Role of Leadership Competencies on Virtual Team Effectiveness: Evidence Based Research among MNC's in India

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ABSTRACT

This paper examined the dimensions of the Leadership Competencies (LC) and Virtual Team Effectiveness (VTE) among Multinational Corporations (MNC's) in India. Further, the research paper also highlighted the impact of leadership competencies on virtual team effectiveness. The research design of the study was descriptive and empirical. The impact of nineteen factors of leadership competencies and twenty two factors of virtual team effectiveness were studied. The study was conducted on a sample of 134 employees working in selected MNC's. The selected factors of the leadership competencies were reduced to four and selected factors affecting virtual team effectiveness were reduced to five dimensions respectively using Exploratory Factor Analysis (EFA). Pearson's Correlation and Regression Analysis was used for testing research hypothesis. The respondents of the study were employees from different MNC's. The leadership competencies were found to be positively related to virtual team effectiveness which means that if the team leader exhibits suitable competencies, then the functioning of virtual teams is significantly improved. The study has important implications for effective functioning in the virtual work environment of MNC's. The study presents an elementary framework to strategically plan the interventions in order to develop the suitable leadership competencies so as to improve the virtual teams effectiveness in terms of goal clarity, interdependence, trust, personal well being of team members and capacity utilization.

KEYWORDS: *Leadership competencies; Virtual Team; Virtual team effectiveness; MNC's; COVID*

INTRODUCTION

Globalization and internationalization of demand, markets, and processes are resulting into incremental development and improvements hence constantly changing economies and workplaces according to the interest and strategic goals of business (Winter 2021). With globalization comes the requirement to coordinate and control the work across cross cultural boundaries. With breakthrough advancements in information technology and electronic communication taking place in the workplace, along with increased global competition and availability of skilled resources to address competitive requirements, organizations are pressurized to adapt virtual team structures. Furthermore, virtual teams are transforming from small project based teams to permanent structures having several team members from across the globe (Piccoli, Powell & Ives 2004; Bal & Teo 2000; Purvanova & Bono 2009). Current COVID-19 pandemic has further increased the dependence of Multinational Organizations on the effective functioning of virtual teams for the achievement of their strategic goals. Normal work pattern, mode of communication and team dynamics have been disrupted (Gardner and Matviak 2020). Hence, the requirement of fresh investigation to identify the role of leadership competencies and its impact on overall virtual team effectiveness becomes all the more significant.

Literature Review

Hambley et al (2007) define virtual leadership as ''a social influence process mediated by advanced information technologies to produce changes in attitudes, feelings, thinking, behaviour, and/or

performance of individuals, groups, and/or organizations''. There are plenty of research studies and empirical theories to analyze the role of leadership capability in traditional team settings, but there is significant dearth of studies addressing the role of leadership in virtual teams (Bass, 1981).

Although abundant number of frameworks exist to examine the role of leadership effectiveness, majority of the theories can be categorized into one to three ideologies ie trait, behavioral or contingency theories (Stott, K., and Walker, 1995). Organizations which have effectively managed virtual teams are capable to facing the challenges offered by today's dynamic and complex business environment (Bosch & Petra, 2004).

Bolden and Gosling (2006) depicted that leadership competencies require transformation from individualistic notions to more inclusive and relational perspectives. Moreover, focus should be given to the mechanism by which such approaches can contribute towards improved organizational performance in order to better understand the applications for which they are suited.

Review suggests that ethical issues may arise in the virtual work environment due to lack of interaction among team members and impact of social isolation (Kim, Emmett and Sikula, 2001).

Ziek (2014) postulated that if the virtual team leaders are able to effectively communicate the team members, the team will be able to effectively complete the tasks assigned to them. Higher level of behavioural competencies are required by virtual team leaders as compared to traditional team leaders because of the innate complexity of virtual team settings. This suggests that virtual team members will prefer leaders who exhibit multiple competencies. Competent leaders will have virtual teams that have good communication and role clarity (Kayworth & Leidner, 2002).

Majority of the studies lay emphasis on team design, trust, stages of trust formation, interpersonal relations, culture, conflicts, awards and recognitions, knowledge sharing in virtual teams (Bhat 2017).

Furst (1999) aimed to examine the factors resulting into virtual team effectiveness by proposing a research agenda. It was inferred that few research studies have studied the framework for identifying the effectiveness of virtual teams. Cordery and Soo (2008) aimed to determine the role of leadership and team climate in removing the hurdles associated with virtual team setting.

Research Gap

Review of Literature depicts that majority of the research has been conducted to identify the impact of leadership capability on traditional team performance. There is significant dearth of studies highlighting the impact of leadership competencies on virtual team effectiveness. Furthermore, COVID pandemic has created revolutionary changes in the overall functioning of multinational organizations. This in turn requires a more complex and interrelated set of competencies to be exhibited by the virtual team leaders to manage their teams effectively. It is with this background the research problem has been formulated.

