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TRUST: THE PANACEA OF VIRTUAL MANAGEMENT?

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Abstract

As more and more information systems (IS) development teams work in distributed arrangements, concerns about enhancing virtual workers' effectiveness will become more common and important for IS management. Trust between managers and employees can potentially enhance employee effectiveness by reducing uncertainty and increasing satisfaction and commitment. To study this, employees' perceptions of interpersonal trust between themselves and their manager in both a virtual management and a non-virtual management environment were quantitatively examined (n = 631). Contrary to suggestions in the literature, it was found that trust had a larger impact on key outcome variables such as job satisfaction and job stress for non-virtually-managed workers than it did for virtual workers. The results also suggest that cognition-based trust is more important than affect-based trust in a virtual workplace. Managers should concentrate on activities that demonstrate their competence, responsibility and professionalism, since this increases cognition-based trust. Although trust is an important determinant of effectiveness for organizations to manage, it does not appear to be any more important in a virtual setting than it is in a non-virtual setting.

Keywords: Changes in work force, remote work, job satisfaction, partial least squares, organizational effectiveness, management theory, trust

1. INTRODUCTION

Is trust between the manager and the employee the panacea or cure-all for virtual work? Numerous authors suggest that trust is essential to making the virtual enterprise hum. For example, Davidow and Malone (1992) suggest that trust is the defining feature of a virtual enterprise and that all types of management in the era of virtual enterprises must be built on trust. Lipnack and Stamps (1997, p. 227) suggest that "In the networks and virtual teams of the Information Age, trust is a 'need to have' quality in productive relationships." The Information Age is enabled by information technology.

What is trust and why is trust so potentially important? Trust is the belief or confidence in a person or organization's integrity, fairness, and reliability (Lipnack and Stamps 1997). In a virtual work setting, where employees are working in different locations than their managers, the opportunity for face-to-face contact is limited. This means that the manager has significantly fewer opportunities to view employee behavior than would exist in a conventional work setting (i.e., where the manager and employee work in the same building). Managers have often relied on assessing behaviors, through direct observation, as their coordination and control mechanism. Observing behaviors is no longer a feasible coordination and control mechanism in a virtual workplace; trust can be used instead. From the virtual employees' perspective, interpersonal trust with their managers is also very important since the potential for isolation is high. The informal communication and information-gathering opportunities for employees in virtual work environments are typically less than in non-virtual settings. The employees rely on their managers to keep them informed of necessary information and to support their activities with effective feedback and recognition.

Although the literature contains many suggestions about the importance of trust in virtual work (Brown 1994; Caswell 1995; Caudron 1992; Durutta 1995; Duxbury, Higgins, and Irving 1987; Grensing-Pophal 1997; Handy 1995; Hartman, Stoner, and Arora 1992; Klein 1994; Malone and Davidow 1992; Miles and Snow 1995; Posch 1994), there has been little empirical research done on this to-date. Notable exceptions include Jarvenpaa and Leidner (1998), who studied the development and maintenance of trust in globally dispersed teams of students; Iacono and Weisband (1997), who studied trust in temporary teams of students; and Staples (1997), who studied the relationship between trust and perceptions of the effectiveness of remote work, job satisfaction, and job stress in employees that worked remotely from their manager. While these studies provide insights to our current work, none compared the role of manager/employee trust in a virtual setting with a traditional (i.e., non-virtual) workplace. Our study attempts to fulfil this need.

Our study develops and tests a simple model of the outcomes of the employees' perceptions of trust between themselves and their managers, with both remote employees and non-remote employees. We then compare the results for the two groups of respondents.

2. DEVELOPMENT OF THE RESEARCH MODEL AND HYPOTHESES

Interpersonal trust is a pervasive phenomenon in organizational life. In this study, we chose to adopt McAllister's (1995) definition of interpersonal trust as the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decisions of another. This definition was chosen for our study since we wished to examine interpersonal trust between two parties (i.e., the employee and manager). McAllister suggested that there are two dimensions of interpersonal trust: cognition-based and affect-based trust. Cognition-based trust is based on "what we take to be 'good reasons' constituting evidence of trustworthiness such as demonstrated responsibility and competence" (Lewis and Wiegert 1985, p. 970). Affect-based trust consists of emotional bonds between two parties who express genuine care and concern for the welfare of each other (McAllister 1995).

