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Priscilla Arling
University of Minnesota

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The Impact of Telework on Performance:
A Social Network Approach

Priscilla A. Arling
Carlson School of Management
University of Minnesota
parling@csom.umn.edu

ABSTRACT

Despite almost thirty years of research in the area of telework, the findings regarding outcomes remain equivocal (Bailey and Kurland, 2002). This research in progress hopes to advance understanding by identifying a key mechanism by which telework affects performance, specifically its influence on the social network properties of cohesion, power and structural holes. With knowledge of how the number, frequency and diversity of relationships influence performance, practitioners and academics can develop processes to improve teleworker social networks. This in turn will enhance the use of social capital and also facilitate shared attitudes and behaviors, which will lead to higher organizational commitment and promotability in a teleworking environment.

Keywords

Telework, telecommuting, social network analysis, social capital, organizational commitment

INTRODUCTION

When you think of a public relations person you rarely think of a shrinking violet, someone who can easily be ignored or even forgotten by their employer. But according to Cynthia N., a public relations specialist who teleworked from her home, that is exactly what happened. "They literally forgot about me. They put in this computer system and forgot to put me on the network… It didn't work with them at all" (Armour, 2001). Cynthia also encountered psychological and social stressors; unable to separate work and home life and missing the camaraderie of other co-located employees, she eventually left the company.

Unfortunately Cynthia's teleworking experience is not unusual. While telework, generally defined as the accomplishment of work away from a central location by utilizing communication technology, continues to grow worldwide, it is not without its detractors. Estimates of the number of teleworkers has expanded from 19.6 million in 1999 to 28 million in 2001 (ITAC, 2001), even while both workers and employers alike continue to express concern about the potential negative impacts of working away from a central office (Prewitt, 2002). Teleworkers believe that they have more negative relationships with their managers and co-workers and on average they rate their work/life balance lower than their in-office counterparts (Boston College, 2000), yet they enjoy the increased autonomy (Shamir and Solomon, 1985) and flexible work schedules (Khalifa and Davison, 2000). For management, reports of increased employee productivity (DuBrin, 1991; Bélanger, 1999) and firm savings in the millions of dollars annually (Roitz, Allenby and Atkyns, 2002) continue to spur telework implementations.

As the citations above illustrate, even after almost 30 years of research the outcomes of telework remain equivocal (Bailey and Kurland, 2002). Much of prior research in the area has been attenuated by two assumptions: that teleworkers are a homogeneous group and that telework involves only the teleworker (McCloskey and Igbaria, 1998; Bailey and Kurland, 2002). This paper however asserts that telework differentially affects individuals in a wide variety of organizational roles, who practice telework in varying frequencies and who interact with others throughout the firm. Many previous studies have also failed to build cumulative knowledge due to an absence of both links to existing organizational theories and formal, testable propositions (Bailey and Kurland, 2002). These features are included in this study.

The purpose of this paper is to address limitations of previous studies by presenting a perspective that conceptualizes telework as both a *social* and *technological* process within the firm. As a social process a main effect is on the *social networks* of individuals and groups, which in turn influences *performance*. Additionally, this study recognizes that telework

practice occurs on a continuum, which is expressed as the *level of telework practice*, within the context of an *organizational role*. Thus the research questions to be addressed are:

1. What is the impact of telework on the social structures of individuals and groups within a firm?
2. To what extent are the effects of telework on individual performance mediated by social structures?
3. To what extent are the effects of telework differentiated by organizational role?

Figure 1 illustrates the model under study. Section II presents the theoretical background for the study and the social network analysis concepts used in the model are presented in section III. Section IV specifies the model constructs and propositions, and the paper concludes with discussion and implications in section V.
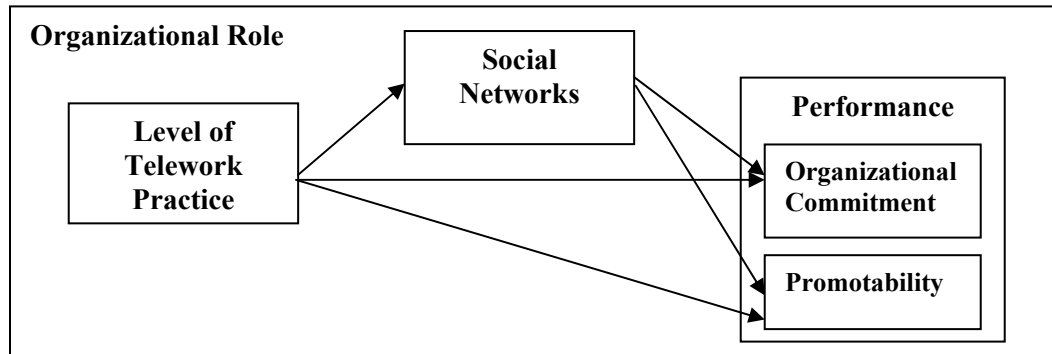

