
RESEARCH ARTICLE

An exploration of the moderating effect of motivation on the relationship between work satisfaction and utilization of virtual team effectiveness attributes: A mixed methods study

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Abstract. A unique challenge for organizations is in leading diverse, dispersed teams whose members are motivated to work independently, but are willing to collaborate. The purpose of this study was to gain an understanding of how nuanced variations in motivational patterns influences the relationship between work satisfaction and virtual team effectiveness. A sequential, mixed methods design was used to analyze and explain the moderating effects of motivational orientation on this relationship. In the first, quantitative phase, participating virtual team members completed an online survey with items comprising the five motivation source scales from the Motivation Sources Inventory, work satisfaction, and eleven variables measuring utilization of virtual team effectiveness attributes from the Virtual Teams Survey. Seven hypotheses were tested, with support found for three of the hypotheses. Work satisfaction and utilization of the virtual team effectiveness attributes were found to be positively correlated. Support was also found for hypotheses that the relationship between work satisfaction and utilization of the virtual team effectiveness attributes will be stronger for virtual team members (VTMs) with low self-concept external and / or moderate or high goal internalization patterns. In the second, qualitative phase, follow-up interviews were conducted to support and provide rationale for the quantitative results. Qualitative analysis of interviews revealed three major themes focused on concerns regarding team leadership, organizational support, and technology. Viewed in context with the quantitative results, the themes suggest that work satisfaction may be improved for most VTMs, regardless of motivation pattern, by strengthening leadership, aligning rewards with goals, and enhancing the technology used for team communication.

Keywords: virtual team effectiveness, leadership, motivation

Introduction

A unique challenge for virtual team leaders is leading individuals who have different needs and wants such that they are motivated to work independently, but at the same time are willing to collaborate and focus on accomplishing team goals. Despite much research on the leadership of virtual teams and decades of utilization of virtual teams in the private sector, virtual team project failure rates may persist as high as 70% (Mackey, 2012). Part of the challenge is that virtual team leaders must be more deliberate in their verbal communications due to the lack of non-verbal communications between leader and virtual team members (VTMs). Not only must virtual team leaders be more deliberate in their verbal communications, they must also do more listening, coaching, and facilitating than leaders of traditional teams (Conway, Jennings, Raschke, Witort, & Beyerlein, 2008).

Perhaps the greatest challenge faced by virtual team leaders is knowing how to motivate VTMs who are functionally, cognitively, and culturally different. They must create a work environment that makes it possible for VTMs to satisfy their unique work related needs. Virtual team leaders need to not only understand how motivation influences an individual's

work satisfaction in operationalizing virtual team effectiveness strategies, but they need to know what characteristics of work that VTMs find enjoyable. It may be important for VTMs to enjoy their work and to be self-motivated, because of the limited number of face-to-face team interactions. Additionally, participation in planning and decision-making may lead to goal commitment by VTMs, while the receipt of positive performance feedback from team leaders may increase team member self-confidence (Geister, Konradt & Hertel, 2006). Finally, a sense of empowerment combined with skills development opportunities may improve virtual team performance as team members become less dependent upon team leaders (Kirkman, Rosen, Tesluk, & Gibson, 2004).

This study has a theoretical foundation based upon the metatheory proposed by Leonard et al. (1999), which is widely accepted as a work motivation theory, and includes five work motivation sources, intrinsic process, self-concept internal, self-concept external, instrumental, and goal internalization. Intrinsic process motivation can be distinguished from other sources of work motivation by the pleasure one receives in working (Leonard et al., 1999). Self-concept internal motivation is the internal drive to act or behave in ways that are consistent with one's traits, competencies, and values (Leonard et al., 1999). Self-concept external motivation arises from the external feedback one receives from others, helping to define one's self-concept by reinforcing traits, competencies, and values (Leonard et al., 1999). Instrumental motivation arises from the perceived potential for earning rewards that are offered in return for achieving desired results (Leonard et al., 1999). Goal internalization arises from a need to pursue a cause for which one is committed to achieve. Strong ideals and beliefs drive this motivational source (Leonard et al., 1999).

It is possible that individuals with certain motivation patterns are more satisfied working in a virtual team environment than are individuals with other motivation patterns. Likewise, satisfaction from operationalizing virtual team effectiveness strategies may vary depending upon the levels of the five sources of individual work motivation and the levels of utilization of the various virtual team effectiveness attributes. This may partially explain why one may be motivated in one work setting but not another. However, assuming utilization of virtual team effectiveness attributes leads to increased job satisfaction, the first hypothesis of this study was:

H1: A positive relationship exists between work satisfaction and utilization of virtual team effectiveness attributes.

Assuming a positive bias towards motivation patterns with high levels of self-concept internal motivation, a second hypothesis regarding the VTM's work satisfaction, motivation, and utilization of virtual team effectiveness attributes was:

H2: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with moderate or high levels of self-concept internal motivation relative to other sources of motivation.

One might expect that a VTM possessing a high level of self-concept external motivation relative to other sources of motivation would not experience a high level of satisfaction from virtual team work. This is because virtual teams often lack organizational visibility. In addition, this VTM may resist the use of collaborative tools and technologies as a substitute for face-to-face interaction (Lebec & Luft, 2007).

However, it is difficult to predict whether a VTM who has low levels of self-concept external motivation relative to other sources of motivation will experience higher work satisfaction. If other sources of motivation are also low, e.g. when someone who is not a self-starter, avoids accountability, or dislikes having to achieve goals, then satisfaction may just be low. However, assuming a positive bias towards motivation patterns with low levels of self-concept external motivation, the third hypothesis was:

H3: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with low self-concept external motivation relative to other sources of motivation.

It is conceivable that success in a virtual environment requires at least a moderate level of goal internalization relative to other sources of motivation. VTMs who have moderate or high goal internalization may like the independence and sense of freedom that virtual team work promotes in allowing them to focus on achieving goals. In addition, a VTM possessing a high level of goal internalization motivation might favor the utilization of tools and technologies which enhance productivity. Assuming a positive bias towards motivation patterns with high levels of goal internalization, Hypothesis 4 was:

H4: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with moderate or high levels of goal internalization motivation relative to other sources of motivation.

A fifth hypothesis, assuming a positive bias towards motivation patterns with high level of Intrinsic Process motivation was:

H5: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with moderate or high levels of intrinsic process motivation relative to other sources of motivation.

A VTM who possesses a high level of instrumental motivation relative to other sources of motivation might be expected to favor a collaborative leadership style that permits input into the setting of goals and rewards (Lawler, 2003). However, a VTM who is not committed to team goals may resist the use of collaborative tools and job characteristics. In highly individualistic societies such as the United States, there may be less commitment to the team if other team members are viewed as competing for contingent rewards. In collectivist societies, such as in China or Japan, it is more natural for individuals to collaborate in team activities than is the case with more individualistic societies (Hofstede & Hofstede, 2005). However, Mawanda (2013) concluded that work satisfaction is positively impacted by receipt of contingent rewards. Therefore, assuming a positive bias towards motivation patterns having high levels of instrumental motivation, Hypothesis 6 was:

H6: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with moderate or high levels of instrumental motivation relative to other sources of motivation.