A research model (Figure 1) was developed which incorporates McAllister's two dimensions of trust with several potential outcomes. These five outcomes were chosen for two reasons. First, we chose outcome variables that could contribute to an employee's ability to be effective in an organization. We wanted to choose variables that were relevant and important to organizations and management. The outcomes of trust are represented by two attitudinal variables (job satisfaction, organizational commitment) and three behavioral variables (performance, ability to cope, job stress). Job satisfaction was included in our model since previous research found positive links between it and employee productivity (Gruneberg 1979), as well as with absenteeism and life satisfaction (Cranny, Smith and Stone 1992; Podsakoff and Williams 1986). Organizational commitment has been found to be negatively related to withdrawal behavior, intention to search for job alternatives, and intention to quit (Mathieu and Zajac 1990) and burnout (King and Sethi 1997). Ability to cope is important for making individuals effective in today's fast paced world (Silberman 1996; Stewart 1996). High job stress leads to organizational costs through increased absenteeism, physical and mental health problems (Bosma, Peter, and Marmot 1996; Shigemi et al. 1997) and has been
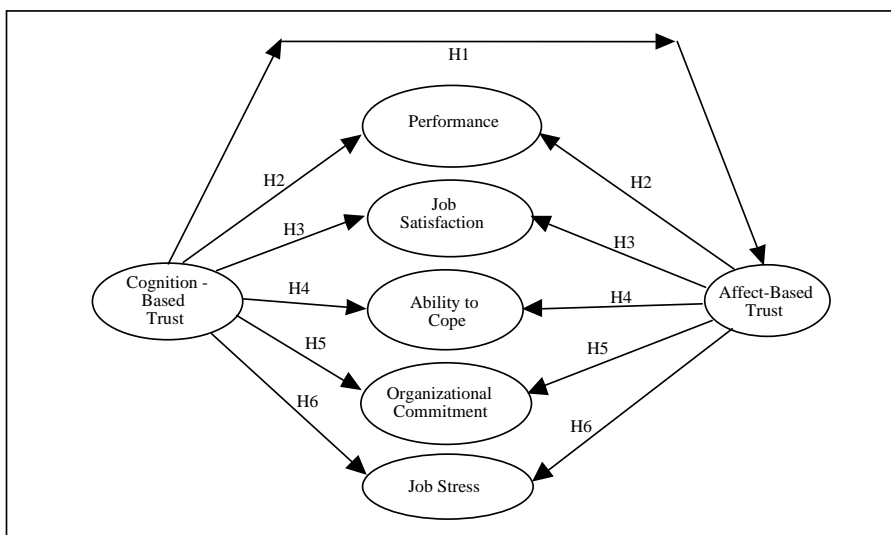

Figure 1. The Research Model

found to be positively associated with propensity to leave the job (Rahim and Psenicka 1996). Second, we chose outcomes that had some basis for a relationship between them and trust. Each of these relationships, with supporting literature and associated hypotheses, are discussed below.

Cognition-Based Trust versus Affect-Based Trust: McAllister suggested that some level of cognition-based trust is necessary for affect-based trust to develop. McAllister tested this hypothesis and found a strong positive relationship between cognition-based trust and affect-based trust. Thus:

> **Hypothesis 1**: Higher levels of cognition-based trust will be associated with higher levels of affect-based trust.

Performance: Numerous authors have suggested that trust is critical for task performance and for effectiveness (Butler 1995; Golembiewski and McConkie 1975; Jeanquart-Barone 1993; McAllister 1995; McCauley and Kuhnert 1992; Porter and Lilly 1996; Robinson 1996; Rotter 1967). McAllister, in his study of cognitive and affect-based trust, found significant correlations between both types of trust and performance. As reviewed in the introduction, the virtual work literature also contains many suggestions about the importance of trust in virtual work. Thus:

> ***Hypothesis 2***: *High levels of employee trust in their manager will be related to employees' positive perceptions of their performance and effectiveness.*

Job Satisfaction: McCauley and Kuhnert (1992) suggested that trust in management was associated with a number of job satisfaction dimensions, including development opportunities, job security and performance appraisal systems. Driscoll (1978) and Robinson (1996) also suggested that trust impacts satisfaction. Hollon and Gemmill (1977) found a significant positive association between trust and job satisfaction and Staples (1997) found a significant positive association between management/employee trust and job satisfaction in his study of virtual workers. Thus, we hypothesized:

> ***Hypothesis 3***: *High levels of trust will lead to higher levels of job satisfaction.*

Ability to Cope: Ability to cope deals with uncertainties and confusion regarding job tasks. Managers who have a successful track record, and higher managerial abilities and interpersonal skills should be able to minimize uncertainties and difficulties for their employees. A successful track record and established abilities and skills is part of the basis of cognition-based trust. Therefore, cognition-based trust would likely be positively associated with the ability to cope. In addition, part of affect-based trust is a component of caring and trying to help the other party with problems. These types of activities have the potential to increase the ability to cope in the recipient. Mishra and Spreitzer (1998) support this by suggesting that high levels of trust increase the capability to cope by reducing uncertainty. Nooteboom, Berger, and Noorderhaven (1997), Lane and Bachmann (1996), and Zaheer and Venkatraman (1995) also suggest that trust reduces uncertainty. Schill, Toves, and Ramanajah (1980) found that increased trust improved the ability to cope with stressful life events. Therefore:

> ***Hypothesis 4***: *High levels of trust will be positively related to the employee's ability to cope.*

Organizational Commitment: McCauley and Kuhnert suggested that mutual trust in employee-employer relations impacts commitment. Ouchi (1981, p. 81), as cited in McCauley and Kuhnert (1992, p. 268), suggested that "trust, perhaps more than any other feature, accounts for high levels of commitment, of loyalty, and of productivity in Japanese firms and in Type Z organizations." Robinson (1996) and Jeanquart-Barone (1993) also suggested trust positively impacts organizational commitment. Thus:

> ***Hypothesis 5***: *High levels of trust will be positively related to higher levels of organizational commitment.*

