

## EFFECT OF TRANSFORMATIONAL LEADERSHIP ON VIRTUAL TEAM PERFORMANCE: THE MEDIATING ROLE OF KNOWLEDGE SHARING

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### *Abstract*

*In today's world, many companies have employees from different countries, and they work together as virtual teams using technology. The leaders of these teams need to know how to manage their teams well, understand their unique skills and overcome challenges. Accordingly, we want to study the specific leadership style and its effects on virtual teams' success. Data for the study was collected from various companies that have online activities. Team members participated in surveys, providing information on how their leaders effectively motivated them to be productive and satisfied in their jobs. Additionally, the surveys examined team members' knowledge-sharing levels in their leaders and organizations. Based on the analyses, we found that transformational leadership positively affects virtual team performance but not knowledge sharing; however, knowledge sharing positively improves team performance.*

**Keywords:** *Virtual Teams, Transformation Leadership, Job Satisfaction, Knowledge Sharing.*

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## **1. INTRODUCTION**

In today's world, businesses face tough competition and challenges to stay ahead. To be successful, they need to find better ways to work and be more efficient and creative. Leaders must understand the importance of virtual teams to make sure these teams succeed in the 21st century. (DuBrin, 2013)

This study examined the experiences of individuals who were part of virtual teams. The primary objective was to investigate the effectiveness of transformational leadership in influencing team performance and knowledge-sharing within this context.

Numerous studies, books, and articles have focused on leadership, virtual teams, performance and knowledge-sharing. While some of these works have examined the impact of leadership and electronic communication, they often narrow their focus to specific aspects, such as group performance or individual performance (Aslantaş, 2016). Further research is needed to understand the broader connections between performance and how they perceive leadership effectiveness in virtual team settings (Kanawattanachai & Yoo, 2007). Other factors like knowledge-sharing and how long a team has been working together can also influence performance and effectiveness.

Technology in the 21st century has rapidly advanced, enabling people from different cultures, experiences, and places to interact virtually despite being in different time zones or having different office hours. Virtual teams are considered future operating systems (Lipnack and Stamps, 2000). While technology is essential in the workplace, human adjustment to these changes is still evolving. Dealing with massive amounts of data, fast information flow, and intense collaboration requires leaders to have new skills to succeed (Dess, Picken, 2000).

Purpose of the Study: there were not enough studies focusing on how transformational leadership impacts performance and knowledge sharing and how these factors lead to increased productivity and better leadership in virtual teams.

Studies have shown that certain traits of transformational leaders positively influence the relationship between leaders and employees, motivating the employees (Ziek & Smulowitz, 2014). Early research also indicated that transformational leadership is effective in virtual environments, helping to overcome the challenges of working in such settings (Purvanova & Bono, 2009).

Despite some existing research on virtual teams, there is still a lack of knowledge about the most suitable leadership styles to adapt to the ever-changing virtual workplace. In recent years, scholars have emphasized the significance of leadership in motivating employees and called for more empirical research to understand its role in team dynamics and overall workforce performance (Ziek & Smulowitz, 2014).

## **2. LITERATURE REVIEW**

This literature review overviews the current research on transformational leadership, virtual teams, performance and knowledge-sharing.

### **Virtual Team**

In the 1990s, organisations generally established virtual teams to work on temporary projects with short timelines. These teams were mostly formed due to the necessity to quickly assemble the required information and experience to handle complicated or non-routine challenges. (Axtell, Fleck & Turner, 2004). The transitory nature of initial virtual teams provided limited chances to establish relationships. (Sarker, Ahuja, Sarker, & Kirkeby, 2011). Presently, organizations are progressively forming virtual teams to collaborate on ordinary duties. Furthermore, organizations are granting employees the opportunity to work remotely from a location of their choosing. The degree of team virtualness refers to the composition of teams inside an organization, which can range from entirely distributed to a combination of co-located and distributed teams.

Various reasons lead organizations to adopt virtual teams. Some of these reasons are:

- to be able to hire the best employees who may be located anywhere in the world;
- to increase the global workday to 24 versus 8 hours; or
- to provide flexibility to support the globalization of trade and corporate activity to be more competitive and responsive to the marketplace.