Therefore, this study aims to explore the dimensions of leadership competencies required in managing the virtual teams effectively. The study also aims to highlight the impact of Leadership competencies on Virtual Team Effectiveness among selected MNC's.

Research Questions:
The research questions of the study are:
1. What are the dimensions of leadership competencies required in managing the virtual teams?
2. What are the dimensions for measuring the Virtual Team Effectiveness?
3. What is the impact of Leadership competencies on Virtual Team Effectiveness among MNC's?

Research Objectives:
The objectives of the study are:
1. To explore the dimensions of leadership competencies required in managing the virtual teams.
2. To determine the dimensions for measuring the Virtual Team Effectiveness.
3. To examine the impact of Leadership competencies on Virtual Team Effectiveness among MNC's.

Hypothesis:
The following hypothesis was framed on the basis of the main objective of the study:

H_0: There is no significant impact of extracted dimensions of Leadership competencies on extracted dimensions of virtual team effectiveness.

H_A: There is significant impact of extracted dimensions of Leadership competencies on extracted dimensions of virtual team effectiveness.

Research Variables:
Variables of the study are as follows:

Independent Variable: Leadership competencies

Dependent Variable: Virtual Team Effectiveness

Research Methodology

A. Research Design:

The present study is empirical in nature based on descriptive research design to study and examine the impact of Leadership Competencies on Virtual Team Effectiveness among MNC's in India. It is a cross-sectional study, in which sample is collected from a population at one specific point in time.

B. Data Sources:

The data has been collected by administering a questionnaire to a random sample of employees working with selected MNCs in India. The time duration for conduct of study was from June, 2021 to August, 2021. The questionnaire was framed in two sections. Section A consisted of statements related to Leadership Competencies in a 19-item scale that measured various determinants of competencies required by virtual teams leaders. It was assessed on a five point Likert scale. Section B consisted of statements related to the determinants used for measuring virtual team effectiveness. It was a 22 item scale and on 5 point scaling. Extensive review of literature has been undertaken to frame the items used in the scale. The research studies of Malhotra et al (2007), Markus et al (2000), Kollock (1996), Sarah Morrison-Smith (2020) were helpful in framing the construct. The secondary data was collected through research publications, journals, periodicals, and websites.

C. Sample Size:

The study has been based on 150 employees working in the MNC's in India. Purposive sampling technique has been used to obtain the responses from the employees who have an experience of working in virtual teams and are currently working in virtual teams due to the COVID pandemic. One thirty four duly filled questionnaires were obtained.

D. Sample characteristics:

Out of selected sample of 134 millennial employees, 57.46 percent (77) respondents were males and rest 42.53 percent (57) were males. Moreover, 41.74 percent (43) respondents were unmarried while remaining 58.25 percent (60) were married.

E. Data Analysis Techniques:

In the current study, responses have been coded and analyzed using IBM SPSS 21. For analyzing data, statistical tools KMO and Bartlett's test of Sphericity, Exploratory Factor Analysis (EFA), Bi-variate Pearson's Correlation and Multiple Regression have been used. The statistical tests have been performed at 5 percent level of significance.

F. Exploratory Factor Analysis

Exploratory factor analysis (EFA) was applied to extract the latent factors of Leadership Competencies and Virtual Team Effectiveness among employees working in selected MNC's. The factor loadings were used to determine correlation between the selected variables of the study. A factor loading close to 1 signifies a strong correlation between the selected variables of the study, while a loading closer to zero signifies weak correlation. The factors were then rotated with the use of Varimax with Kaiser Normalization Rotation Method. Principal Component Analysis (PCA) method was applied for factor extraction and only those factors whose values were greater than 0.4, were interpreted for further study.

Result of KMO and Bartlett's Test and Communalities Score

In order to reduce the number of variables into few number of factors and also to determine the share of effect of the factors, factor analysis was employed. On the basis of the result of Kaiser-Meyer-Oklin (KMO) measures of sampling adequacy and Bartlett's Test of Sphericity (Homogeneity of Variance) appropriateness of the data for factor analysis was measured. The computation carried out reveals that internal cohesion of the data is suitable and the sample size is adequate for expression of the correlation between the research variables.

The results in table 1 and 2 demonstrate that the KMO measure of sampling adequacy was **0.687 (LC)** and **0.732 (VTE)** as it is above 0.6 in both the cases, so the explorative factor analysis operations may therefore be fulfilled. Bartlett's statistic was also significant at the level of $p = 0.01$, and the null hypothesis concerning the identical matrix is rejected, which revealed that adequate correlation existed between the research variables for performing the factor analysis in both the cases.

