

	R-square	R-square adjusted
Virtual Team Performance	0.73	0.721

Source: Processed Primary Data, 2025

Based on the table, the R-square value of 0.730 indicates that 73% of the variability in the Virtual Team Performance variable can be explained by the independent variables, namely E-Leadership, Work Environment, and the interaction between the two. In other words, this model is able to explain most of the variation in Virtual Team Performance quite strongly. Meanwhile, the adjusted R-square value of 0.721 indicates that after adjusting for the number of predictors in the model, there is still 72.1% of the proportion of variance that can be explained, so the model remains stable and does not experience overfitting. These high R-square and adjusted R-square values indicate that the model has good predictive power in explaining virtual team performance based on the factors tested.

3) Q-Square Test Results

Q-Square Test Results Table

	SSO	SSE	Q ² (=1-SSE/SSO)
Virtual Team Performance	600,000	298,444	0.503

Source: Processed Primary Data, 2025

Based on the table, the Q-Square (Q²) value for the Virtual Team Performance variable is 0.503. This value is obtained from the calculation of $1 - (SSE/SSO)$, which is $1 - (298,444 / 600,000)$, which results in the number 0.503. A Q² value greater than 0 indicates that the model has good predictive ability (predictive relevance) for the endogenous variable, in this case Virtual Team Performance. According to Hair et al. (2017), a Q² with a value above 0.35 indicates strong predictive relevance. Thus, this model is proven to be able to predict the Virtual Team Performance variable substantially and relevantly, indicating that The constructs in the model contribute significantly to the prediction of virtual team performance.

Hypothesis Test Results Table

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values

E-Leadership -> Virtual Team Performance	0.719	0.716	0.091	7,926	0.000
Work Environment -> Virtual Team Performance	0.454	0.456	0.081	5,593	0.000
Work Environment x E-Leadership -> Virtual Team Performance	0.314	0.295	0.092	3,404	0.001

Source: Processed Primary Data, 2025

The following are the results of the hypothesis test displayed in the table, which shows the direct and interactive influence between variables on Virtual Team Performance:

a. The effect of E-Leadership on Virtual Team Performance shows an original sample (O) value of 0.719 with a t-statistic value of 7.926 and a p-value of 0.000. This means that the effect of E-Leadership on Virtual Team Performance is positive and significant at the 95% confidence level. In other words, the higher the implementation of E-Leadership, the higher the virtual team performance.

b. The influence of the work environment on virtual team performance has a coefficient value of 0.454, with a t-value of 5.593 and a p-value of 0.000. This indicates that the work environment also has a positive and significant effect on virtual team performance. A conducive work environment can increase the effectiveness and productivity of teams working virtually.

The interaction effect between Work Environment and E-Leadership on Virtual Team Performance shows a coefficient value of 0.314 with a t-value of 3.404 and a p-value of 0.001. This means there is a significant moderating effect, indicating that the role of the work environment strengthens the relationship between E-Leadership and virtual team performance. Thus, a supportive work environment can increase the effectiveness of e-leadership in driving team performance.

Discussion:

1) The Influence of E-Leadership on the Performance of the Virtual Team at PT Dua Bintang Muda Cemerlang

Based on the results of data analysis using the SEM-PLS model, the e-Leadership variable was proven to have a positive and significant influence on virtual team performance, with a t-statistic value of >1.96 and a p-value <0.05. Thus, the first hypothesis in this study was declared accepted. This indicates that the higher the quality of digital leadership possessed by a leader, the higher the performance achieved by the virtual team they lead at PT Dua Bintang Muda Cemerlang.

The e-Leadership indicators measured included leaders' ability to provide direction through digital media, inspire teams online, overcome long-distance communication barriers, and

encourage efficient use of technology. The questionnaire results showed that the majority of respondents rated these indicators favorably, particularly in digital communication and motivation. This indicates that company leaders have been able to adapt their leadership styles to the demands of flexible, technology-based virtual work.

Contextually, the majority of respondents in this study were aged 20–30 years (97%), 72% of whom had worked for less than one year, and 86% held team positions. This situation reflects the characteristics of employees belonging to the digital native generation, who are accustomed to technology but also require a communicative and collaborative leadership approach. Leaders who are able to reach team members through effective virtual communication and provide clear direction have been shown to facilitate teamwork and improve project target achievement.

Theoretically, these results align with the e-Leadership theory (Avolio & Kahai, 2003), which states that digital leadership is effective when leaders are able to build trust, utilize communication technology, and foster team engagement despite physical separation. In the context of PT Dua Bintang Muda Cemerlang, which employs a work-from-home (WFH) system with cross-location teams, implementing e-Leadership is crucial for maintaining optimal team performance. Leaders are not only required to be technologically literate but also to possess interpersonal competencies in managing virtual work dynamics.