Undoubtedly, the advantages of utilizing virtual teams are vast, but, there are also limitations associated with its execution.

In a virtual environment, teams have a lower frequency of face-to-face contact; instead, they usually collaborate through emerging computer and communications technologies to accomplish a specific task or project (Morrison-Smith & Ruiz, 2020). For example, team

members communicate with other team members via email, telephone, or teleconferencing. These new environmental characteristics make communication and collaboration even more critical to a team's success. Furthermore, virtual teams are at a disadvantage compared to regular face-to-face teams. With face-to-face teams, members can observe their fellow team members directly. They can see who attends meetings or participates in conversations about projects and the group's progress. However, these types of visual cues are not possible with virtual teams.

Virtual teams can deliver innovative and beneficial results due to the collective intellectual capital of team members who benefit from each other's knowledge and expertise (Zakaria, Amelinckx & Wilemon, 2004). Therefore, it is crucial to examine virtual teams to understand how companies may effectively allocate resources and accomplish tasks to achieve optimal performance, particularly when compared to conventional face-to-face team environments (Potter and Balthazard, 2002).

This trend has grown exponentially with the emergence of the COVID-19 pandemic when many organizations went from having a modest percentage of team members working virtually to the entire staff working from home. A 2020 survey of 2,865 employees by Global Workplace Analytics found that 67% of those surveyed in the U.S. worked from home for the first time due to the COVID-19 pandemic. (Whillans, Perlow, & Turek, 2021).

<b>COMPARING VIRTUAL AND FACE-TO-FACE TEAMS</b>	
<b>Team Members:</b>	<b>Team Members:</b>
It can be located anywhere in the world	Are usually co-located
Are from an open-ended source of experts	Are from a minimal source of experts
Have often not worked together before	Usually have worked together before
<b>Communication / Interaction:</b>	<b>Communication / Interaction:</b>
Usually, computer-mediated communication is seen as a different	Usually face-to-face, and this is seen as the norm, taken for granted, and best
It is usually asynchronous, slower	Synchronous, instant
Usually, a pause before a response	Responses usually immediate
Responses are often more reflective and data-driven because researched	Responses are often superficial because they are off-the-cuff, not researched

<b>Teamwork:</b>	<b>Teamwork:</b>
Has little social interaction	Opportunity for much social interaction
It is mainly task-focused.	The blend of social and task-focus
Performance is equivalent to face-to-face teamwork over time	Performance is equivalent to virtual team performance over time

### **Transformational Leadership**

Burns describes transformational leadership as a process as opposed to a particular action. Burns claims that transformational leaders inspire followers to create significant and fundamental change (Budur and Poturak, 2021). Transformational leaders provide leaders and followers with more significant connections and higher levels of dedication, performance, and morality (Budur and Poturak, 2021) Transformational leadership is concerned with their followers' particular needs and personal development. Transformational leaders motivate employees to accomplish more than required. Bass (1985) suggests three ways transformational leaders might do this:

- At the beginning, through educating employees on the significance of work objectives,
- second, by encouraging subordinates to put the organization's needs ahead of their own,
- lastly, increasing high-level demands by motivating employees to work harder.

Additionally, transformational leadership stresses the need to recognize and appreciate workers. Transformational leaders elicit emotion and success in their followers. Transformational leaders are more interested in their workers' advancement and development. Transformational leaders also care about self-motivation, morals, and employee development. Consequently, followers regard transformational leaders with trust, adoration, loyalty, and respect (Ozer and Aslantas, 2023; Yukl, 2010).

Transformational leaders find and build common ideas among their followers, empower people and transform their organizations, and persuade subordinates to generate high-quality and high-quantity work. (Chen, Zheng, Yang, and Bai, 2016). They also utilize creativity in subordinate problem-solving. It is a method of motivating, committing, and enabling workers to achieve corporate goals by raising motivation, developing commitment, or empowering them (Hadžiahmetovic et al., 2022). In other words, transformational leaders may increase employee

commitment via shared values and a shared vision (Budur and Demir, 2022). Transformational leaders inspire people to act on their ideas.