Job Stress: Employees who have high job stress can experience sleepless nights and work under a great deal of tension, and possibly show feelings of nervousness. Potentially, high levels of trust can reduce these feelings and behaviors. High levels of interpersonal trust imply that the manager and employee have an effective relationship where they care about each other, listen

to problems, and the manager provides coaching advice and consistent feedback. In support of this, Staples found a significant negative relationship between manager/employee trust and employee job stress. Hollon and Gemmill (1977) and Ross (1994) also found significant negative relationships between trust and job stress. Thus:

> **Hypothesis 6**: *High levels of trust will be related to lower levels of employee job stress.*

As previously referenced, many authors suggest that trust is a critical determinant of effective virtual work. The message implied by this is that trust is more important in virtual work than in non-virtual work, presumably because of the reduced interaction. The employee has to rely on the manager to communicate openly with them, to support their activities and provide feedback, and to recognize and reward their activities. The employee has less chance of observing the manager's activities and less chance of getting information informally through other channels than s/he would if the manager and employee worked in the same location. On the other hand, the manager must also be confident (i.e., trust) that the employee will keep them informed of their activities and will bring important issues to their attention as they arise. However, trust has long been recognized generally as a powerful coordinating mechanism for efficiency in complex organizations overall (McAllister 1995). Mutual trust is a key integrative force in organizations (McCauley and Kuhnert 1992) and seems to be growing in importance in non-virtual organizations too (Chan 1997). In summary, this suggests that while trust certainly seems to be an important variable for all types of organizations, it will be more critical in a virtual work environment than in a non-virtual work setting. Thus:

> **Hypothesis 7**: *The impact of trust on the outcome variables will be stronger for remote workers than for non-remote workers.*

3. METHODOLOGY

This section describes the sampling method, construct measures, and analysis methods employed.

3.1 The Sample

A questionnaire was sent to 1,343 individuals working in 18 North American organizations that (1) employed individuals who worked remotely from their managers and (2) were interested in participating in our study (i.e., a convenience sample). A reminder letter was distributed approximately two weeks later in order to increase response rate. A total of 631 questionnaires were returned, for an overall response rate of 47%. Use of the procedure suggested by Armstrong and Overton (1977) indicated no significant differences between respondents and non-respondents on a variety of demographic variables included in the questionnaire. Thus, non-response bias did not appear to be a major problem.

Of the 631 respondents, 52% worked in private sector high technology firms, 17% worked in private sector financial service firms, and the remaining 31% worked in the public sector. In the current study, workers were defined as remote or non-remote in terms of their physical proximity to their managers. If the employees worked in a different building than their manager (which could be across the city, the state, the country, or even the globe), the employees were considered to be remote workers, since they were working remotely from their manager. Slightly over half of the respondents were working remotely (n = 376; 59.6%) with the median distance between the respondents' office and their manager's office being 483 kilometers (the mean was 1,040 kilometers). Appendix B contains further demographic information.

3.2 Construct Measurement

In order to achieve acceptable levels of measurement reliability and validity, both a pre-test and a pilot study were carried out, following the guidelines suggested by Dillman (1978). Appendix A contains a list of the final items used to measure the constructs. The number of items used to measure each construct and the resulting internal consistencies of the constructs are shown in Table 1. Six of the seven constructs shown in Figure 1 were measured using scales taken from the literature. Four items

from House, Levanoni, and Schuler's (1982) role ambiguity/coping ability scale were used to measure the ability to cope. This short form of the House, Levanoni, and Schuler scale was used successfully by Saks (1995). Six items from the short version of the Mowday, Steers, and Porter (1979) organizational commitment questionnaire were used to measure organizational commitment. A five item scale developed by Rizzo, House, and Lirtzman (1970) was used to measure job stress. Trust was measured using an 11 item scale developed by McAllister, which captured the two dimensions of trust: affect-based trust and cognition-based trust. Affect-based trust, in the context of this study, refers to the emotional bonds between the manager and the employee (six items). Cognition-based trust is based upon evidence of trustworthiness such as demonstrated responsibility and competence (five items).

Initially job satisfaction was measured using a 15 item scale developed by Warr, Cook, and Wall (1979). Although this scale had adequate reliability as reported in the literature (British Telecom 1984), the results of the pilot test found the scale to be multi-dimensional. One group of items dealt with satisfaction with management while the other group appeared to deal with issues about other aspects of the job (i.e., physical work conditions, rate of pay, hours of work, variety in the job, and job security). Five items were used to measure the satisfaction with management construct and eight items were used to measure the construct dealing with other job satisfaction factors.

The last construct, performance, was measured with scales developed for this study based on reviews of previous relevant literature and expert opinion. We measured the respondents' beliefs about the effectiveness of working remotely in general, as well as their own overall perceived productivity. The research model, shown in Figures 2 and 3, was revised to reflect these two constructs, instead of one general performance construct. The items used to measure the overall productivity construct determine the individual's general productivity (eight items). The items used to measure remote work effectiveness (four items) deal with the individual's general perception of the effectiveness of working remotely. (Measures of this were only available from the remote respondents in our study.)

