

THE IMPACT OF LEADERSHIP STYLES ON R&D TEAM PERFORMANCE AND THE MEDIATING ROLE OF KNOWLEDGE SHARING

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Abstract

Purpose: This study aims to examine the impact of leadership styles, specifically on transformational leadership and transactional leadership in R&D team performance of researcher in UniversitiTeknikal Malaysia Melaka (UTeM). Further, this study was to examine the impact of knowledge sharing on R&D team performance as mediating variables.

Methodology: The survey method was adopted to carry out the research. A structured Multifactor Leadership Questionnaire (MLQ) was used for data collection. R&D team performance was assessed based on measures of performance. Regression and Correlation statistical techniques were used to analyze the data elicited from one hundred seventy two (172) randomly selected respondents.

Main Findings: It was revealed from the study that while transformational leadership style had a positive impact on R&D team performance; transactional leadership style also had a positive impact on R&D team performance. It was also revealed from the study that knowledge sharing have significant and positive relationship with mediate both transformational leadership and transactional leadership on R&D team performance.

Implications/Applications: This research shows that R&D teams also can use the full range leadership styles although there are comparisons of uniqueness that exists in the R&D teams with other contexts. This is because leading an R&D team requires the leader to possess certain skills in addition to technical expertise, such as spreading information regarding technical advances, being knowledgeable regarding current professional activities and possessing strategic planning skills in an innovative climate where the team is not permanent or lasts only for a short period of time. This research confirmed that leadership styles led to significant team performance benefits such as an increase achievement of technical objectives, efficiency of resource utilization and other achievements.

Novelty/Originality: This study has successfully extended the full leadership literature by conceptualizing how the transformational leadership and transactional leadership styles positively impact the R&D team's performance. Hence, the findings in this study may be beneficial and act as a framework or a limitation for other studies.

Keywords: Leadership Styles, Transformational Leadership Style, Transactional Leadership Style, Knowledge Sharing, R&D Team Performance.

INTRODUCTION

The importance of a leader's behavior towards team performance has been highlighted in various literature by many researches ([Asrar-UI-Haq and Kuchinke, 2016](#); [Dubois, Koch, Hanlon, Nyatuga and Kerr, 2015](#)). An effective leader influences followers in a desired manner to achieve desired goals ([Nanjundeswaraswamy and Swamy, 2014](#)), while leadership style holds a major position in determining the success or failure of an organization ([Chege and Gokubu, 2017](#)). [Mahdinezhad, et al. \(2013\)](#) added that different leadership styles can influence team performance. Knowledge sharing has also been gaining much interest from scholars and researchers. Knowledge sharing also tend to generate high performance outcome, improve productivity as well as improve profitability. Thus, it is vital for leaders to have a suitable leadership style and knowledge sharing to happen in team activities, to ensure the efficiency and effectiveness of their team also tend to generate high performance outcome, improve productivity as well as improve profitability.

More than a century has lapsed since leadership became a topic of academic reflection, and the definition has been influenced by many factors from world affairs and politics to the perspective of the discipline in which the topic is being studied ([Peter, 2015](#)). [Burns \(1978\)](#) he determined that leadership as a relationship that includes followers to pursue joint purpose that represent the motivation of both leaders followers. A capable leader should offers guidance for the organization and lead followers toward achieving desired goals. Therefore, organizations need to have efficient leaders to

lead and motivate their employees in their daily operation so that they can achieve the organizational goals ([Asrar-Ul-Haq and Kuchinke, 2016](#)). Researchers have found different leadership styles to be optimal depending on the situation. Therefore, certain leaders may be chosen for their style depending on various factors peculiar to the situation which an organization faces at any given ([Sethuraman and Suresh, 2014](#)). A Modern theory known as 'The Full Range Leadership' propose by prominent leadership researchers; Benard Bass and Bruce Avolio in the 80's and 90's who consists of three types of leadership as Transformational Leadership, Transactional Leadership and Laissez-Faire leadership ([Bass, 1985](#)). The first comprehensive theory to explain the differences between transformational leadership and transactional leadership was James MacGregor Burns in 1978. He noted that transformational leadership and transactional leadership might recognize the follower's need. He also argued that transformational and transactional are at opposite ends of the continuum with transformational leaders recognizing that followers may have differing desires for satisfaction in the workplace. In contrast to Burns, who claims that transformational and transactional are at opposite ends of the continuum, [Bass \(1985\)](#) states that transformational leadership and transactional leadership are mutually exclusive processes. Bass also proposed that transformational leadership supplemented the effects of transactional leadership on the subordinates' effort, satisfaction and performance.