A seventh and final hypothesis was based upon research by Purvanova and Bono (2009) who found that transformational leadership which appeals to VTM intrinsic needs will be more effective than transactional leadership which offers extrinsic rewards in exchange for targeted behaviors. Assuming a positive bias towards motivation patterns with high levels of intrinsic motivation, Hypothesis 7 was:

H7: The relationship between work satisfaction and utilization of virtual team effectiveness attributes will be stronger for VTMs with high levels of intrinsic motivation (self-concept internal, intrinsic process, and goal internalization motivation) relative to other sources of motivation.

Methods

This research, performed at the University of Nebraska-Lincoln, Lincoln, NE, received Institutional Review Board approval (IRB Number 20120812667 EX) from the University of Nebraska-Lincoln Office of Research on August 8, 2012. The explanatory sequential mixed methods design utilized had an overall quantitative priority (QUAN=> qual = Explain). This

design involved collecting quantitative data first, and then enriching the quantitative results with in-depth qualitative data obtained via recorded telephone interviews.

Quantitative methods

In the first quantitative phase, the guiding research question was: *Does work motivation influence an individual's level of satisfaction in operationalizing virtual team effectiveness strategies?*

Data were collected using an online survey targeting LinkedIn professional social media groups whose members work on virtual teams. In the first part of the survey, participants responded to 30 items from the Motivation Sources Inventory which measure the intensity of five sources of work motivation. Participants rated their level of agreement to structured statements regarding work preferences on a six-point Likert scale, with values ranging from "Entirely Agree" to "Entirely Disagree." Participants then responded to 65 items from Lurey's (1998) Virtual Teams Survey, focusing on utilization of virtual team effectiveness attributes and work satisfaction. These items were rated on a five-point Likert Scale, with values ranging from "Strongly agree" to "Not Applicable".

Data analysis

In testing the hypotheses in this study, it was assumed that each of the predictor variables contributed to work satisfaction. However, it was not known whether each of the predictor variables was statistically significant in predicting work satisfaction. The statistical analysis procedures utilized were two-tailed Pearson correlation analysis, used in testing H1, and multiple regression with backward selection, used in testing the remaining hypotheses.

Absent a clear empirical model, the use of backward elimination in regression analysis may yield better results than stepwise variable selection (Li, 2012). The variables which were found to contribute least to the model were eliminated first; that is, the variable with the largest p-value was removed and the resulting model was evaluated for its fit in explaining the variability in the data. A conservative approach was used in which the least significant interaction terms involving the motivation pattern indicator were incrementally eliminated. Once the adjusted R-squared value was maximized, no additional interaction terms were eliminated. The model which included all of the predictor variables and which best fit the data was then selected to identify significant predictor variables and motivation pattern interactions.

Measures

Two instruments were utilized in measuring motivation, satisfaction, and utilization of virtual team effectiveness attributes (predictor variables):

Motivation Sources Inventory. Work motivation measurements were used to categorize participants into dichotomous variables. Participants who measured moderate or high in one motivation source relative to the other four motivation sources were classified as moderate/high. Likewise, participants who measured low in one motivation source relative to the other four motivation sources were classified as low. The five sources of work motivation measured by the Motivation Sources Inventory are intrinsic process, self-concept internal motivation, goal internalization, self-concept external motivation, and instrumental motivation. Intrinsic process motivation results from the pleasure experienced from work activities. Self-concept internal motivation refers to the internal drive to act or behave in ways that are consistent with one's traits, competencies, and values. Goal internalization arises from a need to pursue a cause that one believes in, consistent with one's values. Self-concept external motivation arises from the external feedback one receives from others, helping to define one's self-concept by reinforcing traits, competencies, and values. Instrumental motivation arises from incentives or contingent rewards that are offered in return for achieving desired results.

In addition to the five motivation source measures, a composite measure was used to group participants with moderate/high versus low intrinsic motivation patterns. Intrinsic motivation which comes from inside an individual rather than from another person or any extrinsic rewards was measured by computing the mean of the intrinsic process, self-concept internal, and goal internalization component measures. This intrinsic component measure was then compared with the computed mean of the participant's extrinsic self-concept external and instrumental component measures. Differences in which the mean intrinsic measure was equal to or exceeded the mean extrinsic measure indicated moderate/high intrinsic motivation.

In analyzing reliabilities of the Motivation Sources Inventory scales, Cronbach's Alpha values based on standardized items were found to range from 0.70 to 0.79 and were comparable to those reported by Barbuto (2005) for the five sources of motivation. The scales were considered to be reliable (Nunnally & Bernstein, 1994). Because 100% of the observations were valid, the instrument's scales were deemed valid.

Virtual Teams Survey. Utilization of virtual team effectiveness attributes which are considered to be important predictors of virtual team effectiveness was measured by the Virtual Teams Survey. The eleven virtual team effectiveness attributes in the Virtual Team Survey are selection procedures, education system, team process, internal team leadership, executive leadership, job characteristics, design process, communication patterns, team member relations, tool and technologies, and reward system. The Virtual Teams Survey was also used to measure participant work satisfaction by measuring participants' satisfaction from utilizing the eleven virtual team effectiveness attributes. Although the Virtual Teams Survey attempts to measure perceptions about utilization of virtual team effectiveness attributes, team performance, and work satisfaction, this study did not attempt to measure individual perceptions of team performance which may be unreliable.

In analyzing reliabilities of the Virtual Teams Survey scales, Cronbach's Alpha values based on standardized items were found to range from 0.403 to 0.902 for the twelve scales, with nine scale values above 0.70. The reliabilities were comparable to those reported by Lurey and Raisinghani (2000), except for those associated with Utilization of Communication Patterns and Utilization of Reward Systems. As noted by Lurey and Raisinghani (2000), the reliabilities of these two predictors were diminished by the inclusion of only two scale items in measurements. With those two exceptions, the values computed for Cronbach's Alpha and the percentages of valid observations (100%) were sufficiently high to conclude the instrument's scales were valid.

