A Study of Remote Workers and Their Differences from Non-Remote Workers

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Information technology (IT) is enabling the creation of virtual organizations and remote work practices. As this practice of working remotely grows, so does the importance of making these remote end-users of technology effective members of organizations. This study tested a number of relationships that were suggested in the literature as being relevant in a remote work environment. Interpersonal trust of the employee in their manager was found to be strongly associated with higher self-perceptions of performance, higher job satisfaction and lower job stress. There was weak support for the impact of physical connectivity (i.e., the availability of IT) on job satisfaction, supporting the enabling role of IT. These findings were similar for both remote employees (i.e., those that worked in a different building than their managers) and non-remote employees. However, more frequent communications between the manager and employee was associated with higher levels of interpersonal trust only with the remote workers. Cognition-based trust was also found to be more important than affect-based trust in a remote work environment, suggesting that managers of remote employees should focus on activities that demonstrate competence, responsibility and professionalism.

INTRODUCTION

Working remotely is becoming more common with advances in information technology (IT). Information technology is enabling distributed work, both for IS professionals and other professionals. Therefore, many remote workers will be end users of information technology. Making these end users effective in a remote environment holds many challenges for organizations. The purpose of this paper is to explore some of the challenges and issues.

In recent years, there has been some research on telecommuting to understand one type of remote work practice, that of working remotely from home (DeSanctis, 1984; Duxbury and Haines, 1991; Duxbury, Higgins, and Irving, 1987; McCloskey and Igbaria, 1998; Neufeld, 1997; Olson, 1988). A key issue in telecommuting and virtual organizational structures is the management of employees who are located remotely from their manager (Beyers, 1995; Tapscott and Caston, 1993). Managers' roles are changing as traditional, hierarchical methods are no longer appropriate (Grenier and Metes, 1995; Jenner, 1994; Lucas and Baroudi, 1994; Snell, 1994). The fear of lost managerial control is reported to be a significant factor preventing widespread adoption of telecommuting (DeSanctis, 1984; Duxbury et al., 1987; Duxbury and Haines, 1991; Goodrich, 1990; Phelps, 1985; Risman and Tomaskovic-Devey, 1989; Roderick and Jelley, 1991).

The objective of this research was to study issues of remote work and remote management and to explore differences in these issues among remote workers and non-remote workers. For this study, remote workers were defined as employees who work in a physically separate location from their managers. The employee's location could vary considerably from working at another company office or in their home, to working at a customer's location or out of their car. Employees working at home are by definition telecommuting; however, telecommuting is just one work arrangement that results in remote management. As suggested by Jenner (1994), telecommuting is only a small part of the virtual workplace, in which people work together while being physically distant from each other.

A series of hypotheses identifying potentially important IT and management issues in remote work were developed based on the literature and suggestions from exploratory research carried out for this study. The exploratory research was carried out in order to identify key issues of working remotely, both from workers' and managers' viewpoints. The hypotheses were then tested with data gathered via a questionnaire. The development of the hypotheses is presented in the next section. This is followed by a discussion of the methodology used for testing the hypotheses and then the findings are presented. The last section discusses the findings, their contributions and limitations.

DEVELOPMENT OF HYPOTHESES

A series of testable hypotheses were developed based on suggestions in the literature and results from exploratory research carried out for this study. The purpose of the exploratory research was to identify key issues of working and managing remotely and possible practices to address these issues. Details of this exploratory research are briefly described below, and the hypotheses that were developed are then presented.

Exploratory Research

The exploratory research was conducted using focus group interviews to collect the views of both people who were working remotely and managers who were managing remote workers. A total of 104 people from five different organizations participated in nineteen focus groups, split fairly evenly between managers of remote workers (58 participants; 56%) and remote workers (46 participants; 44%). Sixty percent (n=63) of the participants worked in Canada, 37% (n=38) worked in the United States, and 3 % (n=3) of the participants worked in England. Each focus group lasted for an average of 1.5 hours. After brainstorming about remote environment issues for about the first half of the meeting, each participant in the focus groups identified the top three issues from their perspective and ranked them in descending order. The last half of the focus group was spent discussing possible actions organizations could take to address the issues (see Staples [1997] for a full report on the results of these focus groups).

Hypotheses

The first four hypotheses deal with the role of trust in remote work. Both the literature and participants in the exploratory research suggested that trust between the manager and employee is an important factor for making remote work effective. Developing trust and minimal supervision expectations are important since it is very difficult to supervise and control remote employees due to limited face-to-face contact (Duxbury et al., 1987; Handy, 1995; Lucas and Baroudi, 1994; Savage, 1988; Snell, 1994). However, trusting employees often goes against a managerial tradition of control and a tradition that believes control and efficiency are closely linked and that control is necessary for efficiency (Handy, 1995).

Trust is the belief or confidence in a person or organization's integrity, fairness and reliability (Lipnack and Stamps, 1997). In a remote 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 behaviour than would exist in a conventional work setting (i.e., where the manager and employee work in the same building). Observing behaviours is no longer a feasible coordination and control mechanism in a remote workplace; trust needs to be used instead. From the remote employees'

perspective, interpersonal trust with their managers is 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.