Transformational leadership

According to [Burns \(1978\)](#), he describes transformation leadership occurs when leaders and followers interact each other to a higher level of motivation and morality while Burns 2010 expand his argue that transformational leadership that is exemplified by charisma and shared vision between leaders and followers. Transformational leadership is built upon stimulate and inspire followers to achieve extraordinary outcomes, develop their own leadership capacity, help followers grow and grow by empowering them and aligning the objectives and goals at all levels of the organization ([Olin & Lai, 2011](#)). Transformational leadership also send their followers to exceed their performance beyond expectations. Leaders also lead to satisfaction and commitment to a group and organization ([Bass & Riggio, 2006](#)). Transformational leadership consists of four dimensions; idealize attribute or idealized influence, inspirational leadership or motivation, intellectual stimulation, and individualized consideration ([Bass 1985](#)).

Transactional leadership

Based on James Burns, transactional leadership is a rapport between leader and follower is established through exchange. Transactional leadership focuses on the task-related exchange of actions and rewards between follower and leader. Followers receive certain valued outcomes e.g wages, prestige when they act according to their leader's wishes ([Bono & Judge, 2004](#); [Hartog, Muijen, & Koopman, 1997](#); [Olin & Lai, 2011](#)). In short, transactional leadership is most often explained as a cost-benefit exchange between leaders and followers ([Marturano & Gosling, 2008](#)) or a "give and take" working relationship – rapport between leader and follower is recognized through exchange. The transaction itself or exchange encompasses something of value between what the leaders possess or controls and what the follower wants in return for their services ([Marturano & Gosling, 2008](#)). According to [Bass \(1985\)](#), transactional leadership builds the foundation for relationship between leaders and followers in terms of specifying expectations, clarifying responsibilities, negotiating contracts and providing recognition and rewards in order to achieve the expected performance ([Bono & Judge, 2004](#)). Transactional leadership consists of three dimensions; Contingent reward, Management by exception (active) and Management by exception (passive) ([Bass 1985](#)). This leadership style aims only to maintain the existing situation and to supply organizational goals through meeting needs and giving rewards to subordinates ([Tyssen et al., 2014](#)). According to [Rosenbach \(2018\)](#), transactional leadership is a necessary element to allow organizations to achieve high performance. [Rich \(2002\)](#) posited that the transactional leadership style can be applied to any one level of management whether low, middle, or upper level, as all used a moderate degree of transactional leadership style.

Impact of Leadership Styles on Team Performance

In many studies such as [MohdShamsuriMdSaad ; Tim Mazzarol \(2015\)](#) it has been proposed that transformational leadership has a significant influence on the firms' innovation performance among small and medium enterprises (SMEs) within Malaysia's Multimedia Super Corridor (MSC) ([MohdShamsuriMdSaad ; Tim Mazzarol, 2015](#)). Some studies have examined the influence of transformational leadership and transactional leadership in innovation. For example, [Hussain et al. \(2014\)](#) investigated the influence of transformational on process and product innovation in higher education. The findings indicated that there are significant strong relationships between transformational leadership and the process innovation. Consistent with this argument, in another study, [Karakitapoglu-Aygun & Gumusluoglu \(2013\)](#) explore positive and negative leadership behaviors in a non-Western 'change and transformation' context through

qualitative methods. The results indicated that transformational leadership are decisive and actively champion for the success of their team.

Knowledge Sharing

Knowledge sharing is the behavior of diffusing one's own knowledge with other members within one's organization. Knowledge sharing as the action in which employees diffuse relevant information to others across the organization (Srivastava, Bartol, & Locke, 2006). Lee (2001) defines knowledge sharing as activities of transferring or disseminating knowledge from one person, group or organization to another. In complex situations, it is very important to have knowledge sharing activities, as tasks are highly interdependent and individuals do not possess all the knowledge required to solve interdisciplinary problems in complex situations by themselves. However, a sharing knowledge activity in a team is not an official task (Liao, 2008, Kamal et al, 2012). Thus, knowledge sharing has been addressed most specifically in a R&D context. Indeed, R&D professionals have been widely acknowledged to be acknowledging workers, and their work is characterized by complex system designs, application of their knowledge to the rapid advances in technology, and strong competition for sustaining innovation (Assimakopoulos & Yan, 2006 & Liu & Liu, 2011; Rizal et al, 2012). Some studies have investigated how transformational leadership has an effect on knowledge sharing. For example, (Li et al. 2013) investigated the influence of dual-level transformational leadership on three group climates, leader-member exchange (LMX), and knowledge sharing. The findings found that transformational leadership facilitates knowledge sharing through different paths.