Qualitative methods

The qualitative phase was conducted to clarify and explain the results from the quantitative phase of this study using a pragmatist theoretical framework. A realist ethnographic design was utilized to enable the researcher to gain an understanding of VTM experiences while making an effort to not introduce researcher bias in interpreting and reporting participant responses. Because participants were geographically dispersed; telephone interviews using an IRB approved interview protocol were more feasible than conducting face-to-face interviews. The qualitative research questions were:

- a. *What made virtual team work experiences satisfying to participants with a similar pattern of work motivation? What human needs were satisfied?*
- b. *What made virtual team work experiences less than satisfying for participants with similar patterns of work motivation? What human needs were unfulfilled?*
- c. *In what ways might virtual team work be improved?*

Data analysis

Transcribed text obtained from interviews was grouped into meaning units followed by coding into themes using steps outlined by Creswell (2009). Validation of the qualitative data followed those outlined by Creswell and Miller (2000) and included member checking; peer

review of the research process; an external audit by two experts in qualitative research methods; researcher reflexivity of assumptions, beliefs, and biases; and thick, rich descriptions. Qualitative data were then integrated, and themes were analyzed in context with quantitative results. By relating qualitative themes to quantitative results, a better understanding of the quantitative results was obtained to explain hypothesized relationships and answer the mixed methods research questions. The mixed methods research questions were:

- a. *What experiences of VTMs, given each member's pattern of work motivation, explain the correlations between work satisfaction and utilization of virtual team effectiveness attributes?*
- b. *What are the implications of individual VTM experiences on team member selection practices, relating work satisfaction, motivation, and utilization of virtual team effectiveness attributes?*

Results

Phase 1: Quantitative results

Data collection

A total of 116 surveys were completed by participants from 17 countries as shown in Table 1. To ensure consistency in the quality of data subjected to multiple regression analysis, a decision was made to exclude from analysis 16 surveys which contained "Not Applicable" responses to all items in one or more scales. A complete dataset (n=100) was used in assessing reliability and validity of instruments and in quantitative analysis using Pearson correlation and multiple regression with backward selection. Miscellaneous demographic information on participants is provided in Table 2.

Table 1: *Geographic Representation of Survey Participants*

Geographic Representation – 116 Participants from 17 Countries)							
United States ^a	97	Finland	1	Ireland	1	Switzerland ^a	1
United Kingdom ^a	2	Norway	1	Japan ^a	1	Venezuela ^a	1
Germany ^a	3	Canada ^a	1	Romania	1		
Brazil	1	Czech Republic	1	Saudi Arabia	1		
Denmark	1	Indonesia	1	Spain ^a	1		

^a. Represented in qualitative interviews in Phase 2 of the study.

Table 2: *Miscellaneous Participant Demographic Information (n=100)*

Demographic Factor	Mean Years	Range in Years
University Education	5.75	0 – 23
Work Experience	12	1-34 ^a
Current Employment	5	0-30

^a. Includes 40 participants employed 14 years or more and 60 participants employed less than 14 years.

Coding of sample

Responses to the Virtual Teams Survey were grouped and coded by motivation pattern based upon the participants' scored motivation source values, as follows:

- a. Self-concept internal motivation – coding used to test Hypothesis 2:
Sample included 62 participants with low levels of self-concept internal motivation and 38 participants with moderate or high levels of self-concept internal motivation.

- b. Self-concept external motivation – coding used to test Hypothesis 3:
Sample included 35 participants with low levels of self-concept external motivation and 65 participants with moderate or high levels of self-concept external motivation.
- c. Goal internalization - coding used to test Hypothesis 4:
Sample included 49 participants with low levels of goal internalization and 51 participants with moderate or high levels of goal internalization.
- d. Intrinsic process motivation - coding used to test Hypothesis 5:
Sample included 34 participants with low levels of intrinsic process motivation and 66 participants with moderate or high levels of intrinsic process motivation.
- e. Instrumental motivation - coding used to test Hypothesis 6:
Sample included 25 participants with low levels of instrumental motivation and 75 participants with moderate or high levels of instrumental motivation.
- f. Intrinsic motivation- coding used to test Hypothesis 7:
Sample included 71 participants with low levels of intrinsic motivation and 29 participants with moderate or high levels of intrinsic motivation.

Correlation and regression analysis

Pearson correlations between the dependent variable, satisfaction, and the virtual team effectiveness variables were analyzed using the full sample (n=100) of valid data collected. For the purpose of assessing multicollinearity of predictor variables, a correlation coefficient threshold of 0.8 was used.

Multiple regression with backward elimination was utilized to determine how motivation influences work satisfaction in utilizing the virtual team effectiveness attributes. The moderating influence of each motivation pattern scheme on the relationship between the predictor variables and the dependent variable, assumed to be continuous, was investigated by using indicator variables. Before utilizing multiple regression analysis, however, several assumptions about the data collected were validated to ensure the reasonableness of conclusions.

The assumption of non-multicollinearity of predictor variables was confirmed through assessment of the Pearson correlation coefficients, which were below the 0.8 threshold (recommended, for example, by Licht, 1995; Cooper & Schindler, 2003; and Rubin, 2013). Also, normality of plotted residuals was assessed to ensure the fit of the model to the data (Frost, 2013). Linearity of the relationship between predictor variables and the dependent variable was evaluated to ensure that valid conclusions could be made about the regression model (Frost, 2013). Regression residuals were evaluated for homoscedasticity to ensure predictive value of the independent variables in the model (Frost, 2013).

Hypothesis testing

The results from testing Hypotheses 1-7 are detailed below.

Hypothesis 1

A two-tailed Pearson correlation analysis was run to demonstrate that a positive relationship exists between work satisfaction and the predictor variables. The results are shown in Table 3.

Table 3: Descriptive Statistics and Two-tailed Pearson Correlation Matrix for Work Satisfaction and Utilization of Virtual Team Effectiveness Attributes.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Work Satisfaction	9.25	3.02	(.89)											
2. Selection Proc.	6.97	1.94	.56*	(.59)										
3. Educ. System	13.83	3.49	.36*	.28*	(.75)									
4. Int. Team Lead.	9.99	3.18	.64*	.59*	.46*	(.87)								
5. Design Process	18.05	5.51	.48*	.48*	.41*	.43*	(.82)							
6. Team Process	24.19	5.77	.64*	.55*	.58*	.71*	.58*	(.85)						
7. Comm Patterns	4.31	1.28	.56*	.45*	.42*	.57*	.45*	.71*	(.54)					
8. Team Mem. Rel.	20.39	4.69	.60*	.61*	.49*	.70*	.61*	.78*	.54*	(.76)				
9. Tools & Tech.	5.95	1.83	.64*	.56*	.42*	.57*	.50*	.63*	.58*	.49*	(.80)			
10. Job Characteristic	6.93	2.39	.61*	.50*	.42*	.52*	.54*	.68*	.55*	.54*	.60*	(.86)		
11. Exec Leadership	14.78	4.84	.65*	.59*	.44*	.71*	.48*	.67*	.48*	.64*	.67*	.62*	(.90)	
12. Reward System	9.25	1.42	.37*	.38*	.55*	.54*	.39*	.53*	.45*	.52*	.40*	.42*	.58*	(.41)

Note. Reliability coefficient estimates (α) are in parentheses along diagonals. * $p < .01$ (two-tailed test)

All the predictor variables were positively correlated with work satisfaction, and several were highly correlated with one another. Because utilization of each of the predictor variables was positively correlated with work satisfaction, Hypothesis 1 was supported. However, as shown in Tables 4 and 5 below, running multiple regression revealed that none of the predictor variables was statistically significant in predicting work satisfaction. This suggested that other factors besides the predictor variables contributed to work satisfaction.