Table 1 LC: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.687
Bartlett's Test of Sphericity	Approx. Chi-Square	277.882
	Df	171
	Sig.	.000

Source: Primary Data

Table 2 VTE: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.732
Bartlett's Test of Sphericity	Approx. Chi-Square	210.537
	Df	143
	Sig.	.000

Source: Primary Data

The results from table 3 and 4 of the factor analysis depicts that all the extracted communalities were good enough for both dependent as well as independent research variables and as their extraction values are big hence, both variables are fit for the factor solution. Factor loadings were applied to measure correlation between variables under study.

Table 3: LC Communalities

	Initial	Extraction
LC1: Allows people to go out of their way for good of the institution.	1.000	.934
LC2: Is able to enhance visibility of virtual members within the team and within the larger organization.	1.000	.639
LC3: Has an understanding of the project sequence and how individuals tasks fit in to the overall project.	1.000	.650
LC4: Information sharing about organization strategic intent with the team members on timely basis.	1.000	.649
LC5: Provides opportunities to exchange enough social information among team members to develop strong cohesion.	1.000	.818
LC6: Is aware and sensitive towards Team diversity such as nationality, language, or culture.	1.000	.718
LC7: Is empathetic towards the integration of personal life and work life demands of the virtual team members.	1.000	.526
LC8: Ability to utilize the technology available, and, when necessary, to educate the team on their proper uses.	1.000	.806
LC9: Must be able to recognize the achievements of team members as they are not there in person to get praise in front of coworkers.	1.000	.670
LC10: Must be able to carefully assess group dynamics and make adjustments based on the findings they gain through observation, listening and regular assessment of group dynamics.	1.000	.804
LC11: Is able to inculcate relationship building to foster the ability to form closer interpersonal relationships between members in the absence of physical interaction.	1.000	.639
LC12: Is able to make the members recognize the benefit of working together so that they can develop trust among themselves.	1.000	.845
LC13: Is Socially aware which includes knowledge about team members and their social environments.	1.000	.842
LC14: Should have good Communication skills and is able to listen and hear what cannot be seen.	1.000	.700
LC15: Should be able to deal with complexity and be prepared to make decisions that encompass multiple variables, considerable ambiguity, and evolving environments.	1.000	.642
LC16: Enables team members to self manage and self regulate their performance.	1.000	.829
LC17: Should have the ability to allocate time and resources efficiently to manage costs and keep the project on its tracks.	1.000	.872
LC18: Organizes training programs and counsels team members for career enhancement.	1.000	.713
LC19: Fosters participative management by encouraging involvement.	1.000	.837

Extraction Method: Principal Component Analysis.

Source: Primary data

Table 4: VTE Communalities

	Initial	Extraction
VTE1: The team is aware of the organizational objectives and is committed to achieving them.	1.000	.729
VTE2: The team has the resources it needs to do the job and meet the targets it has been set.	1.000	.776
VTE3: Successes and failures are shared collectively.	1.000	.880
VTE4: All individuals are committed to perform to the best of their ability within the team.	1.000	.917
VTE5: Morale within the team is high.	1.000	.841
VTE6: There is a high level of trust in our team.	1.000	.625
VTE7: Conflict does not linger because people in this team are quick to resolve arguments.	1.000	.838
VTE8: We are rewarded as a team.	1.000	.759
VTE9: We have opportunities for personal development.	1.000	.821
VTE10: We have the resources and tools we need to meet our requirements.	1.000	.711
VTE11: Team members demonstrate excellence in their work habits.	1.000	.796
VTE12: The organization is concerned about our well being.	1.000	.817
VTE13: We have the skills we need to meet our requirements.	1.000	.704
VTE14: We have open, honest, direct communications.	1.000	.781
VTE15: We seek ways to support each other.	1.000	.845
VTE16: Individuals feel valued as members of the team.	1.000	.928
VTE17: We are rewarded fairly for our contributions.	1.000	.703
VTE18: Members of the team feel that they are fully utilized.	1.000	.810
VTE19: When things at work are stressful, we pull together as a team.	1.000	.845
VTE20: Team members are willing and able to share their knowledge and information, hence developing a sense of obligation.	1.000	.901
VTE21: There are clear objectives established for team activities.	1.000	.807
VTE22: Roles and responsibilities are clear.	1.000	.865

Extraction Method: Principal Component Analysis.

Source: Primary data

Results of Total Variance Explained for the Leadership Competencies (LC) and Virtual Team Effectiveness (VTE)

Table 5 depicts the total variance of **Leadership Competencies (LC),** the first four components (factors) in the initial solution have an Eigen values over 1, and it accounted for about **68.613** per cent of the observed variations considering the responses of a random selection of employees working in MNC's.