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) suggest that "In the networks and virtual teams of the Information Age, trust is a 'need to have' quality in productive relationships." (page 225). Although the literature contains many suggestions about the importance of trust in remote work (Brown, 1994; Caswell, 1995; Caudron, 1992; Duratta, 1995; Duxbury et al., 1987; Grensing-Pophal, 1997; Handy, 1995; Hartman, Stoner and Arora, 1992; Klein, 1994; Miles and Snow, 1995; Posch, 1994), there has been little empirical research done on this to-date.

The results of the exploratory research support the views in the literature. In the focus groups, remote employees were concerned about how to remotely build trust and a relationship between managers and employees. Managers who managed remote employees also identified performance management issues as being common problems (ranking second in terms of weighted frequency). Many of these performance management issues involved trust. Key issues identified included how to build trust between managers and employees such that the manager feels confident about what their employees are doing, as well as how to measure productivity and shift towards a result-based focus.

From the above, the importance of trust in a remote work environment, where the employee works remotely from his/her manager, appears clear. However, in a non-remote environment, trust is also important and has been suggested to be related to performance and effectiveness (Golembiewski and McConkie, 1975; McAllister, 1995; McCauley and Kuhnert, 1992; Rotter, 1967). McAllister (1995) in his study of cognitive and affect-based trust, found significant correlations between both types of trust and performance. Therefore, a positive relationship was hypothesized between employee/manager trust and employee perceptions of the effectiveness of working remotely.

Hypothesis 1. Higher levels of trust between the manager and employee will be associated with more positive perceptions of self-performance.

Employees in the focus groups suggested that trust of the manager in their abilities and being able to trust the manager increased the enjoyment and satisfaction they received from their job. McCauley and Kuhnert (1992) lend support to these focus group participants' ideas by suggesting that trust in management is 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. Thus, the second hypothesis is:

> *Hypothesis 2.* Higher levels of trust between the manager and employee will be associated with higher levels of job satisfaction.

As reviewed above, trust potentially has important impacts on the ability of an employee to perform effectively. Therefore, examining possible things that impact levels of trust is warranted. It was suggested in the focus groups that trust is developed through effective communications, both formal and informal. Voss (1996) supports this view by suggesting that open and spontaneous communication is the basis for building trust and establishing relationships. Grenier and Metes (1995) also suggest that communication builds trust, which in turn builds better communication. Therefore, it was hypothesized that:

> *Hypothesis 3.* More frequent communication between employee and manager will be associated with higher levels of trust.

Trust has also been found to impact things other than performance and effectiveness. Hollon and Gemmill (1977) and Ross (1994) found significant negative relationships between trust and 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 behaviours. 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. This can potentially reduce feelings of isolation, an important issue identified by remote employees in the focus groups. Participants in the exploratory focus group research also specifically suggested that job stress declines as trust between the manager and employee increases. Therefore, it is suggested:

> *Hypothesis 4.* Higher levels of trust between the manager and remote employee will lead to lower levels of job stress for remote employees.

Telework researchers have argued that working at home leads to increased stress levels for the teleworkers, generally attributed to difficulties in attempting to balance work and family responsibilities (Di Martino and Wirth, 1990; Olson and Primps, 1984). In support of this, McCormick's (1992) study found that more than 70 percent of teleworking participants reported increased stress as a result of trying to deal with family issues during work hours. However, telework also has the potential to reduce job stress. Explanations for decreased stress include: decreased commute time (Bailey, 1989; Cassidy, 1992; Maynard, 1994; Mayor, 1994; McNerney, 1994; Meall, 1993); relaxed social

and political pressures (Metzger and Von Glinow, 1988; Olson and Primps, 1984); decreased interruptions (Olson and Primps, 1984); and improved ability to manage work and family demands (Cosgrove, 1992; Pierce, Newstrom, Dunham and Barber, 1989). Participants in the focus groups conducted for this study suggested that the extra burdens imposed by remotely working can create higher job stress for remote employees than non-remote employees. Potential contributors to the extra burdens were travel, more formal communications, and increased work/family conflict. While there appear to be both positive and negative impacts on job stress caused by remote work, and some of these are specific for work-at-home employees, for this study it was hypothesized that:

> *Hypothesis 5.* Remote employees will have higher job stress than non-remote employees.

The focus group participants also suggested that job stress declines as job experience increases. The logic suggested for this was that as one becomes more experienced, the employee develops ways to deal with the potential for work/family conflict. Routines for communication become established which is less stressful. Isolation also reduces as the employee builds networks and contacts. Travel demands may decline as the employee learns to be more discriminating in choosing when they really have to be there face-to-face (i.e., so there is less travel). Therefore,

> *Hypothesis 6.* Remote work experience will be negatively associated with job stress.

Information technology (i.e., the level of connectivity) was suggested to be an important enabler of effective remote work by many of the focus group participants and by various authors in the literature (Freedman, 1993; Greengard, 1994; Handy, 1995; Lucas and Baroudi, 1994; O'Hara-Devereaux and Johansen, 1994). The technology allows tasks to be distributed in different places and executed at different times while integrating and effectively controlling the whole process (Mowshowitz, 1994). The virtual workplace provides access to information needed to do a job anywhere, anytime, anyplace and the latest in communication technology is used to accomplish this (Jenner, 1994). Information technology issues were the second most frequently identified class of issue for remote employees. Focus group participants that were not well connected wanted more capabilities including voice-mail, electronic-mail, groupware, and the perceived ultimate capability, videoconferencing, as well as reliable, constant IT support and access to networks. Participants that were well connected realized the value of it. One participant summarized the feeling succinctly by stating that "IT was their lifeline" to the rest of their work group and the organization. Therefore, examining the level of connectivity and its impact on the employee's perception of the effectiveness of working remotely and their job satisfaction was warranted.