Table 4: Analysis of Variance ($n=100$) –Without Considering Moderating Variables

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	21.676	11	1.971	12.034	.000
Residual	14.410	88	.164		
Total	36.086	99			

Note: $R^2 = .601$; Adjusted $R^2 = .551$; Std. Error of the Estimate = 0.4047

Table 5: Summary of Multiple Regression Analysis for Variables Predicting Work Satisfaction

Utilization Predictor Variable	B	SE B	β	t	Sig.
Constant	.029	.213		.134	.894
Design Process	.013	.081	.015	.161	.872
Job Characteristics	.157	.103	.155	1.525	.131
Selection Procedures	.099	.090	.104	1.091	.278
Team Member Relations	.140	.151	.120	.927	.356
Team Process	.004	.171	.003	.023	.982
Internal Team Leadership	.190	.107	.201	1.772	.080
Education System	-.030	.079	-.034	-.374	.709
Reward System	-.095	.080	-.112	-1.193	.236
Executive Leadership	.140	.108	.159	1.295	.199
Tools and Technologies	.182	.104	.186	1.749	.084
Communication Patterns	.116	.095	.125	1.223	.225

Testing of hypothesis 2 – 7

Multiple regression analyses using backward elimination was utilized to identify the models that best explain the relationships between work satisfaction, predictor variables, and the applicable motivation patterns.

Hypothesis 2

Multiple regression analysis with backward elimination was run with the eleven predictor variables, a dummy variable used to group participants possessing a moderate or high self-concept internal motivation pattern, and interactions between

the predictor variables and the dummy variable. The F-statistic of 5.393 and the Adjusted R-Squared value of .505 indicated a moderately strong relationship between work satisfaction and the predictor variables with 50.5% of the variability in data explained. However, none of the predictor variables or interaction terms in the model was statistically significant in predicting VTM work satisfaction in the initial regression step.

Even after iteratively removing the least significant interactions to maximize the Adjusted R-Squared value, no predictor variables or interaction terms were statistically significant in predicting work satisfaction. While the F-statistic improved to 11.050, the Adjusted R-Squared improved to only .549. Because none of the predictor variables was statistically significant in predicting work satisfaction (see Tables 6 and 7), Hypothesis 2 was not supported.

Table 6: *Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/High Self-concept Internal (SCI) Pattern*

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	21.790	12	1.816	11.050	.000
Residual	14.296	87	.164		
Total	36.086	99			

Note: $R^2 = .604$; Adjusted $R^2 = .549$; Std. Error of the Estimate = 0.4054

Table 7: *Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/High Self-concept Internal (SCI) Pattern*

Utilization Predictor Variable	B	SE B	β	t	Sig.
Constant	.060	.217		.277	.783
Design Process	.022	.081	.026	.273	.785
Job Characteristics	.168	.104	.167	1.618	.109
Selection Procedures	.101	.091	.106	1.111	.270
Team Member Relations	.100	.159	.086	.629	.531
Team Process	.028	.174	.024	.162	.872
Internal Team Leadership	.194	.108	.205	1.803	.075
Education System	-.035	.080	-.041	-.444	.658
Reward System	-.087	.080	-.103	-1.087	.280
Executive Leadership	.142	.108	.161	1.314	.192
Tools and Technologies	.166	.106	.169	1.557	.123
Communication Patterns	.120	.095	.128	1.253	.214
Moderate/high SCI Indicator	-.076	.091	-.061	-.832	.408

Hypothesis 3

Multiple regression was run with the eleven predictor variables, a dummy variable used to group participants possessing a low self-concept external motivation pattern, and interactions between the predictor variables and the dummy variable. The F-statistic of 6.116 and the Adjusted R-Squared value of .543 indicate a moderately strong relationship between work satisfaction, the predictor variables, and self-concept external motivation, with 54.3% of the variability in data explained. In addition, none of the predictor variables or interaction terms was statistically significant in predicting VTM work satisfaction.

With the only statistically significant term in the model being the interaction of the low self-concept external motivation pattern with Internal Team Leadership, and with an Adjusted R-Squared of .543, multiple regression was run iteratively in steps until the adjusted R-Squared value was maximized. By eliminating the least significant motivation pattern interactions with utilization of Executive Leadership, Team Process, Team Member Relations, Tools and Technologies, Job Characteristics,

Selection Procedures, Design Process, and Reward System, the F-statistic and Adjusted R-Squared values improved to 9.639 and .567, respectively.

The results shown in Tables 8 and 9 indicated that utilization of Tools and Technologies and the Internal Team Leadership interaction were significant in predicting work satisfaction for low self-concept external motivation patterns. For VTMs assigned to the moderate or high self-concept external motivation pattern, a 0.22 unit increase in work satisfaction was predicted for every one unit increase in utilization of Tools and Technologies. For VTMs with a low self-concept external motivation pattern, a 0.38 unit increase in work satisfaction is predicted for every one unit increase in Internal Team Leadership.

Because the predicted increase in work satisfaction from the Internal Team Leadership interaction is high for VTMs assigned to the low self-concept external motivation pattern, Hypothesis 3 is supported. However, a more profound conclusion is that through utilization of high levels of Tools and Technologies and Internal Team Leadership, a high level of work satisfaction can be obtained for most VTMs.

Table 8: *Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Low Self-concept External (SCE) Pattern*

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	22.825	15	1.522	9.639	.000
Residual	13.261	84	.158		
Total	36.086	99			

Note: $R^2 = .633$; Adjusted $R^2 = .567$; Std. Error of the Estimate = 0.3973

Table 9: *Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Low Self-concept External (SCE) Pattern*

Utilization Predictor Variable	B	SE B	β	t	Sig.
Constant	.106	.252		.422	.674
Design Process	-.011	.082	-.012	-.130	.897
Job Characteristics	.149	.102	.148	1.453	.150
Selection Procedures	.112	.090	.117	1.239	.219
Team Member Relations	.227	.153	.194	1.478	.143
Team Process	.043	.176	.037	.243	.808
Internal Team Leadership	.004	.140	.004	.030	.976
Education System	-.085	.098	-.097	-.859	.393
Reward System	-.077	.079	-.091	-.974	.333
Executive Leadership	.089	.109	.101	.818	.416
Tools and Technologies	.220	.105	.225	2.087	.040
Communication Patterns	.197	.107	.211	1.849	.068
Low SCE Indicator	-.606	.415	-.481	-1.460	.148
Education System Pattern Interaction	.142	.149	.325	.951	.344
Internal Team Leadership Pattern Interaction	.372	.178	.645	2.093	.039
Communication Patterns Pattern Interaction	-.234	.178	-.417	-1.319	.191

Hypothesis 4

Multiple regression was run with the eleven predictor variables, a dummy variable used to group participants possessing a moderate or high goal internalization motivation pattern, and interactions between the predictor variables and the dummy variable. The F-statistic of 7.068 and the adjusted R-Squared value of .585 indicate that goal internalization may be an important moderator of the relationship between work satisfaction and utilization of the virtual team effectiveness attributes. None of the predictor variables or interaction terms was statistically significant after the initial regression step; however, a significant positive effect for the moderate or high goal internalization pattern was reported.