Furthermore, transformational leaders put the organization first and direct followers' devotion to the organization's objectives. They persuade followers to choose the common good over self-interest. They can motivate their supporters to perform at a better level as a result of this.

### Transformational Leadership's Components

It is vital to remember that Bass defines transformational leadership as having some characteristics that include the following characteristics.

1 - Idealized influence: Idealized influence, sometimes referred to as charismatic, is a term that refers to transformational leaders who enhance motivation for their supporters. (Bass, 1985). Idealized influence is linked to charm and a leader's capacity to be a role model for followers and genuinely lead the way. Idealized influence leaders prioritize the demands of their followers before their own. With their high moral and ethical standards, charismatic leaders draw subordinates (Northouse, 2007). Leaders with charisma can convince others and connect with their followers. Furthermore, a charismatic leader conveys a specific vision and feeling of intentions, elicits passion, and shares achievements and risks with supporters. As a result, supporters look up to and aspire to be like their leaders.

2 - Inspirational motivation: Inspirational motivation arises when leaders encourage and inspire others around them by offering challenges and significance to their job (Yulk and Van Fleet, 1982). They present visions of what is achievable and strategies for achieving these objectives. Specific to this, these leaders engage their followers in imagining the future, instilling a sense of optimism about the tasks ahead and demonstrating a commitment to the common goal.

3 - Intellectual stimulation: Intellectual stimulation instils in followers an attitude of creativity and innovation. (Bass (1985). In the implementation, transformational leaders assist others in rethinking old challenges and constantly challenging and refining their ideas, presumptions, and worth. Additionally, these leaders collaborate with their followers to solve challenges with novel methods. The satisfaction of all those participating in their acts and their united accomplishment in overcoming challenges will increase followers' devotion to the institution.

4 - Individualized consideration: Per Bass (1985), individualized consideration entails knowing and recognizing others' interests and support levels and engaging every single member distinctively. Rather than just identifying and satisfying each follower's existing wants, leaders work with them to broaden and elevate those requirements to help followers achieve their full potential as human beings.

### **Knowledge-Sharing**

Knowledge sharing in a team is not automatic, and the team's leader has the potential to influence the extent of knowledge sharing strongly (Wickramasinghe & Widyaratne, 2012). Leaders create opportunities and processes that stimulate and encourage knowledge sharing amongst team members. For example, by offering new ideas, challenging technical solutions, and stimulating new approaches to work, leaders instigate team discussions and reviews, leading to knowledge sharing (Demir et al., 2022). Leaders also actively role model knowledge sharing. They are setting the example and signaling that the open sharing of ideas and information is essential and valuable for the team. As a result of this role modeling, team members are likely to reciprocate and share their expertise and knowledge with the team.

Knowledge sharing in the team leads to better team performance for three reasons: improved decision-making (Davenport et al., 1996), better problem-solving (Kogut and Zander, 1992), and enhanced creativity (Nonaka and Takeuchi, 1995). Increased knowledge sharing helps team members to consider more options, to learn from the experiences of others, and to better use the knowledge within the team, leading to improved decision-making. Knowledge sharing can help with problem-solving because the problem at hand can be better understood, potential issues can surface earlier, and more diverse alternatives to the problem can be explored. Finally, Nonaka and Takeuchi (1995) suggest that the process of creativity starts when team members meet to share knowledge in a given area, much of which is tacit. Tacit knowledge may include insights into customer needs, hunches about what might fix an intractable problem, lessons learned from previous experience, how others have approached similar problems, and information about new technologies. Sharing such tacit knowledge creates a flow of novel ideas that contribute to successful outcomes, such as new products, processes, and patents (Aslantas, 2024; Tajeddini et al., 2023). Numerous studies support that knowledge sharing is critical for team performance (Ancona and Caldwell, 1992; Faraj and Sproull, 2000; Aslantas, 2024; Muhammed, S., and Zaim, H. (2020).