3.3 Analysis

A structural equation modeling technique called partial least squares (PLS) was chosen for analyzing the research model (Wold 1985). PLS uses a combination of principle components analysis, path analysis, and regression to simultaneously evaluate theory and data (Pedhazur 1982; Wold 1985). The path coefficients in a PLS structural model are standardized regression coefficients, while the loadings can be interpreted as factor loadings. A detailed discussion of the implementation of PLS in an information systems context is provided by Barclay, Higgins, and Thompson (1995), who also compare PLS and LISREL. PLS is ideally suited to the early stages of theory development and testing—as is the case here—and has been used by a growing number of researchers from a variety of disciplines (e.g., Birkinshaw, Morrison, and Hulland 1995; Green, Barclay, and Ryans 1995; Higgins, Duxbury, and Irving 1992).

Table 1. Internal Consistency of the Constructs

Construct	Number of Items	Internal Consistency	Cronbach's Alpha	Average Variance Extracted
Cognition-Based Trust	6	0.93	0.90	0.69
Affect-Based Trust	5	0.92	0.89	0.70
Remote Work Effectiveness	4	0.86	0.78	0.61
Overall Productivity	8	0.88	0.87	0.48
Satisfaction with Management	5	0.92	0.89	0.69
Satisfaction with Other Job Factors	8	0.86	0.81	0.44
Ability to Cope	4	0.90	0.87	0.70
Organizational Commitment	6	0.93	0.91	0.70
Job Stress	5	0.88	0.84	0.60

The explanatory power of the model is tested by examining the size, sign, and statistical significance of the path coefficients between constructs in the model (Davies 1994). The statistics for the paths are generated using a jackknifing technique (Fornell and Barclay 1983). The predictive capacity of a PLS model can also be evaluated by examining the variance explained (i.e., R^2) in the dependent (or endogenous) constructs.

In order to test whether the role of trust was the same in remote workers and non-remote workers, the PLS model was run twice, once for remote respondents and once for non-remote respondents. Statistical significance of the differences in the explained variance values (i.e., R^2) was tested using a variance ratio test (Anderson and Sclove 1978).

4. Results

The results of the measurement model analysis are presented first, followed by a formal test of the hypotheses for the remote respondents. The hypotheses are then tested again using the non-remote respondents. The results of the two model runs are then compared.

4.1 Measurement Model Assessment

Table 1 reports internal consistency values for each of the constructs in the research model (using both a measure proposed by Fornell and Larcker [1981] and Cronbach's alpha), and average variance extracted (a measure used to assess discriminant validity). Table 2 presents the intercorrelations of constructs. The diagonal element of Table 2 is the square root of the average variance extracted. This table can be used to assess the discriminant validity of the constructs.

All constructs had acceptable internal consistency values as assessed using the Fornell and Larcker measure and Cronbach's alpha. An examination of Table 2 shows that the discriminant validity was somewhat weak among the two types of trust and satisfaction with management. This can be seen by examining the correlations among the three constructs and the square root of the average variance extracted. Even though the correlations were high, these correlations were less than the average variance extracted indicating adequate, albeit marginal, discriminant validity. As an additional check of discriminant validity, the loadings of each item were examined via a cross-loading matrix to ensure that the items loaded highly on the constructs they were supposed to measure, with low cross-loadings on the rest of the constructs. All items loaded highest on their designated construct.

Table 2. Discriminant Validity Analysis

Construct	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Cognition-Based Trust	**0.831**								
2. Affect-Based Trust	0.789	**0.839**							
3. Remote Work Effectiveness	0.202	0.242	**0.778**						
4. Overall Productivity	0.245	0.349	0.250	**0.690**					
5. Satisfaction with Management	0.704	0.708	0.355	0.346	**0.828**				
6. Other Satisfaction	0.413	0.405	0.352	0.354	0.674	**0.660**			
7. Ability to Cope	0.110	0.131	0.381	0.373	0.254	0.319	**0.835**		
8. Organizational Commitment	0.327	0.337	0.265	0.311	0.490	0.561	0.212	**0.834**	
9. Job Stress	-0.221	-0.166	-0.285	-0.135	-0.280	-0.309	-0.304	-0.228	**0.772**

The bold diagonal elements are the square root of the variance shared between the constructs and their measures (i.e., the average variance extracted). Off diagonal elements are the correlations between constructs. For discriminant validity, the diagonal elements should be larger than any other corresponding row or column entry.

4.2 Assessment of the Structural Model

Given an adequate measurement model, it is appropriate to now turn to an examination of the structural model. This was done in two steps. The predictive power of the model was assessed first, followed by an analysis of the hypothesized relationships among the constructs.

4.2.1 The Predictive Power of the Model

Cognition-based trust explained 62.3% of the variance in affect-based trust (Figure 2). The model explained 5.9% of the variance in the remote work effectiveness construct, while 12.5% of the variance in overall productivity was explained. The two constructs that dealt with job satisfaction, satisfaction with management and satisfaction with other job factors, had R^2 values of 55.7% and 18.7%, respectively. The variance explained in the ability to cope construct was only 1.7%. Finally, the model explained 12.3% of the variance in organizational commitment and 4.9% of the variance in job stress. With the exception of the variance explained in the ability to cope construct, overall the amount of variance explained by the model appeared reasonable. For all of the outcome constructs, trust would be one of many things affecting the respondents' attitudes and behaviors, resulting in the relatively modest R^2 values for most of the constructs. Clearly there was a strong relationship between trust and satisfaction with management. This was not surprising given that the focus here was on the employee's perceived trust between themselves and their manager.