Continuing with additional regression steps yielded statistically significant results, as shown in Tables 10 and 11. The F-statistic value increased to 9.481, while the Adjusted R-Squared was maximized at .607, by eliminating insignificant pattern interactions with utilization of Internal Team Leadership, Team Member Relations, Design Process, Reward System, and Tools and Technologies. Utilization of Selection Procedures and Tools and Technologies were significant in the final model, as was the moderate or high goal internalization pattern.

Because the moderate or high goal internalization pattern was significant with a large positive effect, Hypothesis 4 was supported. One may infer that VTMs assigned to the moderate or high goal internalization pattern experience heightened satisfaction from achievement of goals. For these VTMs, a 0.98 unit increase in work satisfaction was predicted at mean levels of utilization of predictor variables with pattern interactions. For VTMs possessing low levels of goal internalization relative to other sources of motivation, it was predicted that a one unit increase in utilization of Selection Procedures will produce a 0.28 unit increase in work satisfaction. In addition, a one unit increase in utilization of Tools and Technologies was predicted to produce 0.24 unit increase in work satisfaction.

Table 10: *Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Goal Internalization (GI) Pattern*

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	24.471	18	1.360	9.481	.000
Residual	11.615	81	.143		
Total	36.086	99			

Note: $R^2 = .678$; Adjusted $R^2 = .607$; Std. Error of the Estimate = 0.3787

Table 11: *Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Goal Internalization (GI) Pattern*

Utilization Predictor Variable	B	SE B	B	t	Sig.
Constant	-.485	.293		-1.655	.102
Design Process	.011	.077	.013	.149	.882
Job Characteristics	.019	.156	.019	.125	.901
Selection Procedures	.278	.136	.292	2.038	.045
Team Member Relations	.150	.142	.128	1.052	.296
Team Process	.278	.245	.240	1.133	.261
Internal Team Leadership	.156	.106	.165	1.467	.146
Education System	.117	.125	.134	.930	.355
Reward System	-.128	.077	-.151	-1.665	.100
Executive Leadership	.159	.131	.180	1.217	.227
Tools and Technologies	.242	.104	.247	2.319	.023
Communication Patterns	-.161	.159	-.173	-1.016	.313
Moderate/High GI Indicator	.952	.409	.792	2.329	.022
Job Characteristics Pattern Interaction	.365	.207	.622	1.765	.081
Selection Procedures Pattern Interaction	-.271	.168	-.565	-1.613	.111
Team Process Pattern Interaction	-.452	.296	-.889	-1.526	.131
Education System Pattern Interaction	-.209	.149	-.529	-1.401	.165
Executive Leadership Pattern Interaction	-.149	.181	-.293	-.822	.413
Communication Patterns Pattern Interaction	.359	.194	.697	1.848	.068

Hypothesis 5

Multiple regression was run with the eleven predictor variables, a dummy variable used to group participants possessing a moderate or high intrinsic process motivation pattern, and interactions between the predictor variables and the dummy variable. Based upon the F-statistic value of 5.575 and the Adjusted R-Squared value of .515, intrinsic process motivation appears to play a relatively minor role in moderating the

relationship between work satisfaction and utilization of virtual team effectiveness attributes. In this first step no variables or interaction terms were statistically significant

Continuing with additional iterations of regression steps and removing the least significant interaction terms in steps, the Adjusted R-Squared was maximized at .551; additionally the F-statistic value increased to 8.590. In the resulting model, shown in Tables 12 and 13, utilization of Internal Team Leadership was the only predictor variable that was statistically significant. A 0.22 unit increase in work satisfaction was predicted for every one unit increase in utilization of Internal Team Leadership for VTMs assigned to the low intrinsic process motivation pattern. No significant interaction effects were found for VTMs assigned to the moderate or high intrinsic process motivation pattern. Therefore, Hypothesis 5 was not supported.

Table 12: Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Intrinsic Process (IP) Pattern

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	22.500	16	1.406	8.590	.000
Residual	13.587	83	.164		
Total	36.086	99			

Note: R² = .623; Adjusted R² = .551; Std. Error of the Estimate = 0.4046

Table 13: Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Intrinsic Process (IP) Pattern

Utilization Predictor Variable	B	SE B	β	t	Sig.
Constant	.461	.504		.915	.363
Design Process	.031	.081	.036	.380	.705
Job Characteristics	.324	.178	.321	1.824	.072
Selection Procedures	.116	.095	.122	1.225	.224
Team Member Relations	-.173	.267	-.148	-.649	.518
Team Process	-.033	.173	-.028	-.189	.851
Internal Team Leadership	.220	.110	.231	1.998	.049
Education System	.006	.131	.007	.044	.965
Reward System	-.056	.086	-.065	-.647	.520
Executive Leadership	.123	.112	.139	1.099	.275
Tools and Technologies	.151	.106	.155	1.430	.156
Communication Patterns	.004	.134	.004	.027	.979
Moderate/ High IP Indicator	-.471	.560	-.372	-.841	.402
Job Characteristics Pattern Interaction	-.261	.208	-.415	-1.258	.212
Team Member Relations Pattern Interaction	.425	.283	.846	1.501	.137
Communication Patterns Pattern Interaction	.196	.171	.381	1.148	.254
Education System Pattern Interaction	-.144	.156	-.342	-.922	.359

Hypothesis 6

Multiple regression was run with the eleven predictor variables, a dummy variable used to group participants possessing a moderate or high instrumental motivation pattern, and interactions between the predictor variables and the dummy variable. Based upon the moderately high F-statistic of 7.126 and the Adjusted R-Squared of .587, instrumental motivation may be important in moderating the relationship between work satisfaction and utilization of virtual team effectiveness attributes. However, the only statistically significant predictors were the interactions of Team Process and Internal Team Leadership with the moderate or high instrumental motivation pattern.

Continuing with additional iterations of regression in steps resulted in a model with an F-statistic of 8.937 and an Adjusted R-Squared of .604. In this regression

model, shown in Tables 14 and 15, utilization of Job Characteristics, Team Process, and Tools and Technologies were statistically significant, as were the interactions between instrumental motivation and utilization of Team Process and Internal Team Leadership. For VTMs assigned to the low instrumental motivation pattern, a one unit increase in utilization of Team Process resulted in a predicted .84 unit increase in work satisfaction. In addition a .40 unit increase in work satisfaction is predicted from utilization of one unit of Job Characteristics. While a .22 unit increase in work satisfaction was predicted for every unit of Tools and Technologies utilized, this is not considered to be a strong effect. No other interactions were significant in predicting work satisfaction for VTMs assigned the low instrumental motivation pattern.

The motivation pattern interactions with utilization of Internal Team Leadership and utilization of Team Process were the only variables significant in predicting work satisfaction for VTMs assigned to the moderate or high instrumental motivation pattern. The interaction of instrumental motivation with utilization of Internal Team Leadership resulted in a predicted .29 increase in work satisfaction for every one unit increase in Internal Team Leadership. This increase in work satisfaction may be partially offset, however, due to the interaction of instrumental motivation with utilization of Team Process, which results in a predicted 0.16 decrease in work satisfaction.