> *Hypothesis 7.* Higher levels of connectivity will positively impact the remote worker's performance.

Hypothesis 8. Higher levels of connectivity will positively impact the remote worker's job satisfaction.

Consistent with the literature (Greengard, 1994; Illingworth, 1994; Voss, 1996; Walsham, 1994), maintaining or developing an appropriate corporate culture in a dispersed work environment was found to be a key issue with some of the focus group participants. This was especially true in companies where their corporate culture was explicitly viewed as a valuable asset. Replacing the informal sharing of values and stories that occurs naturally when people are physically together has to be replaced in a virtual setting by explicit efforts that will typically fall upon the manager's shoulders. This can be difficult to do. Therefore, it may be that remote employees develop different perceptions of the organization's culture than do non-remote employees. In order to test this idea, the following hypothesis was posited.

Hypothesis 9. Remote employees will have a different perception than non-remote employees of the organization's corporate culture.

Two of the nine hypotheses developed above explicitly compare remote workers with non-remote workers (i.e., hypotheses 5 and 9). The other seven hypotheses deal with relationships between various concepts that are developed specifically for remote workers, although all of these seven relationships could also apply to non-remote workers. Participants of the focus groups suggested that working remotely is considerably different than working locally. The remote work literature also implicitly supports this suggestion. Therefore, the strength and directions of the relationships suggested by the seven hypotheses may be different in the two settings. In order to examine if the relationships are different for remote versus local workers, the following proposition is suggested:

Proposition 1. Hypotheses 1 through 4, and 6 through 8, will be supported more in a remote work setting than in a non-remote setting.

RESEARCH METHODOLOGY

The Sample

Data were gathered by sending a questionnaire to 1,343 individuals working in 18 North American organizations, which both (1) employed individuals who worked remotely from their managers, and (2) were interested in participating in a study of remote workers. A total of 631 questionnaires were returned, for an overall response rate of 47%. Although this response rate is somewhat low, raising potential concerns about non-response bias, 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.

A total of 376 of the returned questionnaires were from remotely-managed employees, as defined by the employee having their office in a different building than their manager. Forty-seven percent of these remote respondents worked in private sector high technology firms, 22% worked in private sector financial service firms, and the remaining 31% worked in the public sector. About 44% of the respondents had been with their organization 11 or more years. Approximately half of the respondents had been in their present position three or more years, and about 60% had worked for their present manager two years or less. Seventeen per cent of the remote-managed respondents worked at home, with the vast majority of these indicating that it was easy for them to so. The median distance between the respondents' office and their manager's office was 483 kilometres.

Slightly under half of the respondents were locally managed (n=255; 40.4%). The demographic characteristics of the remotely-managed respondents were similar to those of the locally-managed respondents. As would be expected, more remotely-managed respondents worked from their home which meant that on average, the remotely-managed respondents had a shorter commute time. The remotely-managed respondents also appeared to have longer tenure in their position than the locally-managed respondents. MANOVA and Chi-Square tests of independence analyses were conducted to test if the differences between remotely-managed and locally-managed respondents were statistically significant. Only two significant differences were found. On average, remotely-managed respondents had been in their position longer, and a higher proportion of remotely-managed respondents were married than were locally-managed respondents (87.3% versus 79.0% respectively). It was judged that these two differences were not critical to the issues being studied here so it was acceptable to proceed with testing the hypotheses that dealt with differences between remote and non-remote employees.

Analysis

Analysis of variance techniques were used to test the hypotheses. Specifically, MANOVA, which is a technique for analyzing differences between group means of categorical variables (i.e., the independent variables) in situations where there is more than one dependent variable, was used. MANOVA results are assessed in two steps. First, the overall test of significance is examined (i.e., the Omnibus test) which takes into account the intercorrelations of the dependent variables. If the overall test is significant, the dependent variables can then be examined individually. If an individual item's F-test is statistically significant, then there are differences between the groups for that dependent variable. The rejection criteria for the individual F-tests are adjusted using a Bonferroni procedure (i.e., divide the nominal alpha by the number of dependent variables [Bray and Maxwell, 1985]).

Construct Measurement

Where possible, the constructs were measured with proven scales taken from the literature. 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). Questionnaire pre-testing was first completed using faculty, graduate student, and practitioner input. This information was used to refine the original survey instrument. A preliminary pilot study questionnaire was then administered to remote employees in one insurance firm, resulting in 64 responses. The resulting data were analyzed and used to further modify the questionnaire items for the full study. Measurement of the dependent variables is described below, followed by a description of the independent variables.