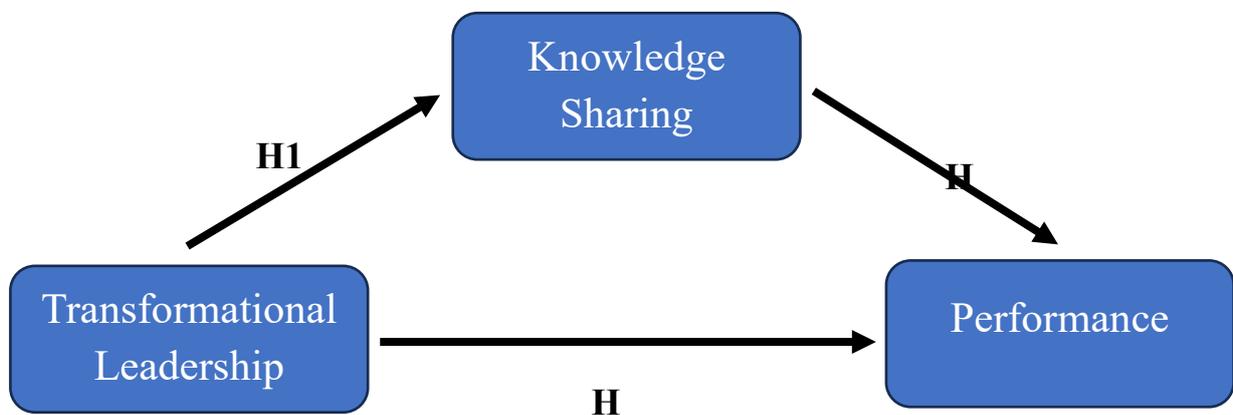
### 3. METHODOLOGY

This study aimed to investigate and test the relationship among transformational leadership styles, knowledge sharing, and performance in virtual teams. Based on the aim of the study, a survey questionnaire has been prepared and delivered to the sample group via the questionnaire method. In total, 119 data were collected from various companies with online activities in the market. To reach the study's aim, reliability analyses have been applied through the SPSS software package, and SEM has been via the Smart PLS software package. Collected data has been evaluated by a 5-level Likert scale, in which "1" represents "strongly disagree" and "5" represents "strongly agree".

#### 3.1. Research Model, Research Questions and Hypotheses

The relationship between transformational leadership styles, knowledge sharing and performance has been analyzed in many aspects. Transformational leadership has four dimensions, and knowledge sharing has two sub-dimensions. The dimensions of transformational leadership are idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, while explicit knowledge and implicit knowledge are components of knowledge sharing. In the same way, performance has two dimensions: individual performance and group performance.

Performance is accepted as a dependent variable, while transformation leadership is independent with the mediating role of knowledge sharing. The model of the study is as follows,



### Research Questions;

- 1- How does the transformational leadership style in virtual teams relate to performance?
- 2- How does knowledge sharing in virtual teams relate to team performance?
- 3- Does knowledge sharing mediate the relationship between transformational leadership style and performance in virtual teams?

### Hypotheses

*H1; In Virtual Teams Transformations Leadership style positively relates to Knowledge Sharing*

*H2; In Virtual Teams, Knowledge Sharing positively relates to Performance*

*H3; In Virtual Teams Transformations Leadership style positively relates to Performance*

*H4; In Virtual Teams, Knowledge Sharing has a positive mediating role between the Transformations Leadership and Performance*

### **3.2. Instrumentation**

The model of the thesis comprises four primary constructs, and the questionnaire has five sections. First section evaluates the demographics of the respondents, such as gender, education, and position. Secondly, transformational leadership has twelve questions adapted from Bass and Avolio's multifactor leadership questionnaire (MLQ). Moreover, knowledge-sharing is adapted from Connelly et al., 2012 with five items. Lastly, performance has adapted from Jehn, Northcraft, & Neale, 1999 with eight items. Furthermore, participants responded to questions on a Likert scale of 1 to 5, with 1 representing strongly disagree and 5 representing strongly agree, with the other alternatives being 2 disagree, 3 natural, and 4 agree.

### **3.3. Data Analysis**

In order to evaluate the collected data, it is proposed to use SPSS and Smart PLS4 software programs.