4.2.2. Hypothesis Testing

Figure 2 shows the estimated path coefficients and Table 3 contains a summary of the path coefficients and the *t*-values (and associated significance levels) for each path. The paths from cognitive trust to the following constructs were statistically significant: to affect-based trust (H1); to satisfaction with management and to satisfaction with other job factors (H3); to organizational commitment (H5); and to job stress (H6). All these significant paths were in the direction hypothesized, therefore supporting the proposed hypotheses. The paths from cognitive trust to performance (H2) and to ability to cope (H4) were not statistically significant. Only the paths from affective trust to the two job satisfaction constructs were statistically significant (i.e.,

to satisfaction with management and to satisfaction with other job factors), lending support to hypothesis 3. The paths from affective trust to performance (H2), to ability to cope (H4), to organizational commitment (H5), and to job stress (H6) were all non-significant.

4.3 Model Results for the Non-remote Respondents

4.3.1 The Predictive Power of the Model

Cognition-based trust explained 62.1% of the variance in affect-based trust (Figure 3). The model explained about 16.9% of the variance in overall productivity. The satisfaction with management and satisfaction with other job factors constructs had R^2 values of 67.1% and 33.5%, respectively. The variance explained in the ability to cope construct was 11.3%. The model explained 22.8% of the variance in organizational commitment and 11.1% of the variance in job stress.

*p < .05; **p < .01; ***p < .001 (2 tail test) (darker lines indicate significant paths)

Figure 2. Results for the Remote Respondents (n = 376)

Table 3. A Summary of the Path Coefficients for Both Models

| | Non-remote Respondents | | Remote Respondents | |
	Path Coefficient	*t*-value (df = 254)	Path Coefficient	*t*-value (df = 375)
From Cognitive Trust to:				
Affective Trust (H1)	0.788	27.33***	0.789	33.38***
Remote Work Effectiveness (H2)	-[1]		0.028	0.91
Overall Productivity (H2)	-0.299	-3.79***	-0.081	-1.77
Satisfaction with Management (H3)	0.378	5.23***	0.385	3.45***
Satisfaction with Other Job Factors (H3)	0.089	1.98*	0.247	3.95***
Ability to Cope (H4)	0.253	1.13	0.018	0.35
Organizational Commitment (H5)	0.207	1.87	0.163	3.32**
Job Stress (H6)	-0.213	-2.89**	-0.239	-3.50***
From Affective Trust to:				
Remote Work Effectiveness (H2)	-[1]		0.220	0.87
Overall Productivity (H2)	0.603	6.53***	0.407	1.87
Satisfaction with Management (H3)	0.487	6.42***	0.403	4.32***
Satisfaction with Other Job Factors (H3)	0.506	4.67***	0.224	4.16***
Ability to Cope (H4)	0.097	0.02	0.117	1.25
Organizational Commitment (H5)	0.297	2.61**	0.217	0.56
Job Stress (H6)	-0.138	-0.35	0.022	-0.46

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test); [1] - no corresponding measures for the non-remote respondents.

*$p < .05$; **$p < .01$; ***$p < .001$ (2 tail test) (darker lines indicate significant paths)

Figure 3. Results for the Non-remote Respondents (n = 255)

4.3.2 Hypothesis Testing

As shown in Figure 3 and Table 3, the paths from cognitive trust to the following constructs were statistically significant: to affect-based trust (H1); to overall productivity (H2); to satisfaction with management and to satisfaction with other job factors (H3); and to job stress (H6). All these significant paths were in the direction hypothesized, therefore supporting the proposed hypotheses. The paths from cognitive trust to ability to cope (H4) and to organizational commitment (H5) were not statistically significant.

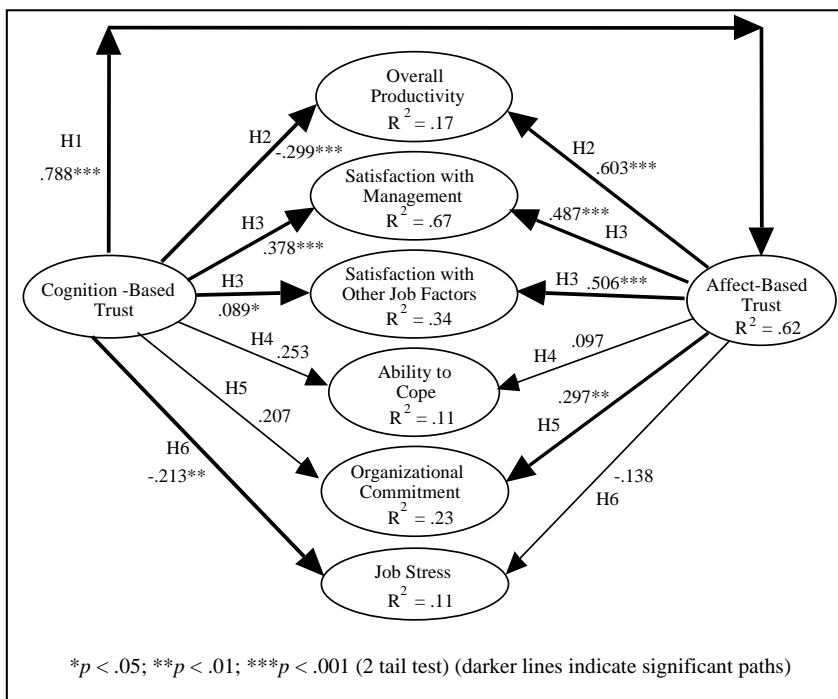From affective trust, the paths to the following constructs were statistically significant: to overall productivity (H2); to satisfaction with management and to satisfaction with other job factors (H3); and to organizational commitment (H5). The paths from affective trust to ability to cope (H4) and to job stress (H6) were not statistically significant.