Similarly table 6 shows the total variance of **Virtual Team Effectiveness (VTE)**, five components (factor) in the initial solution have an Eigen values over 1, and it accounted for about **55.513** per cent of the observed variations considering the responses of employees.

Table 5: LC Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Component		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.187	43.091	43.091	8.187	43.091	43.091	1	8.187	43.091
2	2.109	11.098	54.189	2.109	11.098	54.189	2	2.109	11.098
3	1.558	8.198	62.387	1.558	8.198	62.387	3	1.558	8.198
4	1.183	6.226	68.613	1.183	6.226	68.613	4	1.183	6.226

Source: Primary data

Table 6: VTE Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Component		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.951	13.414	13.414	2.951	13.414	13.414	1	2.951	13.414
2	2.617	11.897	25.311	2.617	11.897	25.311	2	2.617	11.897
3	2.543	11.559	36.870	2.543	11.559	36.870	3	2.543	11.559
4	2.261	10.278	47.148	2.261	10.278	47.148	4	2.261	10.278
5	1.840	8.366	55.513	1.840	8.366	55.513	5	1.840	8.366

Source: Primary data

Extraction of latent factors of Leadership Competencies (LC) and Virtual Team Effectiveness (VTE) by using Principal Component Factor Analysis followed by Varimax Rotated Factor Analysis.

Table 7& 8: Results of Rotated Component Matrix

Table 7: LC results of Rotated Component Matrix[a]

	Component			
	1	2	3	4
LC1: Allows people to go out of their way for good of the institution.	.923			
LC18: Organizes training programs and counsels team members for career enhancement.	.772			
LC16: Enables team members to self manage and self regulate their performance.	.634			
LC19: Fosters participative management by encouraging involvement.	.679			
LC2: Is able to enhance visibility of virtual members within the team and within the larger organization.	.519			
LC3: Has an understanding of the project sequence and how individuals tasks fit in to the overall project.		.774		
LC15: Should be able to deal with complexity and be prepared to make decisions that encompass multiple variables, considerable ambiguity, and evolving environments.		.772		
LC4: Information sharing about organization strategic intent with the team members on timely basis.		.695		
LC11: How often do you lose sleep due to late night log ins			.825	
LC5: Provides opportunities to exchange enough social information among team members to develop strong cohesion.			.751	
LC12: Is able to make the members recognize the benefit of working together so that they can develop trust among themselves.			.728	
LC6: Is aware and sensitive towards Team diversity such as nationality, language, or culture.			.686	
LC7: Is empathetic towards the integration of personal life and work life demands of the virtual team members.			.674	
LC13: Is Socially aware which includes knowledge about team members and their social environments			.643	
LC8: Ability to utilize the technology available, and, when necessary, to educate the team on their proper uses.				.868
LC14: Should have good Communication skills and is able to listen and hear what cannot be seen.				.765
LC10: Must be able to carefully assess group dynamics and make adjustments based on the findings they gain through observation, listening and regular assessment of group dynamics.				.731
LC9: Must be able to recognize the achievements of team members as they are not there in person to get praise in front of coworkers.				.652

| LC17: Should have the ability to allocate time and resources efficiently to manage costs and keep the project on its tracks.				.589
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 4 iterations.				

Source: Primary data

Table 8: Results of VTE Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
VTE1: The team is aware of the organizational objectives and is committed to achieving them.	.910				
VTE21: There are clear objectives established for team activities.	.895				
VTE22: Roles and responsibilities are clear.	.648				
VTE2: The team has the resources it needs to do the job and meet the targets it has been set.	.665				
VTE15: We seek ways to support each other.		.949			
VTE3: Successes and failures are shared collectively.		.874			
VTE19: When things at work are stressful, we pull together as a team.		.852			
VTE4: All individuals are committed to perform to the best of their ability within the team.		.741			
VTE20: Team members are willing and able to share their knowledge and information, hence developing a sense of obligation.		.629			
VTE16: Individuals feel valued as members of the team.			.845		
VTE5: Morale within the team is high.			.862		
VTE14: We have open, honest, direct communications.			.726		
VTE6: There is a high level of trust in our team.			.652		
VTE7: Conflict does not linger because people in this team are quick to resolve arguments.			.689		
VTE17: We are rewarded fairly for our contributions.				.835	
VTE8: We are rewarded as a team.				.645	
VTE12: The organization is concerned about our well being.				.691	
VTE9: We have opportunities for personal development.				.532	
VTE13: We have the skills we need to meet our requirements					.875
VTE10: We have the resources and tools we need to meet our requirements.					.736
VTE11: Team members demonstrate excellence in their work habits.					.624
VTE18: Members of the team feel that they are fully utilized.					.582
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 5 iterations.					