Utilization of a Reward System did not have a significant effect on work satisfaction. However, results reported by other researchers have been mixed in terms of the measured satisfaction that VTMs attributed to the offering of contingent rewards. Mawanda (2013), in a study focused on the motivational effects of transformational leadership and contingent rewards on VTM work satisfaction, concluded that contingent rewards positively impacted work satisfaction. However, in surveying 169 virtual community members, Chen, Chang, and Liu (2012) reported that incentives do not positively affect work satisfaction.

Table 14: Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Instrumental Pattern

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	24.529	19	1.291	8.937	.000
Residual	11.557	80	.144		
Total	36.086	99			

Note: R² = .680; Adjusted R² = .604; Std. Error of the Estimate = 0.3801

Table 15: Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Instrumental Pattern

Utilization Predictor Variable	B	SE B	β	T	Sig.
Constant	.327	.415		.788	.433
Design Process	.001	.077	.001	.016	.987
Job Characteristics	.403	.186	.399	2.162	.034
Selection Procedures	.167	.088	.175	1.896	.062
Team Member Relations	-.266	.267	-.228	-.999	.321
Team Process	.838	.348	.725	2.410	.018
Internal Team Leadership	-.387	.242	-.408	-1.602	.113
Education System	-.255	.155	-.293	-1.648	.103
Reward System	-.260	.146	-.306	-1.780	.079
Executive Leadership	.025	.107	.028	.229	.819
Tools and Technologies	.215	.105	.220	2.042	.044
Communication Patterns	.360	.203	.386	1.777	.079
Moderate/ High Instrumental Indicator	-.425	.478	-.310	-.890	.376
Job Characteristics Pattern Interaction	-.207	.208	-.316	-.994	.323
Team Member Relations Pattern Interaction	.538	.299	.976	1.796	.076
Team Process Pattern Interaction	-.995	.397	-1.766	-2.508	.014
Internal Team Leadership Pattern Interaction	.681	.266	1.176	2.562	.012
Rewards System Pattern Interaction	.235	.175	.478	1.346	.182
Communication Patterns Pattern Interaction	-.310	.225	-.570	-1.379	.172
Education System Pattern Interaction	.214	.181	.474	1.185	.239

A stronger relationship between work satisfaction and utilization of virtual team effectiveness attributes exists for VTMs assigned to low instrumental motivation patterns than for VTMs assigned to moderate or high instrumental motivation patterns. However, more surprising is the conclusion that utilization of a Reward System was not statistically significant in predicting work satisfaction. The results suggest that instrumental motivation moderates the relationship between work satisfaction and utilization of virtual team effectiveness attributes, but not as hypothesized. Thus, Hypothesis 6 was not supported.

Hypothesis 7

Multiple regression was run with the eleven predictor variables, a dummy variable used to group participants possessing a moderate or high intrinsic motivation pattern, and interactions between the predictor variables and the dummy variable. The F-statistic value of 6.270 and the Adjusted R-Squared value of .550 suggested that the relationship between work satisfaction and utilization of virtual team effectiveness attributes was moderated by intrinsic motivation. Utilization of Job Characteristics and Internal Team Leadership were statistically significant in predicting work satisfaction.

Continuing with additional iterations of regression in steps increased the F-statistic and the Adjusted R-Squared to 10.218 and .583, respectively. In the model shown in Tables 16 and 17, utilization of Internal Team Leadership and utilization of Job Characteristics were the only predictor variables which were statistically significant. For VTMs assigned to the low intrinsic motivation pattern, a one unit

increase in utilization of Internal Team Leadership results in a predicted 0.25 unit increase in work satisfaction. In addition, a one unit increase in utilization of Job Characteristics results in a predicted .24 unit increase in work satisfaction. For VTMs assigned to the moderate or high intrinsic motivation pattern, none of the predictor variables was significant in predicting work satisfaction. Therefore, Hypothesis 7 was not supported.

Table 16: *Analysis of Variance (n=100) – Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Intrinsic Pattern*

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	23.311	15	1.554	10.218	.000
Residual	12.776	84	.152		
Total	36.086	99			

Note: $R^2 = .646$; Adjusted $R^2 = .583$; Std. Error of the Estimate = 0.3900

Table 17: *Summary of Final Multiple Regression Analysis for Variables Predicting Work Satisfaction: Moderate/ High Intrinsic Pattern*

Utilization Predictor Variable	B	SE B	B	t	Sig.
Constant	-.021	.247		-.087	.931
Design Process	-.002	.079	-.002	-.026	.979
Job Characteristics	.244	.104	.241	2.354	.021
Selection Procedures	.183	.097	.192	1.875	.064
Team Member Relations	.312	.188	.267	1.665	.100
Team Process	-.236	.202	-.204	-1.167	.246
Internal Team Leadership	.254	.108	.267	2.346	.021
Education System	-.050	.077	-.058	-.653	.516
Reward System	-.080	.078	-.094	-1.020	.311
Executive Leadership	.105	.105	.119	.995	.323
Tools and Technologies	.142	.103	.145	1.382	.171
Communication Patterns	.109	.094	.117	1.161	.249
Moderate/ High Instrumental Indicator	.399	.413	.304	.966	.337
Selection Procedures Pattern Interaction	-.230	.206	-.435	-1.121	.266
Team Member Relations Pattern Interaction	-.453	.305	-.798	-1.487	.141
Team Process Pattern Interaction	.445	.263	.765	1.692	.094

In summary, Hypotheses 1, 3, and 4 were supported. Hypothesis 1 was supported as work satisfaction was found to be positively correlated with utilization of virtual team effectiveness attributes. However, utilization of Design Process, Reward System, and Team Member Relations did not contribute significantly to VTM work satisfaction. Hypothesis 3 was supported, as VTMs possessing low levels of self-concept external motivation relative to other sources of motivation tended to find utilization of Internal Team Leadership satisfying, without any significant negative effects. However, VTMs possessing moderate or high levels of self-concept external motivation tended to find utilization of Tools and Technologies satisfying. Hypothesis 4 was supported, as a significant positive effect was associated with the moderate or high goal internalization indicator. Participants assigned to the moderate or high goal internalization pattern tended to find virtual team work more satisfying than did participants assigned to the low goal internalization pattern. However, participants assigned to the low goal internalization pattern did tend to find utilization of Selection Procedures and Tools and Technologies satisfying.

Hypotheses 2, 5, 6, and 7 were not supported. Hypothesis 2 was not supported, as no predictor variables or interaction terms were statistically significant in predicting work satisfaction. Similarly, no significant effects were found to be associated with the moderate or high intrinsic process motivation pattern; therefore Hypothesis 5 was not supported. While a small positive effect from utilization of internal team leadership was associated with the

moderate of high instrumental motivation pattern, this effect was diminished by a negative effect from utilization of team processes. Additionally, participants assigned to the low instrumental motivation pattern tended to find utilization of Team Process, Job Characteristics and Tools and Technologies satisfying. Therefore, Hypothesis 6 was not supported. Finally, excluding the positive effects associated with goal internalization (tested in Hypothesis 4), no other effects were found to be significant for participants assigned to the moderate or high intrinsic motivation pattern. Additionally, VTMs assigned to the low intrinsic motivation pattern tended to find utilization of Internal Team Leadership and job characteristics satisfying. Therefore, Hypothesis 7 was not supported.