## 4. RESULTS

### 4.1. Descriptive Statistics

**TABLE 4.1** Gender distribution

Gender	Frequency	Percent
1 - Male	81	68.1
2 - Female	38	31.9
Total	119	100

Given in the Table 4.1 the respondents were women with a percentage of 38 respondents (31.9 %), while male respondents were 81 respondents with a percentage (68.1%). It can be concluded that the majority of respondents in this study are male.

**TABLE 4.2** Education level of the respondents

Education	Frequency	Percent
1 - High School	33	27.8
2 - Vocational School	21	17.6
3 - University	63	52.9
4 - Degree (Master PhD)	2	1.69
TOTAL	119	100

Table 4.2 shows the educational background of the survey questionnaire participants. Given in the results, 27.8 % were high school graduates, 17.6 % were Vocational school graduates. Furthermore, 52.9 % graduated with a bachelor's degree from various universities, and 1.69 % were master's degree holders.

**TABLE 4.3** Position in Companies

Position	Frequency	Percent
1 - General Director	2	1.68
2 - Director	4	3.36
3 - Middle Level Manager	10	8.41
4 - Expert	94	78.99
5 - Other	9	7.56
TOTAL	119	100

Table 4.3 shows the position of the participants who filled out the survey questionnaire. Given in the results, 1.68 % of the top management, 3.36 % of them were middle management,

8.41 % were low-level management (team managers), and 78.99 % of the participants were nonmanagerial employees (experts).

## 4.2. Empirical Findings

### 4.2.1. Data Distribution

Based on the Shapiro-Wilk test results for the variables transformational leadership, knowledge sharing, and performance, it appears that none of these variables follows a normal distribution. The significance level (p-value) for each variable is less than the commonly used significance level of 0.05 ( $p < 0.05$ ), indicating that the data significantly deviate from a normal distribution.

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
<b>TR</b>	0.115	119	0.001	0.966	119	0.004
<b>KS</b>	0.153	119	0	0.948	119	0
<b>PR</b>	0.102	119	0.004	0.966	119	0.005

a. Lilliefors Significance Correction

### 4.2.1. Frequencies

		TR	KS	PR
N	Valid	119	119	119
	Missing	0	0	0
Mean		3.6443	2.5227	3.6208
Median		3.6667	2.4001	3.6251
Mode		4.33	2.41	3.63 <sup>a</sup>
Std. Deviation		0.65542	0.86753	0.66859
Range		2.75	4	3.25
Minimum		2.08	1	1.5
Maximum		4.83	5	4.75

<sup>a</sup> Multi mode exist. The smallest value is shown

### 4.2.1. Reliability Results

To determine reliability, the researcher calculated a Cronbach's alpha measure for each of the five sets of four items that were meant to measure participants' perceptions of their leaders'