Source: Primary data

Findings of EFA: In the present study, table 7 and 8 reveal the two variables namely Leadership Competencies (LC) and Virtual Team Effectiveness (VTE) and two different models derived by applying Exploratory Factor Analysis (EFA). For the independent variable, viz., Leadership Competencies (LC), four dimensions have been extracted. They were labeled as, **Transformational Competencies, Strategic Competencies, Socio-Economic Competencies and Cross Functional Competencies**. Similarly, for the dependent variable, viz., Virtual Team Effectiveness (VTE) in selected MNC's five latent variables have been extracted and named as **Degree of Goal Clarity, Degree of Interdependence, Degree of Cohesion & Trust, Degree of Personal Growth & Well Being of team members and Degree of Effective Capacity Utilization**.

Figure 1: Extracted dimensions of Leadership Competencies and Virtual Team Effectiveness
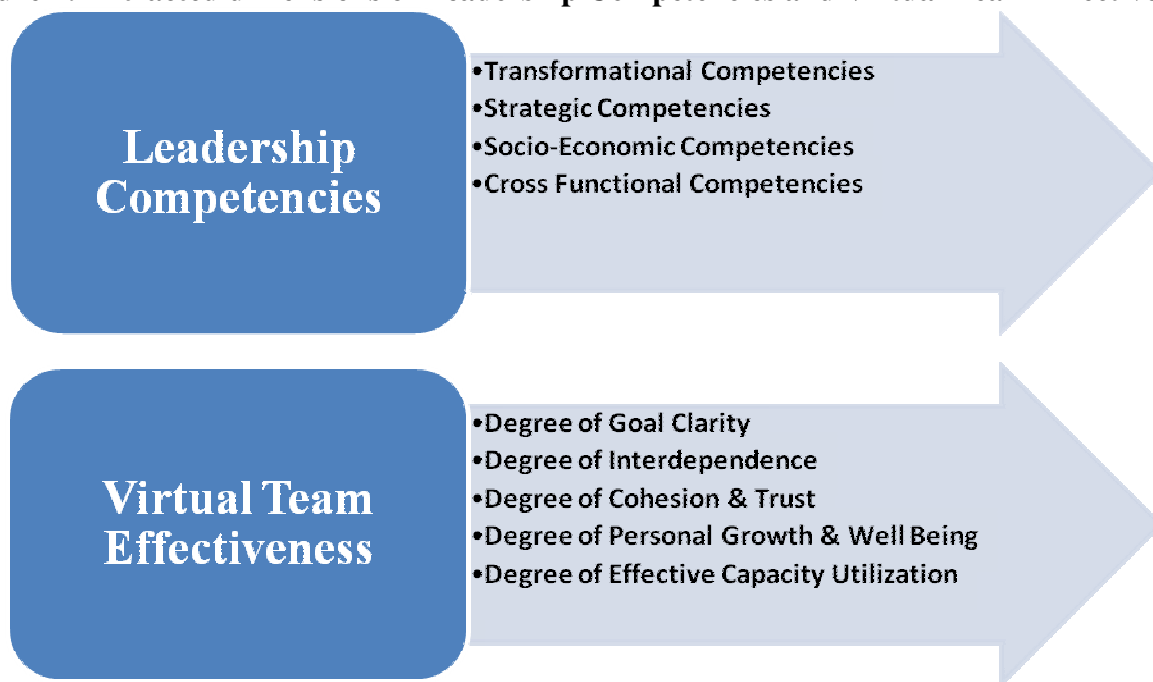
Source: Primary data

Hypothesis Testing

The stated hypothesis has been tested using Multiple Correlation and Multiple Regression Analysis.

H_0: There is no significant impact of extracted dimensions of Leadership competencies on extracted dimensions of virtual team effectiveness.

H_A: There is significant impact of extracted dimensions of Leadership competencies on extracted dimensions of virtual team effectiveness.

RELATIONSHIP BETWEEN LEADERSHIP COMPETENCIES (LC) AND VIRTUAL TEAM EFFECTIVENESS (VTE)

Multiple Correlation Analysis

Relationship between the Leadership Competencies (LC) and Virtual Team Effectiveness (VTE) has been determined by comparing only the significant values of Bivariate correlations.