The Dependent Variables. In the nine hypotheses, six unique dependent variables are used. Four of these dependent variables were measured with existing scales taken from the literature that had demonstrated acceptable psychometric properties in previous studies. These were: trust, job satisfaction, job stress, and organizational climate. Trust was measured using an 11 item scale developed by McAllister (1995). Warr, Cook and Wall's (1979) 15 item scale was used to assess job satisfaction. A five item scale developed by Rizzo, House and Lirtzman (1970) was used to measure job stress. Fineman's (1975) Job Climate Questionnaire was initially used to measure organizational climate. A measure of organization climate was chosen over a culture measure since organizational climate was seen to fit better with this study. Organizational climate has a somewhat shorter time frame (relatively enduring) than organizational culture (highly enduring) and climate is more practice oriented, operating at the level of attitudes and values (Moran and Volkwein, 1992). However, the results of the pilot test indicated that the Fineman scale had poor psychometric properties even though it was reported to have good reliability in the literature. Therefore, it did not appear to work in this context and it was replaced in the final version of the survey with a five item scale Higgins and Duxbury developed and validated in several in-house company surveys involving several thousand respondents. The loadings of the five items of this organizational climate scale consistently demonstrated good reliabilities (loadings of .8 or higher) in Higgins and Duxbury's work (C.A. Higgins, personal communication, May 28, 1996). As shown in Table 1, Cronbach's alpha for the four constructs were all above 0.8 in this study indicating adequate internal consistency.

The dependent variable for hypotheses 1 and 7 was the respondents' perceptions of their performance. Performance was operationalized via two measures that were developed for this study. The first measure collected information on remotely-managed employees perceptions of the effectiveness of working remotely. Six items were used to do this. The second measure assessed overall perceived productivity. Respondents were asked to indicate their agreement with eight statements regarding their overall effectiveness (two items), efficiency (two items), quality of work (three items), and productivity (one item). Internal consistency of these two measures was found to be adequate (Cronbach's alpha of 0.82 and 0.87, respectively). Face validity was assessed during the pre-test and found to be acceptable. Principal components analysis with varimax rotation was conducted to examine the construct validity of these measures. The eight productivity items broke into two factors. One factor dealt with the five items that asked about the respondent's own beliefs about their productivity and the other factor dealt with the 3 items that asked about the respondent's beliefs about how other's view their productivity (i.e., their manager and co-workers). The loadings were high within these factors (i.e., ranging from .70 to .90) and the cross-loadings were low on other factors (i.e., a maximum of .30). This indicated good discriminant validity and reasonable internal consistency within the factors. Overall, the results suggested that the productivity construct, as measured, had two sub-dimensions. This appeared reasonable given the items used. Since all the items dealt with productivity, and adequate internal consistency was indicated by the Cronbach's alpha's, using the eight items together for the MANOVA analysis was judged to be reasonable.

Similar results were found for the remote work effectiveness measure. The six items broke into two factors, one of which was comprised of the three items asking about changes in the respondent's productivity since they started working remotely. The other factor was made up of three items asking about perceptions of working remotely in general. The loadings were high within these factors (i.e., ranging from .77 to .91) and the cross-loadings were low on other factors (i.e. a maximum of .39). These results also suggested that the effectiveness of working remotely construct, as measured, had two sub-dimensions which appeared reasonable given the items used. Since all the items dealt with perceptions of working remotely, and adequate internal consistency was indicated by the Cronbach's alpha's, using the six items together for the MANOVA analysis was again judged to be reasonable. Principal components analysis was then conducted using the 14 performance items and the items that

Table 1. The reliability of the scales used to measure the dependent variables

Name	Number of items	Cronbach's alpha
Perception of remote work effectiveness	6	.82
Perception of overall productivity	8	.87
Job satisfaction	15	.89
Trust	11	.94
Job stress	5	.84
Organizational climate	5	.87

measured trust and connectivity (i.e., the independent variables in the relevant hypotheses). The results indicated good discriminant validity between the measures as all eleven of the trust items collapsed into one factor, as did the three connectivity measures (described below). Cross-loadings of items onto constructs that they were not designed to measure were all low.

The Independent Variables. To test the nine hypotheses, categorical variables were required to measure five constructs: trust, frequency of communications, remote work, experience, and connectivity. A dichotomous measure of trust was created by summing the 11 trust items and splitting the respondents into two groups at the midpoint. A dichotomous measure of the frequency of communication was created. Respondents indicated how frequently they used six different media (face-to-face meetings, written correspondence, telephone, e-mail, groupware, and videoconferencing) for four different activities (i.e., receiving coaching feedback

and performance feedback, discussing other information, and staying in touch with the manager). The responses were summed to create one variable that was split at the midpoint to create two groups. Remote workers were defined as those who indicated that their primary office was in a different building than their managers.

Experience was assessed in three different ways. A dichotomous variable measuring the length of time the respondent had been remotely managed was used with the break point being three years. The length of time the respondent had been working for their company was assessed with a variable that had five categories, ranging from "less than one year" to "over 20 years". The experience the respondent had in their current position was assessed with a four category variable, with the responses ranging from "less than one year" to "over 5 years".