METHODOLOGY

In this research, descriptive study was used. This research seeks to examine the impact of Leadership styles on R&D team performance in UTeM by using quantitative research method was used where a questionnaire was utilized as the data collection tool associated with a deductive approach, where the focus was on using data to test the theory of leadership styles (transformational leadership and transactional leadership) towards R&D team performance. The research population consists of R&D team leaders in technical university in Melaka. The implementation measures review process begins with identifying the research problem statements. Based on the problem statements, goals and objectives of the research were developed. In order to obtain an overview and guidance in achieving the objectives of research, literature review was performed.

DISCUSSION / ANALYSIS

The Reliability Analysis Results (Cronbach's Alpha)

Reliabilities for the total items and for each leadership factors scale ranged from 0.811 and 0.917. The reliability within each data set of the Multifactor Leadership Questionnaire Form 5x generally indicate that it is a reliable measure of each leadership factor (Rich, 2002). The value of the reliability statistics for transformational leadership is 0.917. The value is more than other independent variables. This also shows that the data is very reliable and could be accepted among 172 respondents. Secondly, the value of transactional leadership reliability statistics is 0.811 which is acceptable and respondents were able to understand all the questions as well. Therefore, from the result, the researcher can conclude that the independent variable for transformational leadership is highest then followed by transactional leadership.

Next is mediating variable, the explicit knowledge sharing on reliability statistics shows 0.864 of value and this means the data is very reliable and could be accepted among 172 respondents. Next is the value of implicit knowledge sharing show reliability statistics is 0.875 and this means the data is also reliable and could be accepted within 172 respondents.

Lastly is the variable of R&D team performance consists of 16 items of questions show 0.949 is reliable and accepted by respondents. Overall the result on reliability Cronbach's Alpha analysis for independent variable are reliable, accepted and respondents understand the item of questionnaire.

Table 1 illustrates the relationships between two variables, Transformational leadership, and Performance. The Pearson correlation for transformational leadership and performance is equal to .446. The significant 2-tailed for both of them is also very significant that is 0.000 between the 172 respondents. Restricting this analysis to the Pearson correlation relevant for hypothesis 1, transformational leadership dimension and performance dimension, the medium positive correlation is at 0.446 (Pearson's $r = .446, p < .01$). The positive correlation (as one variable increases, so does the other) or a negative correlation (as one increases, the other decreases). The positive relationship means that the increase in one variable will also affect increase in other variables.

Analysis Correlation between Transformational leadership and Performance.

Table 1: Analysis of Correlation Transformational Leadership and Performance

		TFL	PERFORMANCE
TFL	Pearson Correlation	1	.446**
	Sig. (2-tailed)		.000
	N	172	172
PERFORMANCE	Pearson Correlation	.446**	1
	Sig. (2-tailed)	.000	
	N	172	172

** . Correlation is significant at the 0.01 level (2-tailed).

Analysis Correlation between Transactional leadership and Performance.

Table 2: Analysis of Correlation Transactional Leadership and Performance

		TSCL	PERFORMANCE
TSCL	Pearson Correlation	1	.456**
	Sig. (2-tailed)		.000
	N	172	172
PERFORMANCE	Pearson Correlation	.456**	1
	Sig. (2-tailed)	.000	
	N	172	172

** . Correlation is significant at the 0.01 level (2-tailed).

Table 2 illustrates the relationships between two variables, Transactional leadership and Performance. The Pearson correlation for transactional leadership and performance is equal to .456. The significant 2-tailed for both of them is also very significant that is 0.000 between the 172 respondents. Next is restricting this analysis to the Pearson correlation relevant for hypothesis 2, for transactional leadership dimension and performance dimension, the positive correlation is at 0.456 (Pearson's $r = .456$, $p < .01$). The positive correlation (as one variable increases, so does the other) or a negative correlation (as one increases, the other decreases). The positive relationship means that the increase in one variable will also affect increase in other variables.

Analysis Correlation between Knowledge sharing and Performance.

Table 3: Analysis of Correlation Knowledge Sharing and Performance

		KS	PERFORMANCE
KS	Pearson Correlation	1	.456**
	Sig. (2-tailed)		.000
	N	172	172
PERFORMANCE	Pearson Correlation	.456**	1
	Sig. (2-tailed)	.000	
	N	172	172

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3 illustrates the relationships between two variables Knowledge sharing and Performance. The Pearson correlation for knowledge sharing and performance is equal to .456. The significant 2-tailed for both of them is also very significant that is 0.000 between the 172 respondents. The restricting this analysis to the Pearson correlation relevant for hypothesis 3, for knowledge sharing dimension and performance dimension, the positive correlation is at 0.456 (Pearson's $r = .456$, $p < .01$). The positive correlation (as one variable increases, so does the other) or a negative correlation (as one increases, the other decreases). The positive relationship means that the increase in one variable will also affect increase in other variables.