Table 9: Correlations between dimensions of Leadership Competencies (LC) and Virtual Team Effectiveness (VTE)

Leadership Competencies ↓	Virtual Team Effectiveness →	Degree of Goal Clarity	Degree of Interdependence	Degree of Cohesion & Trust	Degree of Personal Growth & Well Being	Degree of Effective Capacity Utilization
Transformational Competencies	Pearson Correlation	**.364**[**]	.087	**.375**[**]	**.264**[**]	.426
	Sig. (2-tailed)	**.004**	.435	**.007**	**.032**	.009
	N					
Strategic Competencies	Pearson Correlation	**.275**[**]	.031	.015	.098	.025
	Sig. (2-tailed)	**.040**	.750	.538	.332	.426
	N					
Socio-Economic Competencies	Pearson Correlation	.021	**.401**[**]	**.384**[**]	**.547**[**]	.326
	Sig. (2-tailed)	.954	**.007**	**.043**	**.020**	.060
	N					
Cross Functional Competencies	Pearson Correlation	.856	.759	.685	**.586**[**]	**.427**[**]
	Sig. (2-tailed)	.567	.432	.273	**.047**	**.002**
	N					

** Significant at 0.05 level of significance

Source: Primary source

The table 9 infers that significant positive correlation exists between Leadership Competencies (LC) and Virtual Team Effectiveness (VTE) among selected MNC's. Significant positive correlation exists among the following dimensions of leadership competencies and virtual team effectiveness:

➢ **Transformational Competencies** are significantly correlated with **Degree of Goal Clarity, Degree of Cohesion & Trust and Degree of Personal Growth & Well Being.**

➢ **Strategic Competencies** are significantly correlated with **Degree of Goal Clarity.**

➢ **Socio-Economic Competencies** are significantly correlated with **Degree of Interdependence, Degree of Cohesion & Trust and Degree of Personal Growth & Well Being.**

➢ **Cross Functional Competencies** are significantly correlated with **Degree of Personal Growth & Well Being and Degree of Effective Capacity Utilization.**

Multiple Regression Analysis

In order to determine the impact of Leadership Competencies (LC) on Virtual Team Effectiveness (VTE), Regression Analysis was applied relating each of the four extracted factors of Leadership Competencies as independent variables and the five variables of Virtual Team Effectiveness of selected MNC's as the dependent variable. On the basis of the above analysis, five statistically significant regression equation was constructed. The table 10 depicts the **results of regression analysis confirming rejection of null hypothesis and acceptance of alternative hypothesis** which means that fit has been observed between Leadership Competencies and Virtual Team Effectiveness in five regression model.

Table 10: Results of Regression analysis

Table 10.1: Degree of Goal Clarity

Dependent Variable	Independent Variable	R	R^2	Adjusted R^2	F Sig.	Unstandardised Coefficient (B)	t Sig.
Degree of Goal Clarity	Model	0.293	0.088	0.074	0.013	2.856	0.000
	Transformational Competencies					0.263	0.003
	Strategic Competencies					0.271	0.023
	Socio-Economic Competencies					-0.079	0.415
	Cross Functional Competencies					-0.063	0.673

Source: Primary data

Table 10.2: Degree of Interdependence

Dependent Variable	Independent Variable	R	R^2	Adjusted R^2	F Sig.	Unstandardised Coefficient (B)	t Sig.
Degree of Interdependence	Model	0.210	0.042	0.037	0.026	2.782	0.000
	Transformational Competencies					-0.085	0.431
	Strategic Competencies					-0.027	0.732
	Socio-Economic Competencies					0.252	0.004
	Cross Functional Competencies					-0.084	0.854

Source: Primary data

Table 10.3: Degree of Cohesion & Trust

Dependent Variable	Independent Variable	R	R^2	Adjusted R^2	F Sig.	Unstandardised Coefficient (B)	t Sig.
Degree of Cohesion & Trust	Model	0.289	0.075	0.060	0.023	2.758	0.000
	Transformational Competencies					0.273	0.014
	Strategic Competencies					-0.081	0.375
	Socio-Economic Competencies					0.269	0.023
	Cross Functional Competencies					-0.079	0.875

Source: Primary data

Table 10.4: Degree of Personal Growth & Well Being

Dependent Variable	Independent Variable	R	R^2	Adjusted R^2	F Sig.	Unstandardised Coefficient (B)	t Sig.
Degree of Personal Growth & Well Being	Model	0.351	0.093	0.081	0.002	3.421	0.000
	Transformational Competencies					0.293	0.004
	Strategic Competencies					-0.085	0.482
	Socio-Economic Competencies					0.285	0.010
	Cross Functional Competencies					0.269	0.025

Source: Primary data

Table 10.5: Degree of Effective Capacity Utilization

Dependent Variable	Independent Variable	R	R^2	Adjusted R^2	F Sig.	Unstandardised Coefficient (B)	t Sig.
Degree of Effective Capacity Utilization.	Model	0.230	0.053	0.041	0.024	2.751	0.001
	Transformational Competencies					-0.041	0.659
	Strategic Competencies					-0.053	0.742
	Socio-Economic Competencies					-0.065	0.641
	Cross Functional Competencies					0.274	0.043