Phase II: Qualitative results

Data Collection

Thirty-one participants representing nine countries agreed to participate in the qualitative phase. Eight of those participants were assigned to the moderate / high intrinsic motivation pattern. Four of the eight participants assigned to the moderate / high intrinsic motivation pattern were also assigned to the moderate / high self-concept external (SCE) pattern. Eleven participants were assigned to the moderate / high self-concept internal (SCI) motivation pattern, and five of the eleven were also assigned to the moderate / high intrinsic motivation pattern. In total, seventeen participants were assigned to the moderate / high self-concept external (SCE) pattern. Twenty-four of thirty-one participants had moderate or high instrumental motivation relative to other sources of motivation. Finally, eleven participants were assigned to the moderate / high goal internalization (GI) motivation pattern.

While each motivation pattern highlighted in this study is represented by participants interviewed, there were relatively fewer numbers of participants assigned to the moderate / high self-concept internal, goal internalization, and intrinsic motivation patterns. For this reason, the themes presented below cut across the various motivation patterns, but reflect a bias towards attitudes of the more extrinsically motivated participants.

Themes

Three major themes were identified; those themes were team leadership concerns, organization support concerns, and technology concerns. There was near consensus that virtual team leaders lacked the skills or experience needed to lead effectively. Organizational support concerns included perceptions that the process for selecting VTMs was ineffective, that rewards were not aligned with goals, and that executive support was lacking. Similarly, technology was viewed as inadequate, with many commenting on the lack of telepresence to simulate a face-to-face meeting experience. A sample of interview responses illustrating qualitative themes and sub-themes is presented below.

Theme #1: Team leadership concerns. The following sub-themes were identified:

1. *Inadequate Internal Team Leadership.* Participants indicated that improvements in technical and intercultural competence of virtual team leaders is needed. The following participant response illustrates the need for improvements in developing virtual team leaders:

“There was a team leader, but he was not really acting like one. He was very passive really. Basically at the end we had to write something, but there was no leading, and not really organized at all.”

2. *Need for team building.* Participants identified a need for more emphasis on team building. The following participant response illustrates the need for more emphasis on team building:

“Now we have Generation Y, Generation Z, people who are very impatient. They have observed their parents, how they worked hard in their jobs, etcetera. Now suddenly we have people, who join the team and want to make their career within the next two weeks. They talk about themselves, you know. They know what they know, but they do not necessarily respect some of the more experienced team members.”

3. *Bias towards VTMs with high intrinsic motivation.* Participants indicated that having a high level of intrinsic motivation was needed in order to be effective working on a virtual team. The following response illustrates the bias towards VTMs who are intrinsically motivated:

“When we design a team, at least in my case, we make sure it’s the right person and it’s the right job. We somehow build on a virtual basis. From personal characteristics, it’s got to be people that’s kind of self-driven, self-motivated, kind of independent.”

Team leadership concerns are not unique to virtual teams. However, the level of dependence that members have upon technology for communications and the often prevailing presumption among executives that team leadership is somehow less important than in traditional teams are unique to virtual teams. As a result of the lack of body language present in virtual communications, the team leader must be more deliberate in communicating important information, perhaps at the risk of being repetitive, to ensure that messages are understood. Additionally, it is important for team leaders to be viewed as consistent and trustworthy in order to facilitate team collaboration.

Theme #2: Organizational support concerns. The following sub-themes were identified and grouped under the theme of Organizational support concerns:

1. *Need for improved team member selection and development.* Participants identified a need for improved team member selection and development. The following response illustrates the need for improved team member selection:

“They sent me a private email and said hey, we have a profile match for a position we’re recruiting for. I decided I would go ahead and give them a call; then I wound up telephone interviewing with two different individuals in that organization. They went ahead and hired me based on two telephone interviews.”

2. *Need for alignment of rewards with goals.* Participants identified a need for alignment of goals with rewards. The following response illustrates this need:

“I’m working in a global company, and they are cost cutting rather than providing rewards for the last year. I know that it’s changing now, but for the last year it was cost cutting and consolidation.”

3. *Need for Executive Leadership support.* Participants identified a need for improved Executive Leadership. The following sample response illustrating this need:

“My last company decided to move all of their staff in for the benefit of the Chief Admin Officer, so all IT, HR, all the management came in. I didn’t want to move to the Midwest from the West coast. It’s unfortunate that people make blind, blanket decisions like that.”

Organizational support concerns, while not unique to virtual teams, are made more acute as a result of management presumptions that special skills are not needed,

that the work itself and relative freedom from supervision are sufficient rewards for virtual team members, and that virtual team members cannot be trusted to work unsupervised. Certainly organizational concerns may arise in other ways, but these examples illustrate this theme.

Theme #3: Need for improved technology. Participants acknowledged that innovative technology eased the demands of work. Participants also indicated that the absence of non-verbal communication seriously hindered the effectiveness of communications. The following response illustrates the dissatisfaction experienced from relying on virtual communication technology:

“We have some video conferencing facilities in my company, and we use them relatively often. Those help, so instead of just having a WebEx, in which only 50% of the information goes through, you get maybe 60% on a video conference. You’re still losing a lot of information, and it’s not only about the words.”

As previously noted, the unique dependence on technology for communications has implications for team leadership, team member selection, skills development, and performance.

Mixed Methods Results

Significant effects of Internal Team Leadership were associated with four of the motivation patterns studied, and leadership concerns were voiced by nearly all participants who were interviewed. Similarly, significant effects of Tools and Technologies were associated with three of the motivation patterns, and nearly all participants who were interviewed commented on shortcomings of the communications technology that was utilized on their teams. Finally, a significant positive effect was associated with moderate or high goal internalization. However, almost two-thirds of the participants interviewed complained of inadequate or non-existent rewards, suggesting a mismatch between goals and incentives which might be offered to encourage achievement of goals.

The findings suggest that virtual teams have not been implemented consistently with respect to best practices:

Finding #1: Perceived lack of skilled or experienced team leaders

There was a perception among participants that team leaders often lacked needed skills or experience, even though a significant positive effect of Internal Team Leadership in predicting work satisfaction was associated with four of the twelve motivation patterns studied. A possible explanation for this perception is that some executive leaders may have assumed that strong Internal Team Leadership is not needed, when in fact many VTMs feel lost without strong leadership (Day & Burbach, 2011). In addition, a number of participants noted that periodic face-to-face meetings were viewed as costly and unnecessary within their organizations. Finally, some organizations may have failed to implement systems to help team leaders in monitoring productivity.

Finding #2: Perceived lack of rewards for accomplishing goals.