In this thesis, multiple regression is used to answer all of the research question.

Linear Regression for Independent variables and Dependent variable.

Based on the results on the table 4, the value of R is .477 shows that there are medium relations between transformational leadership and transactional leadership towards performance. Meanwhile, the value of R square is .227 which shows the relationship between variables are low. R square .227 or 22.7% shows the impact of transformational leadership and transactional leadership towards performance.

Table 4: Coefficients for Independent variables and Dependent variable

Model	Unstandardized Coefficients		Standardized Coefficients		Correlations		Collinearity Statistics			
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance	VIF	
1 (Constant)	1.339	.269		4.976	.000					
TFL	.265	.129	.227	2.059	.041	.446	.156	.139	.376	2.656
TSCL	.319	.127	.277	2.513	.013	.456	.190	.170	.376	2.656

a. Dependent Variable: PERFORMANCE

As conclusion, a significant regression equation was found $F(2, 169) = 24.872, p < .000$, with R square is .227. R&D team performance predicted is equal to $1.339 + .265$ (transformational leadership) + 2.101 (transactional leadership), where both transformational leadership and transactional leadership were coded or measured as 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree. R&D team performance increase .265 (constant) for every increase measurement of transformational leadership and .319 for transactional leadership. Therefore, both transformational leadership and transactional leadership were significant predictors of R&D team performance.

Based on the table coefficient above, the analysis shows that the transformational leadership are significantly impact the R&D team performance (Beta= .227, $t(172) = 2.059, p < .05$). Similarly, transactional leadership also did significantly impact the R&D team performance (Beta= .277, $t(171) = 2.513, p < .05$)

Linear Regression of mediator

Table 5: Coefficients for mediator

Model	Unstandardized Coefficients		Standardized Coefficients		Correlations		Collinearity Statistics			
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance	VIF	
1 (Constant)	1.048	.269		3.904	.000					
TFL	.123	.129	.105	.952	.343	.446	.073	.062	.347	2.885
TSCL	.280	.122	.243	2.290	.023	.456	.174	.149	.374	2.674
KS	.273	.069	.296	3.932	.000	.456	.290	.255	.743	1.346

a. Dependent Variable: PERFORMANCE

The analysis shows that the transformational leadership are significantly impact the R&D team performance (Beta= .105, $t(171) = .952, p < .05$), and transactional leadership also did significantly impact the R&D team performance (Beta= .280, $t(171) = 2.290, p < .05$). Besides, knowledge sharing also did significantly impact the R&D team performance (Beta= .296, $t(171) = 3.932, p < .05$). This result also shows there is a prove of mediator of knowledge sharing when the original Beta value of transformational leadership from .227 become .105 after the re-run regression analysis and make the value become insignificant. Moreover, the original Beta value of transactional leadership also change from .277 become .243 which also prove the existed of knowledge sharing as the mediator between independent variables and dependent variable.

Linear Regression for Mediator:

In order to conduct the Sobel test for mediation, researcher had computed the raw regression coefficient and the standard error for this regression coefficient for the association between the Iv and the mediator, and the association between the mediator and the DV (adjusting for the IV).

Linear Regression for Mediation for transformational leadership and knowledge sharing towards performance.

Table 6: Coefficients for knowledge sharing (IV) and transformational leadership (the mediator)

Model	Unstandardized Coefficients		Standardized Coefficients		Correlations		Collinearity Statistics			
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance	VIF	
1 (Constant)	1.144	.276		4.139	.000					
KNOWLEDGE SHARING	.638	.084	.502	7.575	.000	.502	.502	.502	1.000	1.000

a. Dependent Variable: Knowledge Sharing

The raw regression coefficient for the association between knowledge sharing (IV) and transformational leadership (the mediator) is .64. The standard error for this raw regression coefficient is .08.

Table 7: Coefficients for transformational leadership and knowledge sharing towards R&D team performance

Coefficients ^a										
Model	Unstandardized Coefficients		Standardized Coefficients		Correlations			Collinearity Statistics		VIF
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance		
1 (Constant)	1.189	.265		4.494	.000					
Knowledge sharing	.339	.089	.290	3.814	.000	.446	.282	.251	.748	1.338
Knowledge sharing	.286	.070	.310	4.081	.000	.456	.300	.268	.748	1.338

Dependent Variable: Performance

The raw regression coefficient for the association between transformational leadership and knowledge sharing towards R&D team performance is .29. The standard error for this regression coefficient is .07.