Three items were developed to measure the connectivity construct. The measures used in this study only assessed

Table 2. A summary of the results of the analysis of variance

H #	Hypothesis Description	Omnibus Test	Significance Level	No. of sig. items
H1a	Impact of trust on remote employees' perceptions of overall productivity	Hotelling's $T^2 = 0.12$ $F(8,358) = 5.41$	$p < .001$	3 out of 8
H1b	Impact of trust on perceptions of remote work	Hotelling's $T^2 = 0.05$ $F(6,359) = 3.27$	$p = .004$	3 out of 6
H2	Impact of trust on perceptions of remote employees' job satisfaction	Hotelling's $T^2 = 0.67$ $F(15,356) = 16.00$	$p < .001$	13 out of 15
H3	Impact of frequency of communications of employee/manager trust	Hotelling's $T^2 = 0.094$ $F(11,361) = 3.08$	$p = .001$	6 out of 11
H4	Trust reduces job stress	Hotelling's $T^2 = 0.04$ $F(5,367) = 3.04$	$p = .011$	2 out of 5
H5	Remote employees have higher job stress than do locally-managed employees	Hotelling's $T^2 = 0.01$ $F(5,621) = 1.04$	$p = .395$	
H6a	Greater tenure in organization reduces job stress	Wilks Lambda = 0.94 $F(20,1212) = 1.10$	$p = .345$	
H6b	Greater experience in the current position reduces job stress	Wilks Lambda = 0.97 $F(15,1008) = 0.79$	$p = .685$	
H6c	More experience at working remotely reduces job stress	Hotelling's $T^2 = 0.01$ $F(5,363) = 0.94$	$p = .454$	
H7a	Impact of having IT communication systems on remote worker's perceived productivity	Wilks Lambda = 0.98 $F(24,995) = 1.09$	$p = .345$	
H7b	Impact of use of remote access tools on remote worker's perceived productivity	Hotelling's $T^2 = 0.04$ $F(8,357) = 1.93$	$p = .055$	
H7c	Impact of remote access to systems on remote worker's perceived productivity	Hotelling's $T^2 = 0.06$ $F(8,359) = 2.55$	$p = .010$	None
H7d	Impact of having IT communication systems on remote worker's attitudes toward remote work	Wilks Lambda = 0.92 $F(18,976) = 1.72$	$p = .030$	None
H7e	Impact of use of remote access tools on remote worker's attitudes toward remote work	Hotelling's $T^2 = 0.01$ $F(6,358) = 0.80$	$p = .570$	
H7f	Impact of remote access to systems on remote worker's attitudes toward remote work	Hotelling's $T^2 = 0.03$ $F(6,360) = 1.58$	$p = .151$	
H8a	Impact of having IT communication systems on remote worker's job satisfaction	Wilks Lambda = 0.81 $F(45,1017) = 1.66)$	$p = .005$	None
H8b	Impact of use of remote access tools on remote worker's job satisfaction	Hotelling's $T^2 = 0.12$ $F(15,356) = 2.74$	$p = .001$	1 out of 15
H8c	Impact of remote access to systems on remote worker's job satisfaction	Hotelling's $T^2 = 0.05$ $F(15,358) = 1.27$	$p = .218$	
H9	Remote employees have a different perception of organizational climate than do locally-managed employees	Hotelling's $T^2 = 0.01$ $F(5,621) = 1.55$	$p = .173$	

physical connectivity (i.e., the degree to which IT tools were available). Multiple items were used to allow a more complete assessment of the degree to which the respondents had IT tools available. The first item assessed respondents' access to IT communication systems. Specifically, this was access to voice mail, e-mail, groupware, and videoconferencing systems, and the item was created by summing responses to four questions which determined whether or not they had access to each of the specific technologies/systems at their place of work. The second item was a sum of the responses to questions dealing with respondents' use of various IT tools associated with enabling remote work (i.e., laptops, modems, fax, cellular phones, and pagers). The third item addressed remote-access capability and was created by summing items

which asked respondents about their ability to use their e-mail, groupware, and telephone / voicemail systems from remote locations. All three of the connectivity items loaded onto one factor in the principal components analysis, described previously.

RESULTS

The results of the MANOVA analysis used to test the hypotheses are presented in Table 2. Support was found for five of the nine hypotheses. These were hypotheses 1 through 4, and hypothesis 8 which are described more fully below. The other four hypotheses were not supported. Remote employees did not have significantly different levels of stress (H5) nor different perceptions of organizational climate (H9)