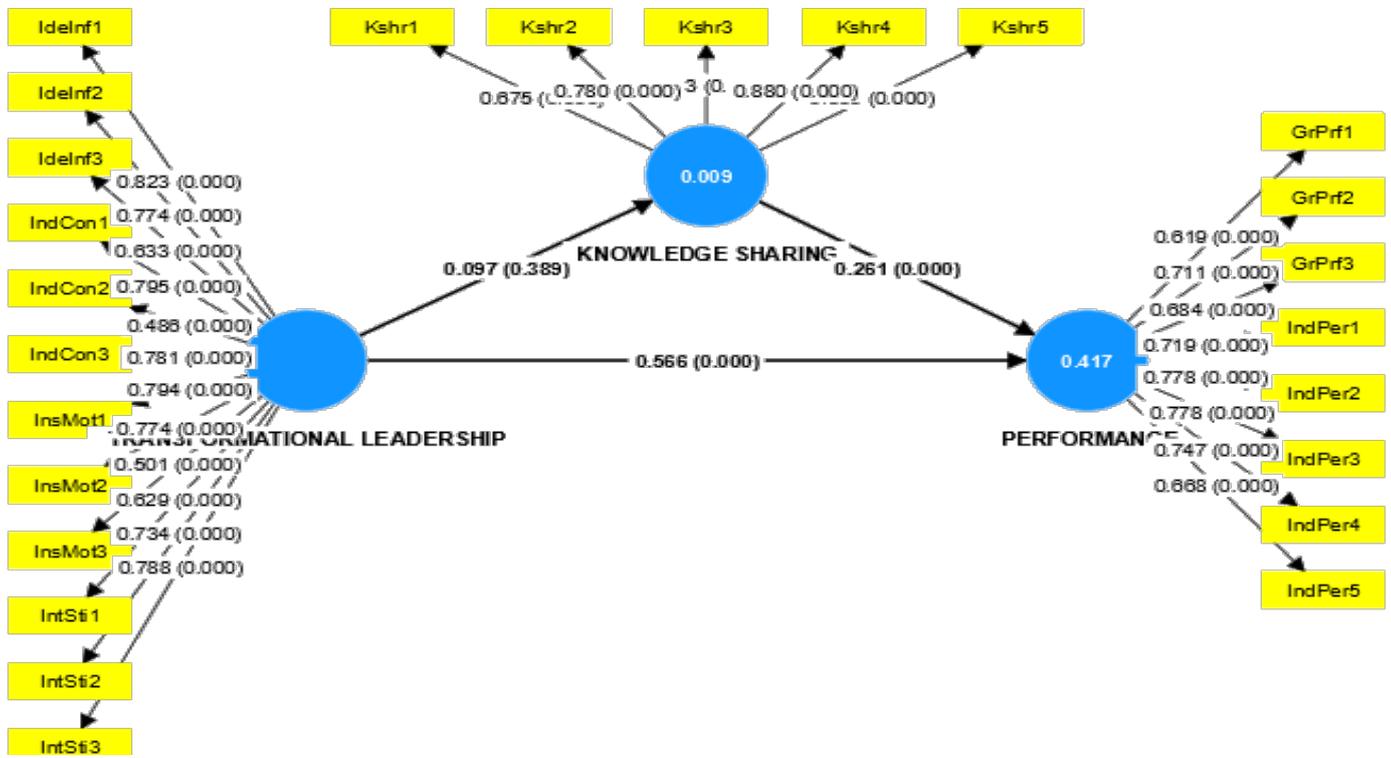
possession of the four different dimensions of transformational leadership (idealized influence, inspirational motivation, intellectual stimulation, and idealized consideration). Similarly, reliability analyses were also conducted on each of the five items that measure participants' perceptions of their knowledge sharing of the two dimensions of knowledge sharing (explicit knowledge, implicit knowledge). For the sake of comparison, a reliability analysis was also conducted on responses restricted to the two dimensions and eight items on the performance.

	<b>Cronbach's alpha</b>	<b>Composite reliability (rho_a)</b>	<b>Composite reliability (rho_c)</b>	<b>Average variance extracted (AVE)</b>
<b>Knowledge Sharing</b>	<b>0.876</b>	<b>0.904</b>	<b>0.904</b>	<b>0.655</b>
<b>Performance</b>	<b>0.863</b>	<b>0.868</b>	<b>0.893</b>	<b>0.511</b>
<b>Transformational Leadership</b>	<b>0.913</b>	<b>0.928</b>	<b>0.926</b>	<b>0.516</b>

The reliability of a scale indicates how free it is from random error (Mitchell & Jolley, 2013). A Cronbach's alpha reliability measure was applied to four survey instruments. George and Mallery (2003) provide the following rules of thumb when established on Cronbach's alpha coefficients, where > 0.90 is Excellent; > 0.80 is Good; > 0.70 is Acceptable; > 0.60 is Questionable; > 0.50 is Poor; and  $\leq 0.50$  is Unacceptable (Torlak et al., 2021).

The Cronbach's coefficient alpha estimating reliability for the Transformational Leadership of 12 items was 0.913, the Knowledge Sharing of 5 items was 0.876, and the performance of 10 items was 0.863, indicating a high internal consistency level for this scale with this specific sample. The reliability values were more significant than 0.70, indicating an acceptable statistic testing level (Cortina, 1993; Tavakol & Dennick, 2011).