Source: Primary data

R which denotes multiple correlation coefficient is the measure of the quality of forecasting of the dependent variable 'Virtual Team Effectiveness in selected MNC's in India'. The R^2 value is the proportion of variance in the components of Virtual Team Effectiveness that can be explained by the dimensions of Leadership Competencies. The ANOVA value depicts whether the regression model is a good fit for the data. The results of regression analysis are as follows:

➢ R^2 value of 0.088 in case of Degree of Goal Clarity (table 10.1) reveals that, on the basis of the responses given by employees, dimensions of Leadership Competencies contribute to 8.8% of Virtual Team Effectiveness as far as Degree of Goal Clarity is considered. Table predicts that two factors of Leadership Competencies (independent variable) i.e Transformational Competencies and Strategic Competencies significantly predict Degree of Goal Clarity in Virtual Team Effectiveness. The constructed regression equation is, therefore, a good fit of the data.

➢ R^2 value of 0.042 in case of Degree of Interdependence (table 10.2) reveals that, on the basis of the responses given by employees, dimensions of Leadership Competencies contribute to 4.2% of Virtual Team Effectiveness as far as Degree of Interdependence is considered. Table predicts that one dimension of Leadership Competencies (independent variable) i.e Socio-Economic Competencies significantly predict Degree of Interdependence in Virtual Team Effectiveness. The constructed regression equation is, therefore, a good fit of the data.

➢ R^2 value of 0.075 in case of Degree of Cohesion & Trust (table 10.3) reveals that, on the basis of the responses given by employees, dimensions of Leadership Competencies contribute to 7.5% of Virtual Team Effectiveness as far as Degree of Cohesion & Trust is considered. Table predicts that two dimensions of Leadership Competencies (independent variable) i.e Transformational Competencies and Socio-Economic Competencies significantly predict Degree of Cohesion & Trust in Virtual Team Effectiveness. The constructed regression equation is, therefore, a good fit of the data.

➢ R^2 value of 0.093 in case of Degree of Personal Well Being (table 10.4) reveals that, on the basis of the responses given by employees, dimensions of Leadership Competencies contribute to 9.3% of Virtual Team Effectiveness as far as Degree of Personal Well Being is considered. Table predicts that two dimensions of Leadership Competencies (independent variable) i.e Transformational Competencies and Socio-Economic Competencies significantly predict Degree of Personal Well Being in Virtual Team Effectiveness. The constructed regression equation is, therefore, a good fit of the data.

➢ R^2 value of 0.053 in case of Degree of Effective Capacity Utilization (table 10.5) reveals that, on the basis of the responses given by employees, dimensions of Leadership Competencies contribute to 5.3% of Virtual Team Effectiveness as far as Degree of Effective Capacity Utilization is considered. Table predicts that one factor of Leadership Competencies (independent variable) i.e Cross Functional Competencies significantly

predict Degree of Cross Functional Competencies in Virtual Team Effectiveness. The constructed regression equation is, therefore, a good fit of the data.

Table depicts that factors of leadership competencies (independent variables) significantly predict the five dimensions of virtual team effectiveness accordingly. However, the equations were constructed by using un-standardized coefficients due to cross-sectional data. This means that there is significant impact of leadership competencies on virtual team effectiveness of selected MNC's. The significant regression equation is as follows:

➤ $VTE_{(Goal\ Clarity)} = 2.856 + (0.263)\ LC_{(TC)} + (0.271)\ LC_{(SC)} - (0.079)\ LC_{(SEC)} - (0.063)LC_{(CFC)}$

➤ $VTE_{(Interdependence)} = 2.782 - (0.085)\ LC_{(TC)} - (0.027)\ LC_{(SC)} + (0.252)\ LC_{(SEC)} - (0.084)LC_{(CFC)}$

➤ $VTE_{(Cohesion)} = 2.758 + (0.273)\ LC_{(TC)} - (0.081)\ LC_{(SC)} + (0.269)\ LC_{(SEC)} - (0.079)LC_{(CFC)}$

➤ $VTE_{(Personal\ Well\ Being)} = 3.421 + (0.293)\ LC_{(TC)} - (0.085)\ LC_{(SC)} + (0.285)\ LC_{(SEC)} + (0.269)LC_{(CFC)}$

➤ $VTE_{(Effective\ Capacity\ U)} = 2.751 - (0.041)\ LC_{(TC)} - (0.053)\ LC_{(SC)} - (0.065)\ LC_{(SEC)} + (0.274)LC_{(CFC)}$

where,

VTE $_{(Goal\ Clarity)}$ stands for virtual team effectiveness derived from degree of goal clarity.

VTE $_{(Interdependence)}$ stands for virtual team effectiveness derived from degree of interdependence.