Table 3. The significant dependent variables from the MANOVA analysis

Individual Test Results *	Item Description	Mean Value of Low Score Group	Mean Value of High Score Group
Hypothesis 1a	**Impact of trust on perceptions of remote employees' productivity**		
$F(1,365) = 8.89, p < .05$	I am a highly productive employee	5.65	5.96
$F(1,365) = 27.20, p < .01$	My manager has recently (i.e., within the last three months) been impressed with the quality of my work	5.03	5.69
$F(1,365) = 30.85, p < .01$	My manager believes I am an efficient worker	5.34	5.92
Hypothesis 1b	**Impact of Trust on Perceptions of remote work**		
$F(1,364) = 15.03, p < .01$	Working remotely is an effective way to work	5.09	5.66
$F(1, 364) = 10.27, p < .01$	It is not difficult to do the job being remotely managed	5.45	5.98
$F(1, 364) = 12.32, p < .01$	Working remotely is an efficient way to work	5.10	5.64
Hypothesis 2	**Impact of trust on perceptions of remote employees' job satisfaction**		
$F(1,370) = 13.54, p < .001$	Satisfaction with the freedom to choose your own method of working	5.60	6.04
$F(1,370) = 50.51, p < .001$	Satisfaction with the recognition you get for good work	4.16	5.20
$F(1,370)= 203.14, p < .001$	Satisfaction with your immediate boss	4.53	6.21
$F(1,370) = 53.56, p < .001$	Satisfaction with the amount of responsibility you are given	5.13	6.06
$F(1,370) = 15.00, p < .001$	Satisfaction with your rate of pay	4.03	5.68
$F(1,370) = 39.00, p < .001$	Satisfaction with the opportunity to use your abilities	4.85	5.71
$F(1,370) = 37.01, p < .001$	Satisfaction with industrial relations between management and employees in your firm	4.40	5.16
$F(1,370) = 23.30, p < .001$	Satisfaction with your chance of promotion	3.48	4.27
$F(1,370)= 143.74, p < .001$	Satisfaction with the way you are managed	4.22	5.76
$F(1,370)= 119.65, p < .001$	Satisfaction with the attention paid to the suggestions you make	4.43	5.79
$F(1,370) = 8.94, p < .05$	Satisfaction with your hours of work	4.90	5.39
$F(1,370) = 18.02, p < .001$	Satisfaction with the amount of variety in your job	5.25	5.80
$F(1,370) = 19.42, p < .001$	Satisfaction with your job security	4.24	4.93
Hypothesis 3	**Impact of frequency of communications on interpersonal trust**		
$F(1,371) = 12.42, p < .01$	My manager and I have a sharing relationship. We can both freely share our ideas, feelings and hopes	4.74	5.32
$F(1,371) = 9.83, p < .05$	We would both feel a sense of loss if one of us was transferred and we could no longer work together	3.75	4.28
$F(1,371) = 9.90, p < .05$	My manager approaches his/her job with professionalism and dedication	5.46	5.88
$F(1,371) = 9.86, p < .05$	Given my manager's track record, I see no reason to doubt his/her competence and preparation for the job	5.11	5.60
$F(1,371) = 12.03, p < .01$	Most people, even those who aren't close friends of my manager, trust and respect him/her as a coworker	4.74	5.28
$F(1,371) = 16.90, p < .01$	Work associates of mine who must interact with my manager consider him/her to be trustworthy	4.83	5.43
Hypothesis 4	**Impact of trust on job stress**		
$F(1,371) = 9.25, p < .05$	I work under a great deal of tension	4.71	4.19
$F(1,371) = 9.63, p < .05$	I have felt fidgety or nervous as a result of my job	3.99	3.40
Hypothesis 8b	**Impact of using remote access tools on remote worker's job satisfaction**		
$F(1,370) = 12.31, p < .05$	Satisfaction with the freedom to choose your own method of working	5.62	6.03

* p value after Bonferroni adjustment

than did the locally managed employees. Greater experience, either with the organization, with the current position, or with working remotely, did not significantly reduce the job stress perceived by remotely-managed employees (H6). Hypothesis 7 was also not supported, although the omnibus test was significant for the impact of connectivity on worker's attitudes toward remote work in two cases (H7c and H7d). However, in both these cases, there were no significant differences between the group responses for the individual items which means that the hypotheses were not supported.

Hypotheses 1 through 4 were supported. Trust had a significant impact on remote employees' perceptions of their performance in a remote work environment, both in terms of perceptions of overall productivity (H1a) and perceptions of remote work (H1b). Trust also significantly affected the remote employees' levels of job satisfaction (H2) and job stress (H4). Individuals with high levels of trust had significantly higher job satisfaction and perceptions of working remotely, and lower job stress. The last column in Table 2 indicates how many of the dependent variables were found to have statistically significant differences via the individual F-tests. The individual items that were significantly different are listed in Table 3. Three of the eight items regarding overall productivity were significant (H1a). Three of the six attitudes towards remote work items (H1b) had significant differences between respondents with high trust and those with low trust. In all cases, the perceptions were more positive for those people who had higher levels of trust between themselves and their manager. Thirteen of the 15 job satisfaction items had significant differences between high

and low trust respondents (H2). Again, in all cases, job satisfaction scores were higher for the high trust respondents versus low trust respondents. Two of the five items that measured stress (H4) had significant differences between the high and low trust groups (see Table 3). Respondents with high trust levels between their managers and themselves felt that they worked under less tension and felt less fidgety and nervous than did the respondents with lower trust levels.

Partial support was also found for the impact of connectivity on remote workers' job satisfaction (H8). Specifically, hypothesis 8b, where the independent variable was the use of remote access tools, was found to be significant, and one individual item was found to be significant (Table 3). Employees that used remote access tools more frequently in their job had higher satisfaction with the freedom to choose their own method of working.

Proposition 1 was examined by testing hypotheses 1 through 4 and 6 through 8 using the responses from the respondents who did not work remotely. The results of the OMNIBUS MANOVA tests are presented in Table 4. Support was found for hypotheses 1, 2, and 4. Partial support was found for hypothesis 8. The results for both the remotely-working respondents and the non-remote respondents are summarized in Table 5. This shows that the pattern of results is quite similar. Hypotheses 1, 2 and 4 were supported for both groups of respondents. Also, hypothesis 8 was partially supported for both groups. The only difference was that hypothesis 3, the impact of the frequency of communications on trust, was only supported in the remote workers' analysis. Given the fairly similar results between the remote and non-

Table 4. A summary of the results of the analysis of variance for non-remote workers