The test statistic for the Sobel test is:

Table 8: Sobel test for transformational leadership and knowledge sharing

Input:	Test statistic:	Std. Error	p-value:
a 1.14	Sobel test: 2.90386	0.1138485	0.00368594
b .29	Goodman (I) test: 2.861756	0.11552333	0.00421296
Sa .28	Goodman (II) test: 2.94787	0.11214865	0.00319968
Sb .07	Reset all Calculate		

The test statistic for the Sobel test is 2.903, with an associated p-value of .004. The fact that the p-value was fall below the established alpha level of .05 indicates that the association between the IV and the DV is significantly by the inclusion of the mediator in the model. In other words, there is evidence of mediator.

Linear Regression for Mediation for transactional leadership and knowledge sharing.

Table 9: Coefficients for knowledge sharing (IV) and transactional leadership (the mediator)

Coefficients ^a										
Model	Unstandardized Coefficients		Standardized Coefficients		Correlations			Collinearity Statistics		VIF
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance		
1 (Constant)	1.480	.275		5.382	.000					
TSCL	.551	.086	.440	6.384	.000	.440	.440	.440	1.000	1.000

a. Dependent Variable: KS

The raw regression coefficient for the association between knowledge sharing (IV) and transactional leadership (the mediator) is .55. The standard error for this raw regression coefficient is .09.

Table 10: Coefficients for transactional leadership and knowledge sharing towards R&D team performance

Coefficients ^a										
Model	Unstandardized Coefficients		Standardized Coefficients		Correlations			Collinearity Statistics		VIF
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Tolerance		
1 (Constant)	1.118	.258		4.332	.000					
TSCL	.366	.083	.317	4.389	.000	.456	.320	.285	.807	1.240
KS	.291	.067	.316	4.379	.000	.456	.319	.284	.807	1.240

Dependent Variable: Performance

The raw regression coefficient for the association between transactional leadership and knowledge sharing towards R&D team performance is .29. The standard error for this regression coefficient is .07.

Table 11: Sobel test for transactional leadership and knowledge sharing

	Input:		Test statistic:	Std. Error :	p-value:
a	1.48	Sobel test:	2.95437244	0.11582832	0.00313306
b	.29	Goodman (I) test:	2.91296185	0.11747493	0.00358018
Sa	.28	Goodman (II) test:	2.99760085	0.11415796	0.00272114
Sb	.07	Reset all	Calculate		

The test statistic for the Sobel test is 2.954, with an associated p-value of .003. The fact that the p-value was fall below the established alpha level of .05 indicates that the association between the IV and the DV is significantly by the inclusion of the mediator in the model. In other words, there is evidence of mediator.

Using the simultaneous linear regression it was found that multiple relationship between the independent variables had a significant predicting influence on R&D team performance. The result indicates that three of the independents including the mediator were significant. These variables are transformational leadership, transactional leadership, and knowledge sharing.

A multiple linear regression was calculated to predict R&D team performance on independent variables transformational leadership and transactional leadership. A significant regression equation was found.

CONCLUSION

The findings also showed that leaders who demonstrated a transactional leadership style contributed positively to team performance as the leaders showed the behavior of giving rewards as an exchange to the followers' effort to accomplish the task given. On the other hand, transactional leaders also provided criticism to improve the followers' performance. Hence, it is recommended that leaders demonstrate both transformational and transactional leadership styles as both styles complement each other and enhance team performance. Based on the multiple regression analysis and the Sobel test, the results revealed that with the existence of knowledge sharing in leadership activities, leaders empower their team members to achieve team outcomes

LIMITATION AND STUDY FORWARD

Although this study had produced interesting and meaningful findings, there were some limitations which needs to be discussed. Firstly, the results of this study were based on a sample of 172 respondents of active researchers in UTeM. Although the respondents may be the leaders of group research, the possibility of personal bias may have occurred during the data collection process. Therefore, future studies should develop alternative measures and employ different data collection methods or different candidates. For example, future researchers can use two different questionnaires that are completed by leaders of research groups and the members of the group as secondary respondents.

Secondly, it should be noted that the researcher studied the impact of leadership styles on R&D team performance towards active group research. Since capturing this process over time is often difficult, the researcher took a 'snapshot' of the situation at a single point of time. Nevertheless, it is possible that some of the effects were more longitudinal in nature.

Finally, the researchers examined R&D team performance only in UTeM. It would be interesting to see how these findings compare to observations from other universities in different areas as critical issues may be different in other areas.

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