4.4 Comparing the Results of the Remote versus Non-remote Respondents

The last column of Table 4 shows that there were significant differences in the variance explained for most of the endogenous constructs (i.e., overall productivity, satisfaction with other job factors, ability to cope, organizational commitment, and job stress). The differences were non-significant for only two endogenous constructs, affective trust and satisfaction with management. In all cases, the model explained more variance for the non-remote respondents than it did for the remote respondents. We interpreted this to mean that trust had less impact on the outcomes in the research model for the remote respondents than it did for the non-remote respondents. Therefore, hypothesis 7 was not supported.

5. DISCUSSION

We focus our discussion below on the major findings and then discuss ideas for future research.

Trust and Productivity (H2): Hypothesis 2 was not supported for the remote workers (although the path coefficients to overall productivity were close to being significant) and was partially supported for the local workers. To examine these relationships further, we looked at zero-order correlations between cognition-based trust and self-assessed productivity, and affect-based trust and self-assessed productivity. For both sets of workers, all correlations were both positive and significant. However, as shown in Figure 3, when both affect-based trust and cognition-based trust were included in the model together, the path from cognition-based trust to productivity was negative. Theoretical reasons for this negative relationship between cognition-based trust and productivity after controlling for affect-based trust are elusive. Perhaps if the managers have high competence and reputations (i.e., high cognition-based trust), their employees raise their standards regarding their own productivity and compare themselves to their high-performance managers. This could lead to a negative relationship between the two constructs. However, the total effect (i.e., direct + indirect effect through affect-based trust) of cognition-based trust on overall productivity was found to be positive.

Trust and Job Satisfaction (H3): The only hypothesis that was consistently supported by both data sets and for both dimensions of trust was Hypothesis 3. Trust was found to be positively related to job satisfaction, consistent with previous studies (Hollon and Gemmill 1977; Staples 1997). Job satisfaction has been linked to overall productivity in previous research (as outlined in section 2) so our results support suggestions that managers who are effective in developing trust in their employees will positively affect their employee's productivity via enhancing job satisfaction. We carried out further analysis on these relationships by dropping affect-based trust from the model of remote workers. The explained variance levels in the two job satisfaction constructs were reduced marginally (R^2 = .50 versus .56 and .17 versus .19). Similar results were obtained when we repeated this analysis for local workers (.58 versus .67 and .25 versus .34).

Table 4. A Comparison of the Predictive Power of the Model for Non-Remote Respondents vs. Remote Respondents

	Variance Explained		
	Non-remote	Remote	Variance
Construct Name	Respondents	Respondents	Ratio Test
Affective Trust	0.621	0.623	F(254,375) = 0.997
Remote Work Effectiveness	- [1]	0.059	
Overall Productivity	0.169	0.125	F(254,375) = 1.352*
Satisfaction with Management	0.671	0.557	F(254,375) = 1.205
Satisfaction with Other Job Factors	0.335	0.187	F(254,375) = 1.791*
Ability to Cope	0.113	0.017	F(254,375) = 6.647*
Organizational Commitment	0.228	0.123	F(254,375) = 1.854*
Job Stress	0.111	0.049	F(254,375) = 2.265*

p< .05 (two-tailed test); [1] - no corresponding measures for the non-remote respondents.

Trust and Job Stress (H6): In both data sets, only cognition-based trust had a significant negative relationship with job stress (H6). Cognition-based trust deals with demonstrated responsibility and competence. The findings suggest that a competent, professional manager reduces an employee's uncertainty and tension related to the job (i.e., job stress). Reducing an employee's uncertainty through coaching, specifying job tasks and roles, helping with problems, and not being careless are all activities that would make an employee more effective via reducing job stress. While the significant findings regarding cognitive-based trust and job stress were logical, it was surprising that affect-based trust did not significantly impact job stress. Affect-based trust includes a component of caring and being willing to listen to and help with problems. Perhaps a willingness to help with problems is not nearly as important as being able to do something about them, via high competence. This, combined with the results for job satisfaction, suggests that if a manager focuses on building cognition-based trust, s/he will be better off than if s/he focused on developing affect-based trust. The manager will reduce job stress and increase job satisfaction almost as much as s/he could by building both types of trust.