H #	Hypothesis Description	Omnibus Test	Significance Level	No. of sig. items
H1a	Impact of trust on employees' perceptions of overall productivity	Hotelling's $T^2 = 0.13$ $F(8,238) = 3.98$	$p < .001$	4 out of 8
H2	Impact of trust on perceptions of employees' job satisfaction	Hotelling's $T^2 = 0.81$ $F(15,235) = 12.76$	$p < .001$	13 out of 15
H3	Impact of frequency of communications of employee/manager trust	Hotelling's $T^2 = 0.04$ $F(11,239) = 0.88$	$p = .556$	
H4	Trust reduces job stress	Hotelling's $T^2 = 0.16$ $F(5,244) = 7.99$	$p < .001$	5 out of 5
H6a	Greater tenure in organization reduces job stress	Wilks Lambda = 0.90 $F(20,800) = 1.23$	$p = .224$	
6b	Greater experience in the current position reduces job stress	Wilks Lambda = 0.99 $F(15,668) = 0.36$	$p = .987$	
H7a	Impact of having IT communication systems on worker's perceived productivity	Wilks Lambda = 0.87 $F(24,682) = 1.44$	$p = .079$	
7b	Impact of use of remote access tools on worker's perceived productivity	Hotelling's $T^2 = 0.06$ $F(8,238) = 1.69$	$p = .101$	
7c	Impact of remote access to systems on worker's perceived productivity	Hotelling's $T^2 = 0.07$ $F(8,236) = 2.12$	$p = .035$	None
H8a	Impact of having IT communication systems on worker's job satisfaction	Wilks Lambda = 0.72 $F(45,693) = 1.82$	$p = .001$	3 out of 15 items
8b	Impact of use of remote access tools on worker's job satisfaction	Hotelling's $T^2 = 0.10$ $F(15,236) = 1.61$	$p = .073$	
8c	Impact of remote access to systems on worker's job satisfaction	Hotelling's $T^2 = 0.10$ $F(15,234) = 1.64$	$p = .066$	

remote groups, it was concluded that there was little support for proposition 1. The relationships between the independent variables and the dependent variables specified in the hypotheses do not appear to be very different for remote workers versus local workers.

DISCUSSION

Information technology (i.e., the level of connectivity) was suggested to be an important enabler of effective remote work by many of the focus group participants and by various authors in the literature (Freedman, 1993; Greengard, 1994; Handy, 1995; Lucas and Baroudi, 1994; O'Hara-Devereaux and Johansen, 1994). Partial support was found for this suggestion from the empirical data in this study. For the remote employees, frequent communications were significantly related to higher levels of interpersonal trust (H3). Since communications in a remote setting are often done via IT, this finding supports the need for good connectivity. Connectivity did not seem to significantly impact perceptions of performance (H7), although if the significance criteria was relaxed somewhat (i.e., to 0.10), the relationship between connectivity and perceived overall productivity would become significant in many of the tests. Partial support was found for an effect of connectivity on job satisfaction (H8). These findings are consistent with previous research that has suggested that the impact of IT would be one of many things influencing outcomes (Barley, 1990; Kling, 1980 and 1987; Symons, 1991). IT does appear to be a necessary enabler but not sufficient condition to strongly impact individual outcomes.

Fulk, Flanagin, Kalman, Monge and Ryan (1996) suggest that there are two different types of connectivity: physical and social. The definition (and set of measures) of connectivity used in the current study dealt with the level of physical connectivity available to the respondents. However, individuals must also be willing and able to use such connectivity. Future research on remote work should broaden the definition of connectivity to include social connectivity, as well as physical connectivity. Social connectivity would capture the individual's willingness and ability to use the physical connectivity. This type of connectivity could well have a stronger impact on individual outcomes such as performance.

The strongest finding of this study centered around the role of trust. Trust was found to significantly impact perceptions of performance, job satisfaction and job stress, as was hypothesized. The findings were consistent for both remote and non-remote workers. Since trust was found to be a key variable, additional analysis was carried out to see if different types of trust had different impacts in remote settings versus non-remote settings. The trust instrument used in this study was McAllister's (1995) interpersonal trust scale. 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 Weigert 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). Both of these dimensions of trust were part of the instrument used in this study so it was possible to refine the analysis to examine the impact of affect-based trust versus the impacts of cognition-based trust. Hypotheses 1, 2 and 4 (impact of trust on performance, job satisfaction, and job stress) were retested for each of the two trust sub-dimensions and for each of the datasets (remote and non-remote workers). The results are summarized in Table 6.

The impact of cognition-based trust on the dependent variables appears to be similar for both remote workers and non-remote workers. For both groups, cognition-based trust was statistically significantly associated with perceptions of overall productivity, job satisfaction and job stress. However, the results suggest that the role of affect-based trust is stronger for non-remote employees than it is for remote employees. Affect-based trust was significantly related to overall productivity, job satisfaction, and job stress for non-remote employees while it was only found to be related to overall productivity and job satisfaction for remote employees. Affect-based trust was not significantly related to job stress for the remote workers, and it seemed to have a somewhat weaker effect on job satisfaction and overall productivity perceptions, as evidenced by the fewer individual items being significant. Therefore, it appears that managers of remote workers should concentrate on building cognition-based trust since that has a bigger impact than affect-based trust. Cognition-based trust can be built by focussing on activities that

Table 5. Proposition 1 – Comparing the results of hypothesis testing between remote workers and non-remote workers