Figure 1
The Impact of the Level of Telework Practice on Social Networks and Performance within Organizational Role

THEORETICAL BACKGROUND

Organizational Theory, Social Structures and Performance

The notion that social structures influence performance is a key theme in several organizational theories. Social capital theory posits that embedded within networks of relationships is a resource available to individuals that facilitates action and without which certain actions would not be possible (Coleman, 1988). Not all effects of social capital are positive however and relationships can both enable and constrain performance (Burt, 1997; Reagans and Zuckerman, 2001). Structural hole theory postulates that diversity in individual network relationships increases social capital and thereby influences both individual and organizational effectiveness (Burt, 1992). Finally social information processing (Salancik and Pfeffer, 1978) notes that communications with others can influence shared attitudes and behavior, which in turn can affect an individual's basis of power, trust and performance. Using these theories as a foundation, this paper asserts that telework affects performance in part through its influence on the network characteristics of structural holes, power, and communication patterns.

Telework, Social Structures and Performance

From the perspectives discussed above, Cynthia's inability to get on to the computer network was not just technical but a structural and relational problem as well. Thus to fully understand the impact of telework, research must consider the interrelationship between the structural, relational and technological elements of the teleworking environment and how together they influence performance.

The structurational model of technology best represents such a intertwining of social and technological elements. The model posits that as technology is used it affects social structures, which in turn affects the use of technology (Orlikowski, 1992). The use of technology is an occasion that triggers social dynamics (Barley, 1986) because it alters both the process and form of personal interactions. Thus teleworking can alter the method by which a relationship is achieved, as well as the number, content and quality of relationships. Teleworkers frequently believe that their performance is not accurately evaluated and that job opportunities are limited by teleworking (McCloskey and Igbaria, 2003). Finally, managers fear that teleworkers'

organizational commitment will be reduced (Baruch, 2000) due to diminished face-to-face interaction and a reduced quality of relationships.

Organizational Roles and Performance

Finally, organizational roles have an overarching effect on factors related to performance. Roles set general expectations and establish norms that signify what patterns of behavior are required (Katz and Kahn, 1978). Roles in part determine the significance of relational aspects of a job (Oldham and Hackman, 1981) and thus influence both social structures and their link to performance. Few studies on telework however have controlled for factors such as job type and frequency of telework participation (McCloskey and Igbaria, 1998), which are often aspects of or shaped by an organizational role.

A SOCIAL NETWORK APPROACH

Social Network Analysis

In order to capture telework's influence on social structures and its subsequent impact on performance, this study must use a tool that facilitates assessment of networks of individuals embedded within larger social structures. Social Network Analysis (SNA) is frequently used for this purpose. SNA is a sub-field of study within the broader arena of structural sociology that uses graph theory and algebraic notation to define and formalize sociological constructs (Wellman, 1988). Its focus is on the relationships between social entities and the structure of social relations that determine the content of those relationships (Mizruchi, 1994; Wasserman and Faust, 1994). The entities, or *actors* in a network are connected via their relationships, known as *ties*. There are many possible types of ties and they can be based on a variety of criteria including evaluation, affiliation, behavioral interaction, and formal authority (Wasserman and Faust, 1994). Some examples of the types of ties commonly used are friendship, kinship, talking to someone, and supervision. For this research the type of ties examined are *communication ties*, specifically relationships maintained by communicating either electronically or face-to-face. Ties enacted primarily through electronic means are termed *E-ties* and those enacted primarily face-to-face are termed *P-ties*. Ties can also take on values that indicate characteristics such as strength (or weakness) and frequency. Finally actors can have either direct or indirect ties to another actor.