### 4.3.4. Structural Equation Modelling (SEM)



	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T statistics (O/STDEV)	P values
Knowledge Sharing > Performance	0.261	0.266	0.071	3.659	0.000
TL > Knowledge Sharing	0.097	0.115	0.112	0.861	0.386
TL > Performance	0.566	0.578	0.058	9.759	0.000

SEM analysis is used to understand the relationship between independent and dependent variables. Based on the results of the table and figure, it has been observed that transformational leadership does not significantly impact the knowledge sharing of the employees in the virtual teams ( $\beta=0.097$ , p value= 0.389). Besides, knowledge sharing positively influences performance ( $\beta=0.26$ , p value= 0.00). Furthermore, lastly, transformational leadership has a significant impact on performance ( $\beta=0.56$ , p value= 0.000).

	<b>Original Sample (O)</b>	<b>Sample Mean (M)</b>	<b>Standard deviation (STDEV)</b>	<b>T statistics (O/STDEV)</b>	<b>P values</b>
<b>TL &gt; KS &gt; Performance</b>	0.025	0.028	0.029	0.866	<b>0.386</b>

The empirical **p-value** of the indirect effect for the Transformational Leadership vs. Performance relationship is **0.386**, yielding a **t-value** of **0.866**.

The relationship is not statistically significant, and we can conclude that Knowledge Sharing can not mediate the Transformational Leadership and Performance relationship.

Also, a sample coefficient of **0.025** for the indirect effect of Transformational Leadership on Performance through Knowledge Sharing shows a positive but weak effect size.

## **5 – DISCUSSION**

### **5.1. Theoretical Implications**

Transformational leadership does not significantly impact knowledge sharing in virtual teams ( $\beta = 0.097$ , p-value = 0.389), challenging the belief that it usually favorably impacts team behavior. The relationship between transformational leadership and knowledge sharing may be more complex than previously thought.

The significant influence of knowledge sharing on performance ( $\beta = 0.26$ , p-value = 0.00) supports existing literature highlighting the importance of knowledge sharing in enhancing team performance. This finding reinforces the importance of organizations prioritizing policies and programs that foster knowledge sharing among their personnel.

Transformational leadership and performance have a substantial positive relationship ( $\beta = 0.56$ , p-value = 0.000). This assertion is consistent with the widely accepted view that transformational leadership favors organizational outcomes. This finding underscores the

importance of cultivating transformational leadership attributes across teams in leadership positions.

Despite the belief that knowledge sharing mediates the relationship between transformational leadership and performance, there was no statistically significant indirect effect (empirical  $p$ -value = 0.386,  $t$ -value = 0.866). This suggests that additional mediators or variables may explain the transformational leadership-performance relationship. Researchers may need to examine different mediators or moderators to understand knowledge sharing's mediating role fully.

## **5.2. Practical Implications**

Organizations should continue to invest in leadership development programs that promote transformational leadership qualities. While the direct impact on knowledge sharing may be limited, the study confirms that transformational leadership positively affects performance.

Organizations should implement strategies to encourage knowledge sharing among employees to enhance performance. This might include creating a culture of collaboration, providing platforms for sharing ideas and best practices, and recognizing and rewarding employees who contribute to knowledge sharing.

When designing strategies to improve performance in virtual teams, leaders should consider that knowledge sharing alone may not be the sole mediator of the relationship between transformational leadership and performance. Other factors may play a role, which should be explored in the specific organization's context.

## **5.3. Limitations and Future Directions**

There is more complexity in the relationship between transformational leadership, knowledge sharing, and performance than previously thought. Future research should aim to uncover the nuanced dynamics and potential moderators or mediators that may influence these relationships further.

## **6. CONCLUSION**

In conclusion, while transformational leadership positively influences team performance in virtual teams, it does not significantly impact employees' knowledge sharing within these

teams. Furthermore, knowledge sharing itself plays a crucial role in enhancing team performance. However, knowledge sharing does not serve as a vital mediator in explaining how transformational leadership affects performance in this context.

These findings highlight the complexity of the relationships among leadership, knowledge sharing, and performance in virtual teams and suggest that organizations should consider multiple factors to improve team performance in such settings.

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