Hypothesis	Remote Workers	Non-Remote Workers
H1a: Impact of trust on employees' perceptions of overall productivity	Supported	Supported
H2: Impact of trust on perceptions of employees' job satisfaction	Supported	Supported
H3: Impact of frequency of communications of employee/manager trust	Supported	Not Supported
H4: Trust reduces job stress	Supported	Supported
H6: Experience reduces job stress	Not Supported	Not Supported
H7: Impact of connectivity on worker's perceived productivity	Not Supported	Not Supported
H8: Impact of connectivity on worker's job satisfaction	Partially Supported	Partially Supported

Table 6. Comparing the results of hypothesis testing between remote workers and non-remote workers for the two different dimensions of trust

	Hypotheses Supported?			
	Non-Remote Workers		Remote Workers	
	OMNIBUS Test	No. of significant items	OMNIBUS Test	No. of significant items
H1a: Trust to employees' perceptions of overall productivity				
Cognition-based Trust	**YES** Hotelling's $T^2 = 0.09$ $F(8,238)=2.81; p=.005$	2 out of 8 items	**YES** Hotelling's $T^2 = 0.08$ $F(8,358)=3.79; p<.001$	2 out of 8 items
Affect-based Trust	**YES** Hotelling's $T^2 = 0.16$ $F(8,238)=4.73; p<.001$	6 out of 8 items	**YES** Hotelling's $T^2 = 0.16$ $F(8,358)=6.99; p<.001$	2 out of 8 items
H1b: Trust to remote employees' perceptions of remote working				
Cognition-based Trust	Not applicable		**YES** Hotelling's $T^2 = 0.05$ $F(6,359)=2.78; p=.012$	3 out of 6 items
Affect-based Trust	Not applicable		**YES** Hotelling's $T^2 = 0.05$ $F(6,359)=3.04; p=.006$	4 out of 6 items
H2: Trust to perceptions of employees' job satisfaction				
Cognition-based Trust	**YES** Hotelling's $T^2 = 0.83$ $F(15,235)=12.97; p<.001$	12 out of 15 items	**YES** Hotelling's $T^2 = 0.47$ $F(15,356)=11.14; p<.001$	10 out of 15 items
Affect-based Trust	**YES** Hotelling's $T^2 = 0.75$ $F(15,235)=11.68; p<.001$	14 out of 15 items	**YES** Hotelling's $T^2 = 0.65$ $F(15,356)=15.52; p<.001$	12 out of 15 items
H4: Trust reduces job stress				
Cognition-based Trust	**YES** Hotelling's $T^2 = 0.10$ $F(5,244)=4.65; p<.001$	3 out of 5 items	**YES** Hotelling's $T^2 = 0.07$ $F(5,367)=5.30; p<.001$	3 out of 5 items
Affect-based Trust	**YES** Hotelling's $T^2 = 0.12$ $F(5,244)=5.88; p<.001$	4 out of 5 items	**NO** Hotelling's $T^2 = 0.02$ $F(5,367)=1.60; p=.159$	

lead to employees trusting managers based on their demonstrated competence, responsibility and professionalism.

The results suggest that managers and employees should work hard at developing a relationship based on trust, both in a remote and a non-remote setting. Knowing what can be done to build this trust is therefore an important avenue for future research. In the current study, one antecedent of trust was hypothesized, frequency of communication (H3). Support for this hypothesis was found in the remote workers' responses but not in the non-remote workers' responses. Splitting trust into the two dimensions and re-analyzing the hypothesis found similar results (i.e., the frequency of communication significantly impacted both dimensions of trust for the remote workers and had no significant effect for the non-remote workers). These findings support suggestions in the literature that frequent communications are an important step to building trust, presumably because this facilitates the sharing of information between the manager and employee on each others' activities and feelings. This sharing builds a relationship between the two parties over time. The findings also suggest that communications in a non-remote setting are not

as important for building trust, possibly because the non-remote employee has other avenues for gathering information that he/she uses to form trust judgements. Examination of other factors that affect the creation of trust in both a remote and non-remote setting are important avenues for future research.

As with all studies, this one has a number of limitations and opportunities for future studies, some of which have been previously identified. Since this was a cross-sectional study, the ability to make causal statements is severely limited. In addition to replicating the cross-sectional research to enhance the external validity of the findings, more qualitative research, such as longitudinal case studies, would be valuable. While questionnaires lend themselves to quantitative analysis, case studies would gather richer, deeper information. This information would be valuable in examining issues such as the role of informal communications in a remote work setting and the way trust can be built effectively in a remote environment. The sample used in this study included respondents from several organizations who did a wide variety of job functions. While this is a strength in terms of the ability to

generalize the results, it can also be considered a limitation since there was no control for potential confounding factors such as job task or organizational culture. Consequently, it must be left to future research work to determine, for example, whether the results are consistent between high technology and non-technology workers, or whether remote work in the public and private sectors is fundamentally different.

In summary, the results from this research study make a contribution for practitioners by identifying that increasing the trust employees have in their managers will be beneficial to organizations since it positively impacts a number of important outcomes. Managers of remote employees can do this through frequent communication. Managers of remote employees should also focus on building cognition-based trust with their employees, since it has a potentially greater payback to the organization. The findings also help guide future research by identifying important aspects of remote work to focus on such as the causes of trust. As the practice of working remotely grows, it will become increasingly important for organizations to understand what they can do to make their remote work environment effective.

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