Telework's Influence on Ties and Networks

Telework's potential influence on an individual's social structure occurs through the following mechanisms: by replacing P-ties with E-ties, by reducing the number of actors and frequency of contact with those actors, and by altering the individual's position in the larger network. First, teleworkers have less face-to-face (F-to-F) contact with other employees in the performance of their jobs (Watson-Fritz, Narasimhan and Rhee, 1996) and the substitution of F-to-F with electronic communication has become a defining feature of telework (Duxbury and Neufeld, 1999). For the most part, electronic communication carries fewer context cues than face-to-face interaction (Daft and Lengel, 1984), which can affect the quality of communication (Sproull and Kiesler, 1986) and subsequently alter relationships. Specifically, the closeness or intensity of relationships, which is the best indicator of strength of a tie (Marsden and Campbell, 1984), is expected to be lower with E-ties than P-ties. Second, while some F-to-F contact can be replaced by electronic communication, teleworking has the potential to reduce the overall number of actors (individuals) available for communication, due to the teleworker's diminished physical presence. Frequency of contact with available actors can also be affected. Informal contact with co-workers and managers can be reduced, e-mail communication is asynchronous and not necessarily reciprocal (Cascio, 2000) and others that are not co-located may be difficult to reach by synchronous electronic means such as the telephone or video conferencing. Finally, by altering communication as described above, telework may affect an individual's placement in the group's social and communication network. With fewer contacts and reduced frequency of contact, a teleworker's overall connectedness to others in the organization can be reduced, as compared to in-office counterparts. In particular, the number of strong, direct ties to others can be diminished.

The next section will describe how the social network analysis concepts described above can be used to model telework's influence on social structures and its subsequent effect on performance. The model constructs will be examined first, followed by a discussion of the associated propositions.

TELEWORK AND PERFORMANCE

Model Constructs

One of the key stumbling blocks to truly understanding the impact of telework has been the lack of control of environmental factors that can influence outcomes (McCloskey and Igbaria, 1998). In particular, the variety of frequencies and job types within the singular concept of telework (Bailey and Kurland, 2002) has complicated the ability to discern patterns of impact across studies. In this model variability in teleworking frequency is accommodated through the construct *'level of telework practice'*. Additionally the constructs of *'social networks'* and *'organizational role'* capture variability associated with job type.

Finally, this paper models two specific constructs related to performance that are highlighted by prior literature as key telework outcome variables: *organizational commitment* and *promotability* (Cascio, 2000; McCloskey and Igbaria, 2003). Promotability, or career advancement prospects, as well as organizational commitment have frequently been linked with individual performance (e.g. Roberts and Reilly, 1979; McCloskey and Igbaria, 2003). How the social network attributes of *cohesion, power* and *structural holes* are related to those constructs is described next.

Cohesion and Organizational Commitment

In SNA terms, cohesive groups contain actors among whom the ties are strong, direct, and/or frequent (Wasserman and Faust, 1994). In other words, high cohesion denotes a high level of interaction between individuals in a group and frequent participation in the network. Both network participation (Roberts and O'Reilly, 1979) and high involvement are related to organizational commitment (Eisenberg, Monge and Miller, 1984) while network involvement is considered a key to successful socialization of new employees (Jablin and Krone, 1987).

Telework is expected to have an influence on the cohesiveness of an individual's network by altering the strength and frequency of ties as well as the number of direct ties. Proximate ties, as exemplified by face-to-face communication, are easier to maintain and more likely to be strong and stable (Monge and Eisenberg, 1987) than non-proximate ties, a category which would include relationships dependent primarily upon electronic communication. Even when easy-to-use and effective electronic communication is available, employees often prefer face-to-face meetings as a means by which to accomplish work (Haythornthwaite and Wellman, 1998). Thus teleworkers may find themselves excluded from communication being conducted by co-located workers. Finally, the number of direct contacts with others may be reduced. These effects and others discussed below are expected to increase as the level of telework practice increases. This leads to the first set of propositions for the model:

> *Proposition 1a: The level of telework practice is negatively associated with the cohesiveness of an individual's social network.*
> *Proposition 1b: The level of cohesiveness of an individual's social network is positively associated with organizational commitment.*

Power, Structural Holes and Promotability

The concept of power, with respect to access to information and influence over others, is frequently operationalized by the SNA constructs of centrality and closeness. Individuals who occupy central network positions are expected to have greater access to information in a communication network (Brass, 2003). Similarly, individuals who are closer to and have more direct ties to others in the network are expected to have a higher degree of access to information. Both of these measures have been found to be related to promotions (Brass, 1985). Additionally, individuals whose ties span 'structural holes' in the organizational network get promoted sooner than their counterparts who have less diverse network ties (Burt, 1992). By spanning holes and connecting people who are otherwise disconnected, such individuals exploit opportunities to enhance their social capital (Monge and Contractor, 2001) and their promotability.