VTMs fitting the moderate or high goal internalization pattern, represented by 51% of the study participants, tended to find virtual team work satisfying. However, rewards that might be aligned with team and individual goals to enhance goal commitment were generally not utilized. A possible explanation for this finding is that executive and internal team leaders may have falsely assumed that VTMs were committed to goals and did not need rewards beyond their enjoyment of work and the relative freedom from close supervision. However, without team commitment to goals (lacking due to absence of leadership, rewards, cohesion/respect for others, etc.), sharing of knowledge and trust among team members may

erode. When coupled with ineffective leadership, conflicts resulting from lack of trust may destroy team effectiveness.

Finding #3: Perceived inadequacies of communication technology

VTMs with low goal internalization, low instrumental motivation patterns, or moderate or high self-concept external motivation patterns (represented by 87% of study participants) tended to find utilization of Tools and Technologies satisfying. However, there was a perception that the communications technology utilized by their teams either was not adequate or was used ineffectively. This finding has significant implications because virtual team morale may be enhanced by improving leadership, aligning rewards with goals, and improving the quality of technology employed. Failing to utilize communications technology effectively, or the failing of organizations to provide tools that are intuitive and easy to work with may partially explain this finding.

The findings have direct implications on the Virtual Team Effectiveness Strategies. Effective leadership influences VTM self-efficacy, a measure of instrumentality. The absence of effective leadership may lead to all sorts of problems (e.g. high turnover, manipulative and dysfunctional behaviors). Alignment of rewards with goals is intended to influence VTM behavior by increasing commitment to goals. Even though no significant effects were associated with Reward System in predicting work satisfaction, the absence of rewards resulted in dissatisfaction among participants interviewed. The communications technology utilized, along with training and developmental experiences, influence expectancy. There was consensus among the participants interviewed that the Tools and Technologies employed were inadequate and a source of dissatisfaction. Stronger effects were found for certain motivation patterns but the reoccurring themes were associated with all of the motivation patterns studied.

Discussion

Self-concept internal motivation had no significant moderating effect on VTM work satisfaction; therefore, Hypothesis 2 was not supported. The implication of this finding is important, considering only 38% of participants possessed moderate or high levels of self-concept internal motivation relative to other sources of motivation.

VTMs possessing low levels of self-concept external motivation found utilization of Internal Team Leadership satisfying, whereas VTMs possessing moderate or high self-concept external motivation relative to other sources of motivation found utilization of Tools and Technologies satisfying. None of the other predictor variables or interactions was statistically significant in predicting work satisfaction. Though weak support was obtained for Hypothesis 3, factors such as availability of better technology, rewards, and leadership could make virtual team work more appealing to all VTMs.

VTMs possessing moderate or high levels of goal internalization relative to other sources of motivation (representing 51% of the participants) tended to find virtual team work satisfying. VTMs possessing low levels of goal internalization tended to find utilization of Selection Procedures and Tools and Technologies satisfying. Selection Procedures may be viewed favorably if team members who are less goal driven are able to influence the selection decision. Regardless of the motivation pattern, team building is needed to integrate skills and build camaraderie to improve team performance. Because of the strong positive moderating effect of goal internalization motivation on the relationship between work satisfaction and utilization of the virtual team effectiveness attributes, Hypothesis 4 was supported.

VTMs possessing low intrinsic process motivation relative to other sources of motivation tended to find utilization of Internal Team Leadership satisfying, while no significant effect was found for VTMs assigned to the moderate or high intrinsic process motivation pattern. Hypothesis 5 was not supported.

VTMs assigned the low instrumental motivation pattern tended to find utilization of Team Process, Job Characteristics, and Tools and Technologies satisfying. Conversely, VTMs assigned the moderate or high instrumental motivation pattern found utilization of Internal Team Leadership satisfying, but tended to find utilization of Team Process dissatisfying. VTMs who are not driven by the prospect of earning rewards appeared more inclined to collaborate, while more instrumentally motivated VTMs perceived a need for Internal Team Leadership. Hypothesis 6 was therefore not supported.

Utilization of Internal Team Leadership and Job Characteristics were viewed as satisfying for VTMs assigned to low intrinsic motivation patterns, while no statistically significant effects were noted for more intrinsically motivated VTMs. The challenge for less intrinsically motivated VTMs is that without effective Internal Team Leadership, cultural, generational, and cognitive conflicts may arise and doom the virtual team to failure. Participants interviewed cited serious team conflicts as a problem. Hypothesis 7 was therefore not supported.

Internal Team Leadership was found to have a statistically significant positive effect in predicting work satisfaction for four of the twelve motivation patterns studied, represented by 90% of participants, without any negative relationships between utilization of Internal Team Leadership and work satisfaction noted for other motivation patterns. This suggests that there is an opportunity for improving work satisfaction through better internal team leader selection and development. In particular, more care is needed in selecting and developing leaders for global virtual teams to ensure they have the technical and intercultural skills and experiences needed to prepare them for leading a diverse, globally dispersed team.

Limitations

Limitations of this study

Fewer than 40% of the participants who volunteered for telephone interviews were in the millennial generation demographic group. It is possible that additional qualitative themes or sub-themes could have emerged had a higher percentage of millennials volunteered for interviews.

High correlations were noted for several of the predictor variables measured by the Virtual Teams Survey. This could have reduced the observed contribution of several of the scales and, in some instances, resulted in errors where predictor variables were not recognized as significant in predicting work satisfaction.

Additionally, backwards selection was justified in selecting the best fitting regression model due to the large number of candidate predictor variables; however, this procedure is not widely accepted in performing multiple regression analysis.

Conclusion

While examining the influence of individual motivation on VTM work satisfaction, this study confirmed the relationships between utilization of virtual team effectiveness attributes and work satisfaction, offered insight into why virtual teams sometimes fail, and suggested ways for improving work satisfaction among VTMs. There was near consensus among participants interviewed that improvements are needed in virtual team leadership, alignment of rewards with goals, and the quality of technology utilized in leading virtual teams. These findings have important implications for leadership practice and further research on virtual team leader selection and development, alignment of reward systems with goals, and development of telepresence systems that may improve the perceived quality of interactions of VTMs with Tools and Technologies.

Recruitment efforts may fail to target candidates with needed competencies or skillsets; in particular, more care is needed in selecting and developing leaders for global virtual teams to ensure they have the intercultural skills and experiences needed to prepare them for leading a

diverse, globally dispersed team. While Rewards were not found to be significant in predicting work satisfaction, the absence of rewards was found to be a source of dissatisfaction. Better alignment of rewards with performance goals may be needed in some organizations to improve goal commitment and team effectiveness. Without commitment to team goals, sharing of knowledge and trust among team members may erode. However, effective monitoring and reporting on performance metrics are needed to assist team leaders in fulfilling their leadership responsibilities. The communication methods and tools utilized may diminish the level of satisfaction for many VTMs, particularly those possessing low levels of instrumental motivation. There was a clear consensus, however, that more telepresence is needed to improve the work experience of VTMs.

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