The Role of Trust for Remote versus Non-remote Workers (H7): A comparison of the variance explained in the model for the two data sets found that, for the common significant relationships (i.e., job satisfaction and job stress), the R^2 were higher for the non-remote respondents in all three cases (Table 4), two of them statistically significantly higher. This suggests that trust, in terms of the research model, has more impact on job satisfaction and job stress for non-remote respondents than it does for remote respondents (i.e., not supporting H7). This is counter to the strong suggestions in the virtual work literature that suggests trust is critical and is more important than in non-virtual work settings. We initially wondered if this result could be due to differences in the underlying levels of trust in the two samples, but, as shown in Appendix C, the values of the construct measures are very similar for both samples. We think that it is premature to conclude that trust is less important in virtual work, but our results suggest that it is not any more important. One possible reason for why trust may have less impact on job satisfaction and job stress could be because remote workers have to work by themselves and therefore depend more on their own abilities. Therefore, the impact that others have on the remote workers' attitudes and behaviors is less than it would be for non-remote workers, who depend on and interact more with others. These higher levels of self-reliance or independence potentially lower the impact of trusting others for the remote workers.

We can see several natural extensions to our work for future research. We examined trust between managers and employees from the employees' perspective. Future studies should be conducted to examine the managers' views. We also did not examine the antecedents or causes of trust, which would be a natural and important extension to this work. Are the things that cause strong trust in managers and employees different in virtual settings than in non-virtual settings? Since we have demonstrated that trust does impact a number of key outcomes, the answer to this question could be very valuable to virtual organizations. We also wonder if the impact of trust could be different at varying levels of trust. Future research to look at the stability of the relationships across groups with high trust and groups with low trust could be valuable.

Future research should replicate our study across other settings and over time so that the external validity of our findings can be established. Our study had a cross-industry, cross-occupational perspective. Because the study does not control for the effects of specific tasks and industries, it cannot investigate potential differences within a specific occupation or industry. Future researchers could determine, for example, whether substantial differences in the role of trust exist between high technology and non-technology workers, or whether the role of trust in remote work in the public and private sectors is fundamentally different. Future researchers could also use a different definition of remoteness such as the frequency of face-to-face contact that remote employees have with their managers.

The cross-sectional nature of our survey design limits our ability to draw causal inferences. Although such a design is useful for identifying what set of relationships exist, it does not address why they exist. Future research efforts, such as in-depth case studies, should be undertaken to validate the survey results reported in this study and explore why it appears trust has less impact on remote workers. We also encourage the use of alternative methods of data collection in future studies. For example, assessments of performance and/or productivity could be obtained from respondents' managers and/or co-workers, or from more objective sources. This could help validate our study, which relied heavily on individual perceptions.

As more and more IS development teams work in distributed arrangements, concerns about enhancing virtual workers' effectiveness will become more common and important for IS management. Managing trust is one way to influence an

employee's effectiveness. This is the first study, as far as we are aware, that has compared the impact of interpersonal trust between managers and employees (from the employees' perspective) of virtual workers and non-virtual workers. The results suggest that, contrary to many suggestions in the literature, trust has less impact for remote workers than it does for non-remote workers on key variables such as job satisfaction and job stress. It has also shown that cognition-based trust is more important than affect-based trust in a remote setting. Managers should therefore concentrate on activities that lead to their employees trusting them based on the manager's competence, responsibility, and professionalism. Efforts to build a social relationship that would enhance affect-based trust would be most effective only once cognition-based trust has been established. Prior to that, the priority should be to focus on building cognition-based trust. Clearly, more research is needed in this area. In addition to replicating our work and repeating it from the managers' viewpoint, research on the causes of trust in a virtual workplace, both from a manager's and an employee's perspective, is needed.

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Appendix A
Questionnaire Items

Item Wording

COGNITION-BASED TRUST

My manager approaches his/her job with professionalism and dedication

Given my manager's track record, I see no reason to doubt his/her competence and preparation for the job

I can rely on my manager not to make my job more difficult by careless work

Most people, even those who aren't close friends of my manager, trust and respect him/her as a coworker

Work associates of mine who must interact with my manager consider him/her to be trustworthy

If people knew more about my manager and his/her background, they would be more concerned and monitor his/her performance more closely *

AFFECT-BASED TRUST

My manager and I have a sharing relationship. We can both freely share our ideas, feelings and hopes

We would both feel a sense of loss if one of us was transferred and we could no longer work together

If I shared my problems with my manager, I know (s)he would respond constructively and caringly

I would have to say that we both made considerable emotional investments in our working relationship

I can talk freely to my manager about difficulties I am having at work and know that (s)he will want to listen