As with cohesiveness, telework is expected to be negatively associated with power and the ability to span structural holes. Teleworking reduces an individual's level of social interaction (Olson and Primps, 1984) and such 'virtual' work can increase the tenuousness of relationships (DeSanctis and Monge, 1999). Therefore teleworkers are expected to have fewer direct ties to others and hence be less centrally located in the network. Fewer interactions could also translate into lower network diversity and fewer opportunities to span structural holes. This leads to the second set of propositions for the model:

Proposition 2a: The level of telework practice is negatively associated with the power of an individual's social network.
Proposition 2b: The level of telework practice is negatively associated with the measure of structural holes spanned in an individual's social network.
Proposition 2c: The power of an individual's social network is positively associated with promotability.
Proposition 2d: The measure of structural holes spanned in an individual's social network is positively associated with promotability.

The Level of Telework Practice and Performance

It is also anticipated that the level of telework practice will have an effect on performance apart from its influence on social networks. One early study found mixed organizational commitment among professional teleworkers, but higher organizational commitment for clerical teleworkers than in-office clerical staff (Olson and Primps, 1984). Also teleworkers enjoy the increased flexibility, productivity and efficiency associated with the practice (Bailyn, 1989; Baruch, 2000; Hill and Miller, 1998). Thus when the effect on social networks is parsed out, it is expected that teleworking will increase organizational commitment. However many managers and employees feel that teleworking limits opportunities for promotions (Cascio, 2000). Despite recent findings in one firm where teleworking had no direct effect on career advancement prospects or evaluation (McCloskey and Igbaria, 2003), the perception of limited promotion opportunities is expected to persist. Therefore the next set of propositions for this model is:

Proposition 3a: The level of telework practice is directly and positively associated with organizational commitment.
Proposition 3b: The level of telework practice is directly and negatively associated with promotability.

The Effect of Organizational Role

Finally, as stated earlier, organizational role has the potential to influence performance in a variety of ways. For instance, managers, salespeople and clerical staff typically have different levels of autonomy (Kahn, Wolfe, Quinn and Snoek, 1964), particularly in regards to where and how they accomplish their work. The balance and relative importance of relational versus task-oriented aspects of these jobs also varies (Oldham and Hackman, 1981) as well as the way in which promotability may be assessed. By introducing variability in norms and expectations, roles are anticipated to differentially affect the constructs and relationships presented in the model. This leads to the final set of proposition for this study:

Proposition 4: The effect of the level of telework practice on social networks and performance will vary by organizational role.

DISCUSSION, DIRECTIONS FOR FUTURE RESEARCH AND PRACTITIONER VALUE

This paper presents a new approach to studying telework that seeks to identify an underlying mechanism by which telework affects performance, specifically its effect on social networks. While the research is in progress, preliminary interviews point to approaches for positively affecting performance in a teleworking environment. First, a variety of communication channels must be available and utilized *by all staff*, so that teleworkers remain linked with and central to the communication structure. The type of media used does not appear to be as important as the ubiquity of its use for both in and out of office staff. Second, it is important for teleworking staff to understand the importance of maintaining contact with a variety of in-office staff. Finally, managers need to consider how organizational role influences expectations about communication patterns and how teleworking may affect the worker's ability to meet those expectations. Teleworking may not be appropriate for a given job type if modifications in either communication processes or expectations are not feasible.

Only a handful of the potential social network constructs and associated outcomes that could be studied are modeled here. Future research could examine the effects of tie multiplexity, network range, and structural equivalence on performance evaluations, job satisfaction and turnover rates, among other variables. For practitioners the model and expected results from this study will provide a basis for specific interventions that can enhance performance. Knowing how the number, frequency and diversity of ties influences outcomes, individuals and team leaders can take steps to alter social structures to enhance the use of social capital and to facilitate shared attitudes and behaviors in order to increase performance in a teleworking environment.

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