Therefore, it can be said that e-Leadership actually helps improve virtual team performance, especially in the context of organizations dominated by younger generations, online work systems, and distributed team structures. Leaders who are adaptive to technology, communicative, and supportive of virtual work autonomy will be better able to maximize the potential of their members.

2) The Influence of the Work Environment on the Performance of the Virtual Team at PT Dua Bintang Muda Cemerlang

The results of the analysis show that the work environment has a positive and significant influence on virtual team performance, as evidenced by the t-statistic value.

>1.96 and $p\text{-value} < 0.05$, thus accepting the second hypothesis. This means that the better the work environment perceived by employees, the higher the performance of the virtual team. The work environment referred to in this research context includes a comfortable work atmosphere, support from coworkers, complete digital facilities, and stable online communication systems.

Respondents gave high scores for work comfort, flexible working hours, and supportive working relationships. However, there were some concerns regarding technological infrastructure, such as unstable internet connections and uneven distribution of work devices across teams. Nevertheless, overall, a conducive work environment has significantly impacted smooth communication and collaboration within the team, particularly in remote work environments like the one implemented at this company.

Looking at the profile of respondents, the majority of whom are new team members with less than one year of service, the work environment is a determining factor.

for them in building comfort and productivity. When organizations provide flexible work systems while maintaining a clear structure, this encourages team member engagement and accelerates the adaptation process to virtual work. This makes the work environment a crucial pillar in supporting effective digital work processes.

Theoretically, these results support Robbins & Judge's (2017) assertion that a conducive work environment will increase employee satisfaction and productivity. In the context of virtual teams, the work environment extends beyond the physical environment to encompass transparent digital work systems, interpersonal relationships built even when not in person, and openness to information. Such an environment is essential in today's work model, which increasingly relies on online collaboration.

Therefore, it can be said that a supportive workplace, both technically and socially, significantly contributes to improving the performance of the virtual team at PT Dua Bintang Muda Cemerlang. Organizations need to take this aspect seriously to maintain the ongoing effectiveness of remote work.

3) The Role of Work Environment in Moderating the Influence of E-Leadership on the Performance of the Virtual Team at PT Dua Bintang Muda Cemerlang

The results of the moderation interaction test indicate that the work environment plays a significant role in strengthening the influence of e-Leadership on virtual team performance. The t-statistic value for the moderation interaction shows results >1.96 and p-value <0.05 , thus the third hypothesis in this study is accepted. This means that the better the quality of the work environment perceived by team members, the stronger the influence of e-Leadership in improving virtual team performance.

These findings indicate that digital leaders with strong skills in managing virtual teams will be more effective when supported by supportive work systems and environments. In situations where the work environment is perceived as positive, including adequate technology, open communication, and efficient coordination, team members will more readily respond to the leader's direction and contribute more actively to achieving team goals. Conversely, if the work environment is not supportive, leader effectiveness tends to decline, even if the leader possesses high competence.

Field conditions show that respondents who work in an organized team environment, with clear work rules and stable technology, demonstrate higher performance scores. Conversely, respondents who face limited access to technology or an irregular work schedule tend to give lower scores. This suggests that e-Leadership and the work environment are not mutually exclusive but rather reinforce each other in creating effective virtual teams.

These results align with the contingency leadership theory, which states that a leader's effectiveness depends heavily on the fit between their leadership style and the work situation. In a virtual context, the work environment is crucial for optimal e-leadership performance. Therefore, organizations need not only prepare leaders capable of digital leadership but also create an adaptive, structured work environment that supports online communication and collaboration.

In conclusion, the work environment plays a significant moderating role in the relationship between e-Leadership and virtual team performance. Without a strong work environment, e-Leadership's effectiveness will be limited, especially in organizations implementing full or partial virtual work.

4. Conclusion

Based on the results of research on the influence of e-Leadership on virtual team performance with the work environment as a moderating variable at PT Dua Bintang Muda Cemerlang, it can be concluded that: E-Leadership has a positive and significant effect on virtual team performance. This indicates that a digital-based leadership style implemented by team leaders can improve coordination, productivity, and target achievement in a virtual work context. Leaders who are effective in using communication technology, providing remote direction, and motivating team members virtually, are able to create optimal team performance. The work environment has a positive and significant effect on virtual team performance. A flexible work environment, supporting online collaboration, and equipped with adequate technological facilities, are important factors in supporting the effectiveness of remote teamwork. Employees who feel comfortable and supported technically and socially will be more motivated to complete team tasks efficiently. The work environment acts as a moderating variable that strengthens the influence of e-Leadership on virtual team performance. This means that when the work environment is well managed, the effectiveness of e-Leadership in improving team performance becomes stronger. Conversely, if the work environment is not conducive, the influence of e-Leadership will be weakened.

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