SATISFACTION WITH MANAGEMENT

The recognition you get for good work

Your immediate boss

Industrial relations between management and workers in your firm

The way you are managed

The attention paid to the suggestions you make

SATISFACTION WITH OTHER JOB FACTORS

The physical work conditions

Your rate of pay

The amount of variety in your job

Your job security

The freedom to choose your own method of working

The amount of responsibility you are given

The opportunity to use your abilities

Your chance of promotion

ABILITY TO COPE

I frequently don't know how to handle problems that occur in my job*

I often find that I cannot figure out what should be done to accomplish my work*

I am frequently confused about what I have to do on my job*

I am frequently unsure about how to do my work*

Item Wording

OVERALL PRODUCTIVITY
I believe I am an effective employee
My co-workers have recently (i.e., the last three months) been impressed with the quality of my work
Among my work group, I would rate my performance in the top quarter
I am happy with the quality of my work output
I work very efficiently
I am a highly productive employee
My manager has recently (i.e., the last three months) been impressed with the quality of my work
My manager believes I am an efficient worker

REMOTE WORK EFFECTIVENESS
Working remotely is not a productive way to work*
It is difficult to do the job being remotely managed*
Working remotely is an efficient way to work
Working remotely is an effective way to work

ORGANIZATIONAL COMMITMENT
I find that my values and the organization's are similar
I promote my organization to my friends as a great organization to work for
I am proud to tell others that I am part of this organization
My organization really inspires the very best in me in the way of job performance
I am extremely glad that I chose this organization to work for over others I was considering at the time I joined
For me, this is the best of all possible organizations for which to work

JOB STRESS
I work under a great deal of tension
I have felt fidgety or nervous as a result of my job
If I had a different job, my health would probably improve
Problems associated with my job have kept me awake at night
I often "take my job home with me" in the sense that I think about it when doing other things

*After the item label designates reverse coding.

Appendix B
Demographic Characteristics of the Samples

| | MANAGEMENT STATUS | | | | Total | |
| | Locally Managed | | Remotely Managed | | | |
	Count	%	Count	%	Count	%
Total Number of Responses	255	40.4%	376	59.6%	631	100%
Gender						
Male	149	59.1%	220	58.7%	369	58.9%
Female	103	40.9%	155	41.3%	258	41.1%
Educational Background						
Secondary or High School	48	19.1%	53	14.1%	101	16.1%
Diploma/Certificate	58	23.1%	114	30.4%	172	27.5%
Undergraduate Degree	95	37.8%	150	40.0%	245	39.1%
Graduate Degree	50	19.9%	58	15.5%	108	17.3%
Tenure in Organization						
Less than 1 year	10	4.0%	17	4.5%	27	4.3%
1 - 5 years	75	29.9%	89	23.7%	164	26.2%
6 - 10 years	73	29.1%	105	28.0%	178	28.4%
11 - 20 years	59	23.5%	120	32.0%	179	28.6%
Over 20 years	34	13.5%	44	11.7%	78	12.5%
Worked for Present Manager						
Less than 1 year	99	39.8%	116	31.4%	215	34.7%
1 to 2 years	56	22.5%	114	30.8%	170	27.5%
2 to 3 years	31	12.4%	43	11.6%	74	12.0%
3 to 5 years	29	11.6%	54	14.6%	83	13.4%
More than 5 years	34	13.7%	43	11.6%	77	12.4%
Distance from Manager's Office						
1 to 50 km	0		105	28.5%		
51 to 100 km	0		20	5.4%		
101 to 200 km	0		21	5.7%		
201 to 500 km	0		56	15.2%		
501 to 1000 km	0		53	14.4%		
More than 1000 km	0		114	30.9%		
Connectivity						
Have Voice Mail	231	91.7%	328	87.7%	559	89.3%
Have Electronic Mail	242	95.7%	309	82.6%	551	87.9%
Have Groupware System	192	75.9%	231	61.6%	423	67.4%
Have Videoconferencing System ...	131	51.8%	123	32.8%	254	40.4%

Appendix C
Statistics of the Construct Measures

Construct	Locally Managed	Remotely Managed	Total
Cognition-based Trust			
Mean *	5.30	5.28	5.29
Std Deviation	1.28	1.26	1.27
Valid N	N=247	N=367	N=614
Affect-based Trust			
Mean *	4.83	4.78	4.80
Std Deviation	1.38	1.31	1.33
Valid N	N=250	N=370	N=620
Satisfaction with Management			
Mean *	4.92	4.95	4.94
Std Deviation	1.19	1.19	1.19
Valid N	N=253	N=375	N=628
Satisfaction with Other Job Factors			
Mean *	4.99	5.02	5.01
Std Deviation	0.94	094	0.94
Valid N	N=252	N=374	N=626
Ability to Cope			
Mean *	5.92	5.96	5.94
Std Deviation	0.91	1.09	1.02
Valid N	N=249	N=373	N=622
Overall Productivity			
Mean *	5.62	5.68	5.66
Std Deviation	0.90	0.80	0.84
Valid N	N=251	N=371	N=622
Remote Work Effectiveness			
Mean *		5.55	5.55
Std Deviation		1.21	1.21
Valid N	N=0	N=373	N=373
Organizational Commitment			
Mean *	4.90	4.99	4.95
Std Deviation	0.96	0.99	0.98
Valid N	N=252	N=370	N=622
Job Stress			
Mean *	3.77	3.99	3.90
Std Deviation	1.38	1.43	1.42
Valid N	N=252	N=375	N=627

* Based on a 1 to 7 scale