VTE $_{(Cohesion)}$ stands for virtual team effectiveness derived from degree of cohesion & trust.

VTE $_{(Personal\ Well\ Being)}$ stands for virtual team effectiveness derived from degree of personal well being.

VTE $_{(Effective\ Capacity\ U)}$ stands for virtual team effectiveness derived from degree of effective capacity utilization.

LC $_{(TC)}$ stands for Transformational Leadership Competency.

LC $_{(SC)}$ stands for Social Competency.

LC $_{(SEC)}$ stands for Socio Economic Competency.

LC $_{(CFC)}$ stands for Cross Functional Competency.

Hence, it is evident from the study that if virtual leaders possess suitable leadership competencies then virtual team effectiveness increases.

Analysis and Discussion

The explorative analysis of the study is broadly divided into parts: Independent Factor, viz., Leadership Competencies and Dependent Factor, viz., virtual team effectiveness among MNC's. In this study, four dimensions of Leadership Competencies and five dimensions of virtual team effectiveness were extracted using Exploratory Factor Analysis (EFA). In order to analyze and interpret the impact of *identified dimensions of* leadership competencies on identified dimensions of virtual team effectiveness among MNC's, Pearson's multiple correlation techniques and Multiple Regression analysis have been applied. A significance value of less than 0.05 indicates that there exists a significant relationship between the variables under study.

➤ The study depicts that transformational leadership competencies enables team members to self manage and self regulate their performance thereby fostering participative management. This in turn results in increased degree of goal clarity, cohesion & trust followed by personal growth & well being among virtual team members.

➤ The study reveals that strategic leadership competencies enables the team leader's to deal with business complications and be prepared to make strategies that encompass multiple variables. This in turn results in greater goal clarity as far as virtual team effectiveness is considered.

➤ The study infers that presence of socio-economic competencies enables the leader to form closer interpersonal relationships between members in the lack of physical interaction. This in turn improves virtual team effectiveness by increased degree of Interdependence, cohesion & trust followed by personal growth & well being among team members.

➤ Furthermore, the study analyzes that cross-functional competencies enables the virtual leaders to conscientiously assess group dynamics and make adaptations based on the findings they gain through observation, listening and assessment. This in turn results in increased degree of Personal Growth & Well Being and effective capacity utilization among team members for effective virtual team functioning.

Managerial Implications

Multinationals and their supply chains have been heavily disrupted by the COVID 19 pandemic, with human resources facing adverse impacts. The findings extracted from the current study may prove to be particularly beneficial in the formulation and

implementation of various interventions and training programmes to ensure a human centered recovery. The MNC'S will get an idea on how to assist the virtual team leaders in developing their core competencies for effectively managing the virtual teams. Human Resource Professionals should understand the problems that deviate the virtual teams from achieving their goals effectively. This understanding will enable the managers to formulate suitable strategies to select and develop the extracted leadership competencies resulting into increased virtual team effectiveness. This would enable the organization in formulating best practices for developing suitable behavior in virtual work environment. This will further benefit the multinational organizations in achieving their strategic goals and objectives on time which in turn results in the attainment of overall vision and mission.

Conclusion

The study was conducted to investigate the relationship between leadership competencies and virtual team effectiveness. The factors extracted by applying exploratory factor analyses for leadership competencies were labeled as *Transformational Competencies, Strategic Competencies, Socio-Economic Competencies and Cross Functional Competencies.* Similarly, for Virtual Team Effectiveness (VTE) in selected MNC's five latent factors have been extracted and named as *Degree of Goal Clarity, Degree of Interdependence, Degree of Cohesion & Trust, Degree of Personal Growth & Well Being of team members and Degree of Effective Capacity Utilization.* Further, the results of regression analysis showed that leadership competencies have significant impact on virtual team effectiveness of MNC's.

The study depicts that suitable competencies possessed by the team leader significantly increases the goal clarity, cohesion & trust among the virtual team members. Furthermore, it encourages personal growth & well being followed by participative management in the organization.

The findings of the study hold relevant to the current pandemic as well where due to COVID protocols MNC's are opting for Work From Home culture for the safety and well being of their employees. Under such situation, the role of virtual leadership competencies in managing virtual teams becomes all the more significant. The results offer that the presence of suitable leadership skills foster's the ability to create closer interpersonal relationships among members in the absence of physical interaction. This in turn results into timely execution and implementation of business strategies.

Limitations and Scope for future research

The study is limited in nature because other factors contributing to virtual team effectiveness could not be measured. Small sample size was also the limitation due to which results of the study cannot be generalized. Studies which larger sample size from diverse cultures, regions and nationalities should be conducted in future to identify the role of leadership competencies in the effectiveness of cross cultural virtual teams.

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